# Effects of Temperamental Characteristics on Depression-Anxiety Levels and the Quality of Life in Infertile Women

## İnfertil Kadınlarda Mizaç Özelliklerinin, Depresyon-Anksiyete Düzeyi ve Yaşam Kalitesi Üzerine Etkisi

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## ABSTRACT

**Objective:** It is known that the risk of anxiety disorders and depression in infertile women increases and their quality of life deteriorates. Temperamental characteristics are considered as predictors of mood disorders. The aim of this study was to investigate temperamental characteristics in infertile women and their effects on depression and anxiety levels, and the quality of life, and to reveal the differences and level of relationship compared to healthy women.
**Method:** Fourty-four female patients with primary infertility and 30 healthy female controls were included in this study. Temperamental characteristics of the participants were assessed with Temperament Evaluation of Memphis, Pisa, Paris and San Diego-Autoquestionnaire version (TEMPS-A). Depression and anxiety severity were evaluated with Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI). To evaluate the quality of life, Short Form 36 (SF-36) health survey questionnaire was also applied.
**Results:** Hyperthymic temperament scores were higher in infertile women than the control group (p=0.001). BDI scores were positively correlated with depressive and cyclothymic temperament scores, and BAI scores were positively correlated with depressive and anxious temperament scores. A negative correlation was found between hyperthymic temperament and BAI and BDI scores. Hyperthymic temperament scores were positively correlated with both physical and mental subdimension scores of the quality of life scale.
**Conclusion:** In this study, hyperthymic temperament in infertile women was shown to be protective against anxiety and depression and it also improves the quality of life. Additional studies are needed to clarify the relationship between hyperthymic temperament and ovarian hormones or other biological parameters.

**Keywords:** Infertility, woman, temperament, anxiety, depression, hyperthymia

## ÖZ

**Amaç:** İnfertil kadınlarda anksiyete bozuklukları ve depresyon riskinin arttığı ve yaşam kalitesinin bozulduğu bilinmektedir. Mizaç özellikleri ise duygudurum bozukluklarının öngörücüsü olarak kabul edilmektedir. Bu çalışmanın amacı infertil kadınlardaki mizaç özelliklerini ve depresyon, anksiyete düzeyi ile yaşam kalitesi üzerine etkilerini inceleyerek, sağlıklı kadınlara göre farklarının ve ilişki düzeyinin ortaya koyulmasıdır.
**Yöntem:** Çalışmaya primer infertilite tanısı almış 44 kadın hasta ve 30 sağlıklı kadın kontrol dahil edildi. Katılımcıların mizaç özellikleri, Memphis, Pisa, Paris ve San Diego Mizaç Değerlendirme Anketi (TEMPS-A) ile değerlendirildi. Depresyon ve anksiyete şiddeti Beck Depresyon Envanteri (BDE) ve Beck Anksiyete Envanteri (BAE) ile değerlendirildi. Ayrıca yaşam kalitesini değerlendirmek için Kısa Form 36 (SF-36) yaşam kalitesi ölçeği uygulandı.
**Bulgular:** İnfertil kadınlarda hipertimik mizaç özellikleri kontrol grubuna göre daha yüksekti (p=0,001). BDE puanları depresif ve siklotimik mizaç puanları ile pozitif, BAE puanları ise depresif ve anksiyöz mizaç puanları ile pozitif korelasyon gösterdi. Hipertimik mizaç ile BAE ve BDE puanları arasında negatif korelasyon bulundu. Hipertimik mizaç puanları, yaşam kalitesi ölçeğinin hem fiziksel hem de zihinsel alt boyut puanları ile pozitif korelasyon gösterdiği saptandı.
**Sonuç:** Bu çalışmada infertil kadınlarda hipertimik mizacın anksiyete ve depresyondan koruyucu olduğu; yaşam kalitesini arttırdığı gösterilmiştir. Hipertimik mizaç ile ovaryan hormonlar ya da biyolojik parametreler arasındaki ilişkinin aydınlatılması için ek çalışmalara ihtiyaç vardır.

**Anahtar kelimeler:** İnfertilite, kadın, mizaç, anksiyete, depresyon, hipertimi

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## INTRODUCTION

Infertility is defined as the failure of pregnancy despite having unprotected sex for at least one year. It affects approximately 10-15% of couples in the reproductive age group (18-45 years)[1]. Most studies have shown a relevant relationship between infertility and mental symptoms[2]. In infertile couples, major depression is the most common psychiatric illness (15-54%), and the frequency of anxiety disorder is reported as 8-18%[3,4].

Psychopathologic disorders occur more in infertile women than in infertile men[2]. Depression is more common in infertile women, and somatic symptoms due to suppressed anxiety are more common in men[5]. In a prevalence study performed on 112 infertile women, 40% of patients met the diagnostic criteria of a psychiatric disorder. The most common diagnosis made was anxiety disorder (23%), followed by major depression (17%) and dysthymic disorder (9.3%)[4].

Infertility is an important health problem that negatively affects couples' relationships with the environment, marital harmony, sex and social life, and thus the quality of life[6]. In a review on the quality of life in infertility, Chachamovich et al. found that the quality of life of infertile women was affected more negatively than infertile men[7]. In particular, it is mentioned that psychiatric symptoms are seen more frequently in the female partner and the quality of life is negatively affected[8].

Personality traits are among the factors more commonly affecting depression and anxiety disorders in infertile patients[9]. Personality is a combination of the genetically determined temperament that comes from genetics and the character of an individual that is acquired later[10]. Akiskal claimed that affective temperament is the basis of mood disorders and defined five basic affective temperaments: depressive, hyperthymic, cyclothymic, irritable, and anxious[11]. Temperamental characteristics are mentioned among many factors in the etiology of psychiatric diseases[12].

To the best of our knowledge, the affective temperaments of infertile women have not been studied. Therefore, the aim of this study was to investigate temperamental characteristics of female patients with primary infertility and their effects on anxiety symptoms, depressive symptoms, and the quality of life, and to compare them with healthy controls. We hypothesized that high anxious and depressive temperaments represent a propensity for anxiety and depression and also low quality of life. The results and relationships that will emerge from this study may contribute to the literature on psychiatric evaluation of these patients.

## MATERIALS and METHODS

### Sample
This cross-sectional study was carried out with the women who applied to Başkent University Konya Research Hospital, obstetrics and gynecology outpatient clinic for treatment of their infertility problems. The subjects were selected by consecutive sampling. The study was approved by the Ethics Committee of Baskent University Faculty of Medicine and written consent was obtained from all participants.

### Sample size
Pasha et al.[13] used for power analysis with 22.42±10.70 BDI mean in infertile women. Effect size was 0.600 and required minimum sample size was found to be 32. Forty-four patients were included in the study.

Inclusion criteria were as follows: diagnosis of depression, and anxiety due to infertility disorders made a minimum of three months previously, failure in conceiving a baby despite regular sexual intercourse (4-5 times a week) within more than 12 months, no conception in the last 12 months, inability to conceive and lack of pregnancy in patient history (primary infertility). Also, the conditions for inclusion in the study were determined

as being literate, married, and in the age range of 18-45 years for all participants. Women with additional central nervous system disease or chronic disease, those with a history of psychiatric treatment within the last three months, and who were on hormonal therapy or medication were excluded from the study. Fifty seven patients with primary infertility were asked to participate in this study. Four patients declined to participate (not having time and tiredness), two patients have a history of psychiatric treatment within last three months and five patients had a chronic disease such as diabetes mellitus and hypertension. Two patients who gave incomplete answers to questions were excluded from the study. Finally, 44 women with primary infertility were enrolled in this study. The control group consisted of 30 healthy women who were relatives of hospital staff and patients. Women with a history of treatment due to infertility were not included in the control group.

A gynecologist evaluated the participants for demographic data regarding the study and then they were visited by a psychiatrist to undergo the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). Beck Anxiety Scale and Beck Depression Scale to determine the level of anxiety and depression, Quality of Life Scale (SF-36 short form) to measure the quality of life, and TEMPS-A temperament assessment questionnaire to determine temperamental characteristics were performed in this study. Data about the socio-demographic characteristics and the infertility treatment of the participants were recorded on the socio-demographic data form.

**Evaluation Tools:**

*Socio-Demographic Data Form:* A questionnaire developed by the researchers consisting of questions about age, educational status, marriage, diagnosis, and treatment time.

*Beck Anxiety Inventory (BAI):* The BAI, developed by Beck et al., is a self-assessment scale that is used to determine the risk of anxiety in adults and

to measure the level of anxiety-related symptoms. It has a total of 21 items. Each item has four types of rating options. Turkish validity-reliability study of the scale was performed by Ulusoy et al.[14].

*Beck Depression Inventory (BDI):* The BDI is a self-assessment scale that is used to determine the risk of anxiety in adults and to measure the level of anxiety-related symptoms. It has a total of 21 items. Each item has four types of rating options. The Turkish validity-reliability study of the scale was conducted by Hisli et al.[15].

*The 36-Item Short Form Health Survey (SF-36):* This is a self-assessment scale developed to measure the quality of life, especially in those with a physical illness. It is a multi-item scale that contains 36 statements, evaluating eight functions (physical function, role limitation-physical, pain, fitness/fatigue, social function, role limitation-emotional, mental health, general health perception) under two main titles (physical and mental). The scores for each subdimension and two main dimensions in the scale range from 0 to 100. SF-36 is scored with a positive rating so that the higher the score of each health domain, the better the quality of life associated with health status[16]. Koçyiğit et al.[17] translated the scale into Turkish and performed its validity and reliability study in Turkey.

*TEMPS-A (Temperament Evaluation of Memphis, Pisa, Paris and San Diego-Autoquestionnaire version):* TEMPS-A is a survey consisting of 100 items[18] developed by Von Zerssen and Akiskal to determine depressive, cyclothymic, hyperthymic, irritable, and anxious temperaments. A person responds "yes" or "no" to the items by thinking about their whole life. "Yes" responses are evaluated by 1 point and "no" responses are evaluated by 0 point. On the scale, depressive temperament is questioned with 19, cyclothymic temperament with 19, hyperthymic temperament with 20, irritable temperament with 18, and anxious temperament with 24 items. The cut-off values to assess the dominant temperament are 13, 18, 20,

13, and 18 points, respectively. Turkish validity and reliability study of this survey was conducted by Vahip et al.[19].

## Statistical Analysis:

In statistical analysis, the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) Ver. 15.0 package program was used. The t-test was used to compare the groups because the variables were shown to have normal distribution when evaluated using the Kolmogorov-Smirnov test. The values were expressed as mean±standard deviation. The chi-square test was used to compare categorical data, and the relationships between parametric numerical variables were examined using Pearson's correlation coefficient. $P < 0.05$ was accepted as the limit of statistical significance in all analyses.

## RESULTS

The mean age of 44 female patients was 30.18±3.90 years and the mean duration of education was 11.91±2.94 years. there was no significant difference between the control and study groups in terms of age and years of education. The mean duration of marriage of the patients was 37.45±19.2 months. Unprotected sex was

practiced within a mean duration of 26.95±16.37 months, and the mean duration of treatment was 13.23±11.93 months. Twenty-eight (63.63%) patients received treatment with intrauterine insemination or in vitro fertilization. The cause of infertility was found as polycystic ovary syndrome (PCOS) in 10 (22.72%), tubal factors in five (11.36%), and decreased ovarian reserve in three (6.81%) patients. The cause was unknown in 26 (59.09%) patients. The clinical and sociodemographic characteristics of the patients in the study are shown in Table 1.

All patients underwent SCID-I interviews and the patients received the diagnoses of the major depressive disorder (n=4, 9.09%), generalized anxiety disorder (n=3, 6.81%), adjustment disorder (n=2, 4.54%), dysthymic disorder (n=1, 2.27%), social phobia (n=1, 2.27%), panic disorder (n=1, 2.27%), and both major depressive disorder and panic disorder (n=1, 2.27%), and a psychiatric disorder (n=13, 29.54%).

Infertile female patients were compared with the control group in terms of TEMPS-A subscales, BAI and BDI scores, and physical and mental subscales of the quality of life scale. Hyperthymic temperament scores were significantly higher (p=0.001), whereas irritable temperamental characteristics were significantly lower (p=0.03) in infertile pa-

**Table 1. Clinical characteristics of patients.**

|  | Patients (n:44) | Controls (n:30) | p |
|---|---|---|---|
| Age (year) | 30.18±3.90 | 29.33±4.54 | 0.39 |
| Education (year) | 11.91±2.94 | 11.13±2.84 | 0.26 |
| Mean duration of marriage (month) | 37.45±19.2 | - | |
| Mean duration of unprotected sex (month) | 26.95±16.37 | - | |
| Mean duration of treatment (month) | 13.23±11.93 | - | |
| **Treatment status** | | - | |
| Treated patients | 28 (%63.63) | - | |
| Untreated patients | 16 (%36.36) | - | |
| **Cause of infertility** | | - | |
| Unknown cause | 26 (%59.09) | - | |
| PCOS | 10 (%22.72) | - | |
| Tubal factors | 5 (%11.36) | - | |
| Decreased ovarian reserve | 3 (%6.81) | - | |

PCOS: Polycystic ovary syndrome

**Table 2. Comparison of the scale scores of the patients and the control group.**

|  | Patients (n:44) | Controls (n:30) | p |
|---|---|---|---|
| TEMPS-A Depressive | 6.00±3.22 | 5.13±2.62 | 0.22 |
| TEMPS-A Cyclothymic | 7.09±3.99 | 7.33±2.79 | 0.77 |
| TEMPS-A Hyperthymic | 9.91±3.78 | 6.93±3.59 | 0.001 |
| TEMPS-A Irritable | 3.09±1.92 | 4.20±2.35 | 0.03 |
| TEMPS-A Anxious | 6.55±3.26 | 6.13±2.51 | 0.56 |
| BDI | 10.32±6.11 | 8.47±3.40 | 0.13 |
| BAI | 15.64±6.14 | 9.67±2.61 | <0.001 |
| SF-36 Physical subscale | 69.82±14.59 | 81.13±7.09 | <0.001 |
| SF-36 Mental subscale | 68.39±16.46 | 79.66±6.57 | 0.001 |

*TEMPS-A: (Temperament Evaluation of Memphis, Pisa, Paris and San Diego-Autoquestionnaire version) BDI: Beck Depression Inventory BAI: Beck Anxiety Inventory SF-36: The 36-Item Short Form Health Survey*

tients compared with the control group. Although the BDI scores were higher in the study group than in the control group, no statistically significant difference was detected. The BAI scores were significantly higher in the study group than the control group (p<0.001). When the groups were compared in terms of the quality of life scores, the scale scores for physical (p<0.001) and mental (p<0.001) subdimensions of the quality of life were significantly lower in the study group than the control group. Comparison of the scores are shown in Table 2.

Since age was a cofounder in the research, partial correlation with age control was performed.

BDI scores were found to be positively correlated with depressive and cyclothymic temperament scores, and negatively correlated with hyperthymic temperament scores. BAI scores were found to be positively correlated with depressive and anxious temperament scores. Both BDI and BAI scores were negatively correlated with the quality of life subscale scores. Anxious temperament scores were found to be negatively correlated with both physical and mental subdimension scores of the quality of life scale. When the correlation coefficients between temperamental characteristics were examined, a positive correlation was found between depressive and cyclothymic, and also between irritable and anxious temperaments. A

**Table 3. Age controlled partial correlation analysis results between the patients' scale scores (Pearson's correlation analysis).**

|  | TEMPS-A Depressive | TEMPS-A Cyclothymic | TEMPS-A Hyperthymic | TEMPS-A Irritable | TEMPS-A Anxious | BDI | BAI | SF-36 Physical subscale | SF-36 Mental subscale |
|---|---|---|---|---|---|---|---|---|---|
| TEMPS-A Depressive | - | 0.529** | -0.242* | -0.016 | 0.104 | 0.422** | 0.233* | -0.214 | -0.069 |
| TEMPS-A Cyclothymic |  | - | -0.240* | 0.001 | 0.154 | 0.414** | 0.157 | -0.200 | -0.133 |
| TEMPS-A Hyperthymic |  |  | - | -0.115 | -0.115 | -0.244* | -0.110 | 0.043 | 0.180 |
| TEMPS-A Irritable |  |  |  | - | 0.258* | -0.142 | -0.079 | 0.006 | 0.012 |
| TEMPS-A Anxious |  |  |  |  | - | 0.078 | 0.549** | -0.479** | -0.445** |
| BDI |  |  |  |  |  | - | 0.426** | -0.200 | -0.456** |
| BAI |  |  |  |  |  |  | - | -0.608** | -0.702** |
| SF-36 Physical subscale |  |  |  |  |  |  |  | - | 0.585** |
| SF-36 Mental subscale |  |  |  |  |  |  |  |  | - |

TEMPS-A: (Temperament Evaluation of Memphis, Pisa, Paris and San Diego-Autoquestionnaire version) BDI: Beck Depression Inventory BAI: Beck Anxiety Inventory SF-36: The 36-Item Short Form Health Survey
*p<0.005, **p<0.01.

**Table 4. Relationships between the sociodemographic characteristics and scale sores of the patients (Pearson's correlation analysis).**

|  | Age | | Education | | Duration of marriage | | Duration of unprotected sex | | Duration of treatment | |
|---|---|---|---|---|---|---|---|---|---|---|
|  | r | p | r | p | r | p | r | p | r | p |
| TEMPS-A Depressive | 0.391 | 0.009 | 0.098 | 0.527 | -0.069 | 0.656 | -0.010 | 0.950 | 0.083 | 0.592 |
| TEMPS-A Cyclothymic | -0.076 | 0.626 | -0.154 | 0.320 | -0.135 | 0.383 | -0.030 | 0.844 | -0.047 | 0.761 |
| TEMPS-A Hyperthymic | -0.194 | 0.207 | -0.076 | 0.624 | 0.271 | 0.072 | 0.182 | 0.236 | 0.162 | 0.294 |
| TEMPS-A Irritable | 0.016 | 0.916 | -0.269 | 0.077 | 0.627 | 0.000 | 0.602 | 0.000 | 0.736 | 0.000 |
| TEMPS-A Anxious | 0.142 | 0.359 | 0.092 | 0.591 | 0.137 | 0.376 | 0.204 | 0.184 | 0.178 | 0.249 |
| BDI | 0.397 | 0.008 | -0.218 | 0.155 | -0.074 | 0.631 | 0.116 | 0.454 | 0.009 | 0.952 |
| BAI | 0.331 | 0.028 | 0.338 | 0.025 | -0.109 | 0.482 | -0.052 | 0.738 | -0.061 | 0.694 |
| SF-36 Physical subscale | -0.371 | 0.013 | -0.221 | 0.150 | -0.025 | 0.872 | -0.043 | 0.783 | -0.108 | 0.487 |
| SF-36 Mental subscale | -0.342 | 0.023 | -0.142 | 0.357 | 0.115 | 0.458 | -0.027 | 0.862 | 0.020 | 0.896 |

TEMPS-A: (Temperament Evaluation of Memphis, Pisa, Paris and San Diego-Autoquestionnaire version) BDI: Beck Depression Inventory BAI: Beck Anxiety Inventory SF-36: The 36-Item Short Form Health Survey

negative correlation was found between hyperthymic temperament and both depressive and cyclothymic temperaments. Relationships between the patients' scores are shown in Table 3.

When the relationship between the sociodemographic and clinical data and the scale scores was examined, it was determined that as the age of the patients increased, the scores of BDI, BAI, and depressive temperament increased, and the scores for both subdimensions of the quality of life scale decreased. It was also shown that irritable temperament traits increased as durations of marriage, practices of unprotected sex and treatment increased. Relationships between the sociodemographic characteristics and scores of the patients are shown in Table 4.

When patients were grouped according to whether they received intrauterine insemination, in vitro fertilization or no treatment, patients who received any treatment were more likely to have irritable temperament than those who did not receive any treatment (p=0.024).

## DISCUSSION

In this study, we firstly aimed to investigate the temperamental characteristics of women with primary infertility, and secondarily, to investigate the relationship between temperamental characteristics and severity of anxiety and depressive symptoms, and the quality of life. The main finding of our study was that hyperthymic temperamental characteristics were found more frequently in women with infertility than the control group. In addition, anxiety levels were higher, and the quality of life was lower in women with infertility. Cyclothymic and depressive temperaments were positively correlated with severity of depression; while depressive and anxious temperaments with severity of anxiety. However, hyperthymic temperament was negatively correlated with depression severity.

It is thought that temperamental characteristics might be a psychiatric marker for mood disorders in particular and they are one of the main factors determining the disease process[20]. Hyperthymic temperament is characterized by being extrovert, energetic, enthusiastic, and sociable[21], and it is more frequently associated with bipolar I disorder when compared with mood disorders[22]. When the difference between the sexes was investigated, hyperthymic temperament was found more commonly in men[23]. When the temperamental characteristics of women with PCOS were investigated, depressive and anxious temperaments were reported more often in these women. In addition, in one study[24] hyperthymic temperamental characteristics were shown to be more frequent in women with PCOS than the control group[25]. High androgen level is a common trait in males, and women with PCOS. Recent studies have shown that androgens are associated with behavioral traits that overlap with hyperthymic temperament, such as extroversion and the quest for innovation[26]. In this study, approximately 20% of patients treated for infertility were diagnosed as having PCOS, and a significant proportion of the patients were diagnosed as having infertility of unknown cause. It is therefore difficult to talk about the relationship between androgen-influenced hormone levels and hyperthymic temperament in the patient group in this study, but it can be emphasized that additional studies that measure the hormone levels of patients are needed.

In a study on temperamental characteristics in women in the perinatal period, it was determined that hyperthymic temperament was at the forefront, and it was mentioned that especially the agonistic effects of estrogen increase on serotonin (5-HT), noradrenaline (NA), and acetylcholine (ACH), and increase in progesterone played roles in hormonal changes in the perinatal period[27]. In a study in which the relationships between ovarian hormone levels during the menstrual cycle and temperament in healthy women of reproductive age were investigated, the temperamental

characteristics that coincide with hyperthymia such as higher levels of activity, endurance, and lower emotional reactivity were found more pronounced in women with high levels of estrogen and progesterone[28]. There is also a study in which low extroversion and high neuroticism were reported to correlate with low ovarian hormone levels[29]. Studies suggest that high ovarian hormones as well as high androgen levels are related with hyperthymic temperament. It is known that hormonal treatments given to women receiving ovulation induction treatment for infertility cause increases in ovarian hormones. In this study, about 60% of patients had a history of intrauterine insemination or in vitro fertilization. It is thought that ovarian hormones, which increased due to the treatment, might be effective in the results of our study.

The higher frequency of hyperthymic temperament in women with infertility was an interesting finding of this study. In a study investigating the relationships between temperamental characteristics and brain-derived neurotrophic factor (BDNF) levels in patients with hypertension, high levels of BDNF were detected in patients with hyperthymic temperament, and a protective effect of hyperthymic temperament against hypertension through BDNF was suggested[30]. The central role of BDNF in neuronal growth is known, and it was shown in a meta-analysis that the reduced level of BDNF in major depressive disorder increases with antidepressant therapy[31]. Although the high frequency of hyperthymic temperamental characteristics in infertile women, which was a finding of our study, may be associated with increased levels of BDNF in infertility. However additional studies are needed to be sure about this relationship. The detection of an increase in BDNF in patients with PCOS and endometriosis, which may be the cause of infertility, supports this possibility[32,33].

Dolenc et al.[34] separated temperamental characteristics into two categories in a study on euthymic patients with bipolar disorder and major depressive disorder. It was shown that higher depressive, irritable, anxious, and cyclothymic temperament scores in the first group led to emotional instability, and that the hyperthymic temperamental characteristics in the second group were associated with lower aggression scores. Validity studies on TEMPS-A have also concluded that there are two basic temperament types[35,36]. In this study, hyperthymic temperament was found to be negatively correlated with depressive temperament score and with severity of depression. When temperamental characteristics are evaluated from this point of view, the protective effect of hyperthymic temperament against anxiety and depressive disorders, and on mental stability are more pronounced than its effect on the risk of bipolarity.

Higher anxiety levels in patients compared with the control group and worse performance in physical and mental subdimensions of the quality of life were the other findings of this study. The results obtained in our study are consistent with the literature because the most common mental illnesses in infertile women are anxiety disorders and depression, and both mental illnesses and environmental factors negatively affect the quality of life[6,9]. However, there was no significant difference between the patients and the control group in terms of the level of depressive symptoms. In some studies, short- and long-term infertility were found to be associated with lower levels of depression than medium-term infertility[37,38]. In our study, the absence of high levels of depressive symptoms compared with the control group could be associated with a relatively short duration of infertility, such as two years.

When we looked at the relationships between symptomatic severity of anxiety and depression and temperamental characteristics, it was observed that as anxiety levels increased, severity of depressive and anxious temperamental traits increased, and as the severity of depressive symptoms increased, the frequency of cyclothy-

mic and depressive temperamental characteristics increased. It was shown in previous studies that cyclothymic temperamental characteristics were more associated with bipolarity and that depressive and anxious temperamental characteristics were associated with mood and anxiety disorders[39,40]. In line with the literature, depressive, anxious, and cyclothymic temperaments may be predictive for the most common mental illnesses in female infertile patients. One of the results of our study was that the depressive, anxious, and cyclothymic temperaments had negative effects on the quality of life, regardless of the severity of anxiety and depression.

In most studies conducted in infertile women, there was no association between the age of the patients and the level of depression or anxiety[4,5,38], but Gülseren et al.[41] found improvement in symptoms of depression and anxiety as age increased. Our study showed an increase in anxiety and depression levels and a decrease in the quality of life scores as patients' age increased. Although there was no study in the literature to support the relationship between the age of patients and the levels of anxiety and depression, the increase in mental symptoms of infertile women as their age increases can be explained by their exposure to more intense social pressure and stigma. According to our results, as the duration of marriage, unprotected sexual intercourse, and treatment increased, the frequency of irritable temperamental characteristics increased and irritable temperament was more frequently seen in patients who received treatment. According to these results, irritable temperament can be interpreted as a factor that reduces the likelihood of pregnancy with or without treatment in infertile women. Comprehensive studies are needed to support these relationships between the age of the patients and other sociodemographic data and temperamental characteristics.

Cross-sectional nature of the study, the small number of patients which did not allow for group-ing for both infertility and age are some of the limitations of our study. There is a need for additional studies in which patients' hormone levels or other biological parameters will be evaluated. In spite of these limitations, we believe that the results of our study, which is the first of its kind in this field, contribute to the literature and that temperamental characteristics should be taken into account in the psychiatric evaluation of infertile women, as is the case with many groups of psychiatric patients.

In conclusion there are many studies regarding temperamental characteristics in patient groups with and without psychiatric diagnoses, but there is no study in the literature about temperamental characteristics in infertile women using TEMPS-A temperament scale. In this study, we found that hyperthymic temperament was at the forefront in infertile women, and it may be suggested that hyperthymic temperament has positive effects on symptoms of anxiety and depression and the quality of life. Gynecologists should be aware of depression and anxiety among infertile women and the need for their referral to psychiatrists. In psychiatric evaluation, clinicians can easily use TEMPS-A temperament scale and identify the infertile women who are at risk for depression and anxiety disorders and who may require more intense psychiatric support. Further comprehensive studies will help to interpret the results and the relationships found in our study more accurately. The relevance of biological or hormonal background of temperamental characteristics in infertile women may be new research topics.

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