The Correlation Between Perfectionism and Serum Thyroid Hormone Levels in Obsessive-Compulsive Personality Disorder Patients

ABSTRACT

Objective: Perfectionism is one of the leading clinical symptoms of the obsessive-compulsive personality disorder (OCPD). This research aimed to compare perfectionism and serum thyroid hormone levels between individuals with OCPD and healthy individuals of a control group.

Methods: The serum levels of free T4, free T3, and thyroid-stimulating hormone of 37 patients diagnosed with OCPD and 36 healthy controls with similar sociodemographic traits were measured. Furthermore, the Sociodemographic and Clinical Data Form, the Beck Anxiety Inventory (BAI), the Beck Depression Inventory (BDI), and the Frost Multidimensional Perfectionism Scale (FMPS) were applied to all participants in the study.

Results: There was a statistically remarkable correlation between the FMPS total score and the T3 level ($r = -0.47, P = .004$), and between the BAI and the T3 level ($r = -0.41, P = .011$).

Conclusion: The research findings demonstrated that there could be a correlation between perfectionism and thyroid hormone levels.

Keywords: Obsessive-compulsive disorder, personality disorders, thyroid hormones, perfectionism

Introduction

Obsessive-compulsive personality disorder (OCPD) is a psychological disorder characterized by orderliness, extreme control in cognitive and interpersonal relationships, and exaggerated perfectionism, which impair an individual’s normal functioning.1,2 Clinically, perfectionism is described as an attempt to meet rigorous standards despite negative consequences, and the dependency of self-esteem on success.3 Although the etiology of OCPD is not known yet, most studies have reported that it is associated with obsessive-compulsive disorder (OCD).4,5

It is known that the prevalence of thyroid disorders is high in patients with OCD.6 Mermi and Atmaca7 reported that the variations in thyroid hormone levels could be associated with the pathophysiology of OCD. In another study, it was determined that TSH and T4 levels may be associated with the obsession and compulsion severity.8 Studies have demonstrated that there may be a correlation between thyroid hormone levels and the clinical prognosis in antisocial and borderline personality disorders.9,10

Although Ghobadi et al11 reported that the risk of thyroid cancer is higher in perfectionist individuals, no studies that analyzed perfectionism and serum thyroid hormone levels in individuals diagnosed with OCPD were identified in the literature review. We considered that the present study may help explain the etiopathogenesis of OCPD.

Methods

Approval for this research was obtained from the Ethics Committee of Fırat University School of Medicine (Approval Date: January 14, 2021; Approval Number: 2021/01-41). This research was supported by the Fırat University Research and Projects Coordination Board. This research was conducted under the guidance of the ethics committee of Fırat University School of Medicine. All participants provided their written informed consent. The study was conducted in accordance with the principles of the Declaration of Helsinki.

All participants were recruited from the outpatient clinics of the Department of Psychiatry in Erzincan Binali Yıldırım University School of Medicine and Elazığ Fırat University School of Medicine. The exclusion criteria included the use of medications that affect thyroid function, other psychiatric disorders, and thyroid disorders. The sociodemographic data, the Beck Anxiety Inventory (BAI), the Beck Depression Inventory (BDI), the Sociodemographic and Clinical Data Form, and the Frost Multidimensional Perfectionism Scale (FMPS) were applied to all participants in the study.

The FMPS is a well-validated tool for assessing perfectionism.12 The BAI and BDI are well-established tools for assessing anxiety and depression.13 The Sociodemographic and Clinical Data Form is a well-validated tool for assessing sociodemographic and clinical data.

Results

The results of this study showed that there was a statistically remarkable correlation between the FMPS total score and the T3 level ($r = -0.47, P = .004$), and between the BAI and the T3 level ($r = -0.41, P = .011$). These results suggest that there could be a correlation between perfectionism and thyroid hormone levels.

Conclusion

The research findings demonstrated that there could be a correlation between perfectionism and thyroid hormone levels. This correlation may help explain the etiopathogenesis of OCPD.

Keywords: Obsessive-compulsive disorder, personality disorders, thyroid hormones, perfectionism
research was conducted according to the ethical standards specified in the Declaration of Helsinki, 1983 revision. The patient population included individuals who were referred to both the outpatient and inpatient psychiatry clinics at Firat University School of Medicine. The healthy control subjects included interns who attended the school of medicine and agreed to join in the study. The sample consisted of patients who were diagnosed with OCPD and were followed up by the Firat University School of Medicine psychiatric outpatient clinic between January and March 2021. Informed consent forms were signed by all participants. All diagnoses were based on the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV) and the Structured Clinical Interview for the Diagnostic Schedule for Mental Disorders-Fourth Edition (SCID). In the study, the Sociodemographic and Clinical Data Form, the Beck Anxiety Inventory (BAI), the Beck Depression Inventory (BDI), and the Frost Multidimensional Perfectionism Scale (FMPS) were applied to both groups. The exclusion criteria employed to assign the research subjects included the presence of any present or past significant medical disease, any present or past hormonal therapy prescription, oral contraceptive use, any current or past thyroid function disorders, a history of endocrinological conditions, gravidity or breast-feeding, or substance abuse. Healthy control subjects included 40 participants screened with a chart review. Participants who did not have a psychiatric disorder themselves or in their first degree relatives were taken as the control group. In addition to the these psychopathological criteria, those with a current or past significant medical disease, a current or past hormonal therapy prescription, oral contraceptive use, any current or past thyroid function disorders, a history of endocrinological conditions, gravidity or breast-feeding, or substance abuse were excluded.

The Scales Employed in the Present Study

Structured Clinical Interview for DSM-IV Axis 1 Disorders (SCID-I): This scale was developed in 1997 for DSM-IV, introduced by First et al, and it is a methodized interview form for Axis I diagnosis.

Structured Clinical Interview for DSM-IV Axis 2 Disorders (SCID-II): This scale is a methodized interview form for the diagnosis of personality disorders.

BDI: It was developed in 1961 to evaluate the depression risk in adults, the variations in severity, and the level of depressive signs. The scale’s cut-off score is 17.

BAI: It is a self-report scale employed to identify the prevalence of anxiety signs experienced by individuals. The 3-point Likert-type scale includes 21 items.

FMPS: This scale was developed by Frost et al to determine the perfectionism tendencies of individuals. It is a 5-point Likert-type scale.

The control group consisted of healthy subjects similar in age and gender to the patients with OCPD. Venous blood samples were drawn from the patients and control subjects to analyze thyroid hormone levels. Thyroid hormone levels were determined with an auto analyzer (Coulter Max M, Coulter Electronics Ltd, Luton, UK).

Statistical Analysis

Statistical analyses were carried out with the SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). A P value of less than .05 was accepted as statistically remarkable. Whether the study data were normally distributed or not was evaluated by the Shapiro-Wilk test. Normally distributed constant data were analyzed by the Student’s t-test, and the chi-square test; Fisher’s exact test, and the Fisher-Freeman-Halton test were used to analyze categorical data. The correlations between the variables were examined with the Pearson correlation coefficient.

Results

The comparison of sociodemographic characteristics between the patient and healthy groups disclosed statistically remarkable differences based on place of residence, and previous psychiatric treatment parameters (P < .05). There were no differences based on education level, income level, occupation, marital status, gender, age, concomitant psychiatric disorder, organic disease, medication, and smoking or alcohol abuse (P > .05). All sociodemographic findings are summarized in Table 1.

The analysis of the thyroid hormone levels disclosed that all 3 hormones (TSH, fT3, fT4) were remarkably higher in the patient group in contrast to the healthy control group (P < .05) (Table 2).

The correlations between the variables were analyzed separately for both groups with the Pearson correlation test. In the case group, a statistically significant relationship was determined between the suspicious behavior subscale score and fT4 (r = 0.35, P = .031), and between the BAI score and fT3 (r = 0.39, P = .015). In the control group, there were statistically considerable relationships between extreme attention to mistakes and fT3 (r = −0.46, P = .005), between parental criticism and fT3 (r = −0.41, P = .011), between parental expectations and TSH (r = −0.39, P = .018), between personal standards and T3 (r = −0.37, P = .026), between the total FMPS score and fT3 (r = −0.47, P = .004), and between the BAI score and fT3 (r = −0.41, P = .011). The findings are presented in Table 3.

The FMPS, BAI, and BDI scores of the patient and control groups are shown in Table 4.

Discussion

In the study, we compared 37 patients with OCPD and 36 healthy controls with similar sociodemographic characteristics. We also investigated the anxiety, depression, and perfectionism levels between these 2 groups. We observed that anxiety and depression symptoms, perfectionism levels, and serum thyroid hormone levels (T3, T4, TSH) were higher in individuals with OCPD when contrasted to the control group.

As hypothesized, the perfectionism level in individuals with OCPD was higher when contrasted to the control group in this research. A previous study reported that pursuit of perfectionism may lead to

**MAIN POINTS**

- In obsessive-compulsive personality disorder, as the perfectionism scores of the patients increased, serum T3 levels decreased.
- In obsessive compulsive personality disorder, as the anxiety levels of patients increase, serum T3 levels decrease.
- We determined that patients with OCPD exhibited higher perfectionism levels and that their serum fT3 levels were also elevated.
several psychiatric disorders and eventually to burnout in individuals with OCPD.18,19 In another study, the authors argued that considering perfectionism and unrealistically high standards during therapy would be beneficial for the treatment.20

In a study conducted with individuals diagnosed with OCD, significant differences were reported between the 3 FMPS subscale scores (“anxiety about making a mistake,” “suspicions about acts,” and “parental criticism”) of the OCD sufferers and healthy control subjects.21 However, in this study, all mean FMPS subscale points were higher in the patient group when contrasted to the control group. It could be suggested that this might be due to the differences between the disease groups and the fact that perfectionism is a dominant symptom only in OCPD. Perfectionism is an expression of obsessive-compulsiveness as well as anxiety. Anxiety is associated with the pituitary-thyroid axis. Perfectionism is considered as a genetic feature and it is mentioned that it will continue after the treatment of existing diseases.22 However, changes in thyroid hormone levels seem likely to affect the course of perfectionism. With the data we obtained, it can be easily said that thyroid hormones affect the severity of perfectionism, since our study conducted a situational assessment. We believe that more data and longitudinal researches are needed in order to make more comprehensive interpretations on perfectionism and its sub-dimensions.

It has been reported that the level of cortisol, known as the stress hormone, was high in extremely perfectionist individuals.23 It is known that the level of anxiety is associated with thyroid hormone levels.24 Our findings are coherent with the results of the study reporting that anxiety symptoms were seen at T3 height. It has been reported that serum thyroid hormone levels are related with the intensity of anxiety.25 We observed that people with high perfectionist perceptions and anxiety had elevated T3 levels. In a 2006 study conducted on patients with eating disorder, the variations in T3 and T4 hormone levels were associated with perfectionist perceptions.26

| Table 1. The Comparison of Sociodemographic Data |
|-----------------------------------------------|
| Patient (n = 37) (%) | Control (n = 36) (%) | P |
| Age, mean (SD) | 37.18 (8.56) | 35.47 (7.99) | .518 |
| Gender | | | .290 |
| Male | 17 (45.9) | 21 (58.3) | |
| Female | 20 (54.1) | 15 (41.7) | |
| Marital status | | | .273 |
| Married | 28 (75.7) | 22 (52.4) | |
| Unmarried | 9 (24.3) | 17 (47.2) | |
| Education level | | | .739 |
| Primary education | 10 (27) | 11 (30.6) | |
| Secondary or higher | 27 (73) | 25 (69.4) | |
| Place of residence | | | .015 |
| Village/District | 3 (8.1) | 11 (30.6) | |
| Urban | 34 (91.9) | 25 (69.4) | |
| Income level | | | .484 |
| Low | 3 (8.1) | 1 (2.8) | |
| Middle | 33 (89.2) | 35 (97.2) | |
| High | 1 (2.7) | 0 | |
| Employment | | | .557 |
| Employed | 10 (27) | 12 (33.3) | |
| Unemployed | 27 (73) | 24 (66.7) | |
| Psychiatric treatment history | | | .002 |
| Yes | 9 (24.3) | 0 | |
| No | 28 (75.7) | 36 (100) | |
| Smoking | | | .922 |
| Yes | 15 (40.5) | 15 (41.7) | |
| No | 22 (59.5) | 21 (38.3) | |

| Table 2. Comparison of Thyroid Hormone Levels |
|-----------------------------------------------|
| Patient (n = 37), mean (SD) | Control (n = 36), mean (SD) | P |
| TSH | 1.99 (1.17) | 1.42 (0.89) | .022 |
| fT3 | 3.19 (0.99) | 2.73 (0.79) | .035 |
| fT4 | 1.26 (0.66) | 0.95 (0.33) | .007 |

| Table 3. The Correlation Between Patient-Group Scale Scores and Hormone Levels* |
|-----------------------------------------------|
| Patient group | Control group |
| TSH | fT3 | fT4 | TSH | fT3 | fT4 |
| Extreme attention to mistakes | | | | | | | | |
| r | .036 | .169 | -.040 | .049 | -.462 | .197 | |
| P | .834 | .317 | .814 | .775 | .005 | .250 | |
| Parental criticism | | | | | | | | |
| r | .093 | .075 | -.052 | .274 | -.419 | .244 | |
| P | .584 | .659 | .760 | .106 | .011 | .152 | |
| Organization | | | | | | | | |
| r | .123 | .038 | .041 | .148 | -.301 | .024 | |
| P | .470 | .824 | .809 | .390 | .075 | .889 | |
| Behavioral expectations | | | | | | | | |
| r | -.039 | -.163 | .354 | .069 | -.259 | .138 | |
| P | .820 | .334 | .031 | .688 | .128 | .423 | |
| Personal standards | | | | | | | | |
| r | .021 | -.011 | .223 | -.180 | -.372 | .072 | |
| P | .902 | .948 | .186 | .292 | .026 | .676 | |
| Total FMPS score | | | | | | | | |
| r | .047 | .126 | .048 | -.100 | -.472 | .149 | |
| P | .783 | .457 | .777 | .560 | .004 | .385 | |
| BAI | | | | | | | | |
| r | .062 | .395 | -.266 | .099 | -.417 | .133 | |
| P | .714 | .015 | .111 | .567 | .011 | .439 | |
| BDI | | | | | | | | |
| r | .168 | .015 | -.199 | .241 | -.048 | -.235 | |
| P | .320 | .928 | .237 | .157 | .777 | .167 | |

*Pearson correlation analysis. fT3, free T3; fT4, free T4; TSH, thyroid-stimulating hormone; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; FMPS, Frost Multidimensional Perfectionism Scale.
In some studies investigating thyroid levels in personality disorders, it was found that serum T3 levels were higher and serum fT4 levels were lower in patients with cluster B personality disorders, in contrast to the healthy control group. T3 levels were elevated in individuals with antisocial personality disorder, and there was a substantial inter-relationship between the TSH levels. In another study, it was shown that T3 levels were elevated in patients with borderline personality disorder, and this was associated with depression. With this limited information, and as far as we know, there is no literature information on thyroid hormone levels in OCPD.

The correlation between psychiatric diseases and thyroid gland disorders is known. A higher prevalence of thyroid disorders is reported in both subthreshold OCD and OCPD patients. Aizenberg et al. observed suppression of the TSH response with thyrotropin-eleasing hormone in OCD patients, and with their results, they hypothesized that there is an irregularity in the hypothalamic–pituitary-thyroid axis in OCD. In a study conducted with 16 child and adolescent OCD patients, it was reported that the serum TSH, fT3, and fT4 levels were elevated in the patient group when contrasted to the healthy controls, and serum TSH and fT3 concentrations declined after clomipramine treatment. Merri et al. reported that there was no remarkable difference in thyroid releasing hormone (TSH) levels between the OCD group and the healthy control group, while free triiodothyronine (fT3) and free thyroxine levels (fT4) were statistically remarkably lower in the patient group when contrasted

**Table 4. FMPS Scales and Subscales, BDI and BAI Scores**

|                          | Patient (n = 37), mean (SD) | Control (n = 36), mean (SD) | *P*  |
|--------------------------|----------------------------|-----------------------------|------|
| Extreme attention to mistakes | 27.64 (5.30)               | 15.97 (5.97)                | <.001|
| Parental criticism       | 14.16 (3.19)               | 9.47 (2.83)                 | <.001|
| Organization             | 21.89 (4.51)               | 12.58 (4.55)                | <.001|
| Behavioral suspicion     | 14.75 (3.38)               | 8.66 (4.13)                 | <.001|
| Parental expectations    | 19.00 (3.74)               | 10.61 (3.92)                | <.001|
| Personal standards       | 23.54 (3.79)               | 12.30 (4.36)                | <.001|
| Total FMPS score         | 119.81 (17.06)             | 69.22 (19.54)               | <.001|
| Beck Depression Inventory| 13.08 (6.15)               | 5.55 (5.27)                 | <.001|
| Beck Anxiety Inventory   | 17.59 (8.23)               | 5.08 (2.67)                 | <.001|

BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; FMPS, Frost Multidimensional Perfectionism Scale; SD, standard deviation.

**Figure 1. FMPS scales, BDI, and BAI scores.**

BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; FMPS, Frost Multidimensional Perfectionism Scale.
to the control group. Serotonergic dysfunction is indicated in the etiopathogenesis of OCPD. Thyroid hormones can affect the serotonergic system in the brain. Although OCD and OCPD share clinical and etiological properties, we determined that the levels of all 3 hormones (TSH, T3, T4) were substantially higher in the case group when contrasted to the healthy control group.

In this research, we determined that the BAI and BDI points of the patient group were higher when contrasted to the healthy control group. A study conducted with 272 employees in Finland reported that 50% of the males and 28% of the females with first-episode depression were diagnosed with OCPD. In fact, individuals with OCPD usually exhibit anxiety and depression symptoms. Perfectionism, which is a basic symptom of the patient group, was suggested to play a role in the development and sustenance of the anxiety and depression symptoms.

The most significant limitation of this research was the small size of the sample group. It should also be mentioned that only the absolute thyroid hormone levels were investigated in the control group; however, a variety of factors could affect these hormone levels.

We determined that patients with OCPD exhibited higher perfectionism levels and their serum FT3 levels were also elevated. The levels of thyroid hormones seem to have an impact on perfectionism, which was among the hallmark symptoms in these patients. However, further studies are required to establish a causality between these parameters.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the Ethics Committee of Firat University (Approval Date: January 14, 2021; Approval Number: 2021/01-41).

**Informed Consent:** Verbal informed consent was obtained from the patients and written informed consent was obtained from the parents or legal guardians of the patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

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**Conflict of Interest:** The authors have no conflict of interest to declare.

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