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Original Article

Temperament and character differences of patients with polycystic ovary syndrome

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ABSTRACT

Aim: There is an unclear relationship between Polycystic Ovary Syndrome and psychiatric disorders including anxiety and depression. We aimed to evaluate temperamental and personal characteristics of patients with PCOS.
Methods: Fifty patients with PCOS and 41 healthy controls were included in the study. Hormonal and demographic characteristics were recorded after gynecologic and psychiatric evaluation. Socio-demographical Data Form, Beck Depression Inventory, Beck Anxiety Inventory and the Cloninger's Temperament and Character Inventory were performed for all participants.
Results: Patients with Policystic Ovary Syndrome had significantly higher depression and anxiety scores when compared to the controls ($p < 0.05$). There were no significant difference in any of the subdimensions neither for temperament nor for character between patient and control groups ($p > 0.05$). Testosteron levels and the degree of hirsutism, LH/FSH ratio and body mass index of the patients did not have significant correlations with depression or anxiety scores or any of the Cloninger subdimentions ($p > 0.05$). However, there was a negative correlation between age and novelty seeking and age and reward dependence (r:−0.33, p:0.018; r:−0.295, p:0.037, respectively).
Conclusions: This preliminary study showed no significant difference between patients and healthy controls regarding temperament and character. Patients had higher anxiety and depression scores. Further research is needed to enlighten this subject.

Introduction

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder affecting 5–15% of women with PCOS [1,2]. Despite many studies, the underlying mechanism of PCOS has not been clearly identified. Insulin resistance plays an important role in the syndrome acting synergistically with luteinising hormone (LH) to stimulate androgen synthesis leading to hirsutism. PCOS is accompanied by a variety of symptoms such as obesity, menstrual irregularity, and subfertility. Each of these symptoms are thought to play a role in the psychological changes among these relatively young women [3,4]. As a result, these patients may avoid social interactions, particularly the adolescent girls. PCOS may lead to anxiety and depression, since the body perception changes in this condition and the patient feels as if she is not liked by others [5,6]. This preliminary study was designed to evaluate temperament and personality characteristics in patients with PCOS. To the best of our knowledge, this is the first study assesing affective temperament in PCOS using Cloninger's Temperament and Character Inventory (TCI) which is the most detailed inventory in this field.

Methods

This prospective cross-sectional study was conducted at the Obstetrics and Gynecology and Psychiatry Clinics, Dumlupinar University Evliya Celebi Training and Research Hospital, Kutahya, Turkey. The study was approved by Afyon Kocatepe University Ethics Committee and conducted in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines.

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A total of 91 subjects were included in the study. Informed written consent was obtained from all participants. PCOS was diagnosed based on the Revised Rotterdam consensus criteria for PCOS [7]. At least two out of the following are required for the diagnosis: clinical and/or biochemical signs of hyperandrogenism; oligo/amenorrhea and polycystic ovaries in ultrasound. Forty age and body mass index (BMI)-matched healthy women referred to the gynecology outpatient clinic for annual cervical cancer screening programme were enrolled as controls. All controls had regular menses with proven ovulatory cycles, normal androgen levels, no complaints of hirsutism and a baseline transvaginal ultrasound scan showing normal ovaries. Ferriman Gallwey scores of all control patients were under 8.

Exclusion criteria included pregnancy, hyperprolactinemia, thyroid dysfunction, Cushing's disease, androgen secreting tumors, non-classical congenital adrenal hyperplasia, and the use of any medication interfering the endocrine and psychiatric parameters for at least 3 months prior to the study. Besides, patients with any psychiatric diseases were excluded after examination by the psychiatrist. Patients lacking the ability to read and understand the given instructions, cooperate with verbal interaction, as well as patients having a clinically proven active psychiatric disorder, or having psychiatric treatment were not involved in the study.

The BMI was calculated as weight in kilograms divided by the square of height in meters. Menstrual periods with intervals of more than 35 days and 182 days are considered as oligomenorrhea and amenorrhea, respectively. Clinical hyperandrogenism was assessed as degree of hirsutism using the modified Ferriman–Gallwey score (FGS), the presence of acne or androgenic alopecia. The FGS ≥ 8 was considered to be the cut-off point for having hirsutism. Venous blood samples for hormonal-biochemical parameters [total testosterone, free testosterone, thyroid stimulating hormone (TSH), free triiodothyronine, freethyroxine, 17αOH-progesterone, estradiol, and prolactine) were drawn between 08:00 and 10:00 a.m. after 12 h of fasting on the third to fifth day of a spontaneous or progesterone- induced menstrual cycle.

Measure

After obtaining written informed consent, the following questionnaires and the sociodemographic data form were given to the participants:

Sociodemographic data form

Data included in the questionaire are; age, sex, marital status, occupation, duration of the disease, monthly income, alcohol consumption and cigarette smoking.

Temperament and character inventory

TCI is a self-report questionnaire composed of 240 true-false questions, measuring 4 dimensions of temperament and 3 dimensions of character. The temperament dimensions measure individual differences in emotional responses to associatively conditioned stimuli. These four temperaments are: harm avoidance, novelty seeking, reward dependence and persistence. The character dimensions assess individual differences in higher cognitive processes that modulate emotional conflicts to satisfy a person's goals and values. The character dimensions quantify the 3 branches of mental self government: self-directedness, cooperativeness and self-transcendence. Character dimensions of TCI measure the presence and severity of personality traits, whereas the temperament dimensions indicate membership in the anxious cluster if high in harm avoidance, the impulsive cluster is indicated if high in novelty seeking, and the aloof cluster is indicated if low in reward dependence [8]. The reliability and factorial validity of Turkish version of TCI was supported [9].

Beck depression inventory (BDI)

The BDI is a self-report inventory for assessing the presence and severity of depressive symptoms experienced during the last two weeks. The inventory includes 21 items. The questions are answered with a scale ranging between 0 and 3 points. The BDI cut-offs are as follows: <10 no or minimal depression, 10–18 points means mild to moderate depression, 19–29 points means moderate to severe depression, and 30–63 indicates severe depression. It is a self-report questionnaire that is widely used to assess the frequency and severity of depressive symptoms in society and valideted in Turkish population [10,11].

Beck anxiety inventory (BAI)

The BAI is a 21 item self-report questionnaire that lists symptoms of anxiety. The responder is asked to rate how much each symptom has disturbed him or her in the past week. The items are rated on a scale, ranging from (0) "not at all"to (3) "severely". The BAI cut-offs are: <7 means minimal anxiety, 8–15 means mild anxiety, 16–25 moderate anxiety and 26–63 severe anxiety. Turkish version of the inventory was found to be reliable and valid [12,13].

Statistical analysis

The statistics were performed using SPSS 16.0. The normality distribution of test scores was tested by Kolmogorov–Smirnov and Shapiro–Wick tests in appropriate measures. The relationship between test scores were tested with Mann–Whitney U and independent samples t-test. Corelations between parameters were evaluated with the Pearson corelation. The p values below 0.05 were accepted as statistically significant.

Results

The mean age for the groups were 22.3 ± 4.2 and 23.4 ± 3.5 respectively and did not have a significant difference ($p > 0.05$). Educational status and occupations between the two groups did not have any significant difference either ($p > 0.05$). PCOS group had more problems than the control group such as; acne, menstrual irregularities, hirsutism, infertility and oligomenorrhea ($p < 0.05$). Mean BMI scores of groups were similar ($p > 0.05$) (Table 1).

Comparing the groups according to the BAI and BDI scores, the PCOS group had significantly higher scores ($p < 0.05$) (Table 2). Cloninger's temperament and character inventory scores of the study groups did not show any significant difference neither in temperament nor in character subdimensions ($p > 0.05$) (Table 3,4). Testosteron (T) levels and the FGS, LH, follicle stimulating hormone (FSH) and BMI of the patients were not correlated significantly with depression or anxiety scores or any of the TCI subdimentions ($p > 0.05$). However, there was a negative correlation with age and novelty seeking and age and reward dependence (r:-0.33, p:0.018; r:-0.295, p:0.037, respectively) (Table 5).

Discussion

In this study, we evaluated the temperament and the character among patients with PCOS. We indicated similar scores of TCI in the patient and control groups. Depression was significantly higher in PCOS group. Besides, correlation study did not demonstrate any correlations between BDI and BAI scores and BMI, LH/FSH, T, and

Table 1
Sociodemographical data for the patient and control groups.

	Patient group (n=50)	Control group (n=41)	*p* value
Age (years)	22.3 ± 4.2	23.4 ± 3.5	0.176
BMI (kg/m²)	24.17 ± 5.01	23.21±4.02	0.323
Marital status			
Married	12 (24%)	17 (41.5%)	0.075
Single	38(76%)	24 (58.5%)	
Eduational status			
Elementary	11 (22%)	6 (14.6%)	
High school	12 (24%)	14 (34.1%)	0.473
College	27 (54%)	21 (52.2%)	
Acne			
Present	25 (50%)	9 (22%)	0.006*
Hirsutism			
Present	33 (66%)	7 (17.1%)	< 0.001**
Infertility			
Present	5 (10%)	0 (0%)	0.037*
Absent	45 (90%)	41 (100%)	
Menstrual irregularities			
Present	37 (74%)	5 (12.2%)	< 0.001**
Oligoamenorrhea			
Present	35 (70%)	0 (0%)	<0.001**

Notes: Numerical data are expressed as mean ± standard deviation, categorical variables are expressed as numbers and percentiles.
Abbreviations: nnumber of subjects; BMIBody mass index.
*p < 0.05; ** p < 0.01.

Table 2
Anxiety and depression scores for the patient and control groups.

	PCOS (n = 50)	Control (n = 41)	p
BAI	16.48 ± 12.2	10.58 ± 7.9	0.021*
BDI	14.16 ± 10	9.07 ± 6. 5	0.031*

Notes: Numerical data are expressed as mean ± standard deviation.
* p < 0.05.
Abbreviatons: n, number of subjects; PCOS, Policystic ovary syndrome; BAI: Mean score of Beck Anxiety Inventory; BDI: Mean score of Beck Depression Inventory.

FGS except for a negative correlation between age and novelty seeking and reward depencence subdimention of TCI.

Psychiatric morbidity in PCOS patients has been a matter of interest and a topic for many studies in recent years. Obesity, hirsutism, and infertility are common signs in patients with PCOS which might make them feel different and less feminine in comparison with the healthy individuals. PCOS patients often

Table 3
Temperament subdimension scores for patient and control groups.

Temperament subdimensions	Patient group Mean ± SD	Healthy controls Mean ± SD	*p* value
Novelty Seeking	18.73 ± 4.53	18.59 ± 4.63	0.906
Exploratory excitability	6.36 ± 2.05	6.24 ± 1.93	0.784
Impulsivity	3.62 ± 1.64	4.05 ± 1.51	0,203
Extravagance	4.17 ± 1.87	3.96 ± 1.88	0,167
Inorderliness	3.96 ± 1.88	4.12 ± 1.67	0,669
Harm Avoidance	18.92 ± 5.91	17.78 6.18	0,373
Anticipatory Worry	6.08 ± 2.31	5.34 ± 2.11	0,119
Fear Of Uncertainty	4.84 ± 1.55	4.49 ± 1.79	0,318
Shyness	3.62 ± 2.30	3.63 ± 1.97	0,975
Fatigability	4.38 ± 2.28	4.32 ± 2.21	0,895
Reward Dependence	14.96 ± 3.43	15.02 ± 3.40	0,929
Sentimentality	7.62 ± 1.86	7.54 ± 1.71	0,826
Attachment	4.62 ± 2.06	4.95 ± 1.65	0,399
Dependence	2.72 ± 1.49	2.54 ± 1.39	0,551
Persistence	5.32 ± 1.77	5.15 ± 1.71	0.638

Note: Numerical data are expressed as mean ± standard deviation.
Abbreviations: SD: Standard Deviation.

Table 4
Character subdimension scores for patient and control groups.

Character subdimension	Patient group Mean ± SD	Healthy controls Mean ± SD	*p* value
Self Directedness	26.18 ± 6.93	26.32 ± 5.90	0,920
Responsibility	4.46 ± 2.21	4.10 ± 1.99	0,419
Purposefulness	5.16 ± 1.62	5.46 ± 1.46	0,357
Resourcefulness	3.10 ± 1.21	3.20 ± 1.41	0,731
Self Acceptance	5.44 ± 2.75	5.24 ± 2.34	0,719
Congruent Second Nature	7.88 ± 2.08	8.39 ± 1.84	0,225
Cooperativeness	28.54 ± 6.22	30.02 ± 5.36	0,232
Social Acceptance	5.72 ± 1.79	5.73 ± 1.62	0,974
Empathy	4.60 ± 1.45	4.66 ± 1.21	0,838
Helpfulness	4.60 ± 1.22	4.98 ± 1.17	0,142
Compassion	7.46 ± 4.56	7.54 ± 2.63	0,924
Principled	6.76 ± 1.53	7.12 ± 1.32	0,237
Self Transcendence	20.40 5.19	20.88 5.91	0,656
Self Forgetfulness	6.82 2.43	6.61 2.46	0,684
Transpersonal İdentification	5.20 1.93	5.61 2.17	0,345
Spiritual Acceptance	8.38 2.14	8.66 1.95	0,523

Note: Numerical data are expressed as mean ± standard deviation.
Abbreviations: SD: Standard Deviation.

experience appearance anxiety and impairment of body perception. These situations may lead to some psychiatric problems [14,15]. The relationship between psychiatric and endocrinological diseases is important because they share a common biological background [16].

There are many studies showing temperament and personality changes in primary psychiatric disorders [17–19]. We speculated that PCOS patients may have some changes in temperament and personality since anxiety and depression is common among them. To the best of our knowledge, this was the first study using Cloninger's personality model in patients with PCOS. Recently, Dag et al. and Asik et al. reported significantly different temperament scores on Temperament Evaluation of the Memphis, Pisa, Paris and San Diego Autoquestionnaire (TEMPS-A) in a relatively heterogenous group of PCOS patients [20,21]. Personality is a summation of individual differences in the perception, processing and storage of data and experience. Dimensional pyschobiological approach to the personality model was developed by Cloninger et al. and according to this model, temperament and character were

Table 5
Coefficients and Significances of Correlations Between Variables of Patients.

Variables			Age	BMI	LH/FSH	FGS	Testosterone
TCI	NoS	r	−0,333	NS	NS	NS	NS
		p	0,018*				
	HA	r	NS	NS	NS	NS	NS
		p					
	RD	r	−0,295	NS	NS	NS	NS
		p	0,037*				
	P	r	NS	NS	NS	NS	NS
		p					
	SD	r	NS	NS	NS	NS	NS
		p					
	C	r	NS	NS	NS	NS	NS
		p					
	ST	r	NS	NS	NS	NS	NS
		p					
BDI		r	NS	NS	NS	NS	NS
		p					
BAI		r	NS	NS	NS	NS	NS
		p					

Notes : * p < 0.05. Abbreviations : TCI : Temperament and Character Inventory; BDI : Beck Depression Inventory; BAI : Beck Anxiety Inventory; NoS : Novelty Seeking subscale; HA : Harm Avoidance subscale; RD : Reward Dependance subscale; P : Persistence subscale; SD : Self Directness subscale; C : Cooperativeness subscale; ST : Self Transcendence subscale; NS : Not significant; r: correlation coefficient; p : correlation significance.

evaluated as two main components of personality. Temperament is a set of behaviours that individuals gain in the first years of life which are relatively more stable. Character involves objective observations of individuals' behaviour and also the inner experiences subjectively reported. Cloninger's Temperament and Character Inventory is being used widely by many researchers in order to determine the relationship between the features of diseases and the personality of the patient in a variety of diseases. Character, temperament and personality are terms which are frequently used interchangeably, though they have different meanings. Temperament is somewhat hereditary and it changes diddly throughout life. Character involves some features developed under the impact of the environment and the way the individual was raised. Therefore, it may change in some ways under certain conditions. Personality is a combination of these two [22]. Temperament and character may have some flexibilities due to a variety of factors. These factors may include a few medical conditions but these changes are usually due to psychosocial factors.

The temperament and character may be altered in PCOS patients since there is increased frequency of depression and anxiety in PCOS patients. In some medical diseases, changes in some subdimensions of the TCI were observed. These findings were attributed to the psychosocial disturbances that is an outcome of chronic disease. It is also thought that psychiatric disorders arise more easily following changes in temparement and character [23]. However, in our study, PCOS patients did not show any differences of temparement and character in comparison with the healthy controls. There may be several reasons for this result. Some possible reasons are, relatively small number of study group, the temperament and character profiles of the healthy controls (TCI questionnaire does not have a cut-off value and the groups are compared with each other) and similar BMI values between the groups (obesity may lead to psychosocial problems and may interfere with the results in the control group). The high depression and anxiety scores are most likely to be a result of the disease rather than another primary psychiatric problem.

Recent studies evaluated temperament in PCOS, so far. They argued PCOS patients to have different temperament scores when compared to the healthy controls. However, they used TEMPS-A score which is less extensive than TCI. Besides, PCOS group had significantly higher BMI than control group in these studies. Therefore, outcomes might be a result of higher BMI in the study group. Besides, psychiatric evaluation of the participants are lacking in those studies.

In our study, PCOS patients had higher depression scores when compared to the healthy controls. There are many studies showing higher depression scores in PCOS patients, consistent with our findings [24–26]. Despite the amount of studies, pathophysiological association between PCOS and depression remains inconclusive. This was attributed to increased levels of androgens in the previous studies [27–29]. The lower scores of depression in PCOS patients on oral contraseptive treatment in comparison with the patients who do not use contraseptives are examples of this phenomenon. Besides, some studies showed positive correlation with BMI and insulin resistance. Anxiety scores are also found to be higher in PCOS patients when compared with the control group in the present study. Although there are some studies that also reported higher anxiety scores in PCOS patients [30,31], some other studies reported no significant difference as well [32]. Long-term health consequences of PCOS may play a role in the development of anxiety. These features may also increase the probability of weight gain which may cause social isolation.

In the present study, we performed correlation analyses to see if BMI, T levels, LH/FSH and FGS scores were correlated with the questionnaires. We did not report any correlation except for a negative correlation between the age and novelty seeking and reward dependence subdimentions of TCI. Previous studies have reported a positive correlation between BMI and depressive symptoms in women with PCOS. However in our study we did not observe a likely correlation.

The limitation of the study is the small sample size. However, the strenght of the study was that, all participants have been examinated by a gynecologist and a psychiatrist.

In conclusion, despite some limitations, our study is a new aspect in its field. Different results may be obtained if the study is performed with different populations having various age, location and cultural features. Since the temperament and character are effected widely by a variety of factors, different results are possible with varied populations. We suggest that, it is very important for PCOS patients to be directed to regular psychiatric consultations to help managing overall symptoms of the disease.

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