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Evaluation of the Relationship Between Disease Severity and Difficulties in Emotion Regulation, Impulsivity, and Quality of Life in Untreated Patients Diagnosed With Obsessive-Compulsive Disorder

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Objective Emotion regulation is an important skill to cultivate in patients with obsessive-compulsive disorder (OCD) for helping with the positive prognosis of their disease. Patients with OCD exhibit higher rates of impulsivity compared to healthy volunteers. According to previous studies, there is significant impairment in the quality of life in OCD. Despite their importance, no study has yet been conducted on the interrelation of these clinical parameters in OCD patients. We investigated the relationship between disease severity, emotional dysregulation, impulsivity, and quality of life in untreated OCD patients.

Methods This study included 40 untreated outpatients with a diagnosis of OCD. We applied the following form and scales: Sociodemographic and clinical data form, the Yale-Brown Obsessive Compulsive Scale, the Difficulties in Emotion Regulation Scale, the Barratt Impulsiveness Scale Short Form, and the World Health Organization Quality of Life Scale Short Form.

Results We found a positive relationship ($p<0.001$) between emotional dysregulation and impulsivity in OCD patients. A positive relationship ($p=0.003$) was identified between disease severity and emotional dysregulation, while an inverse relationship ($p<0.001$) was observed between disease severity and quality of life-psychological health. Increased impulsivity and emotional dysregulation were also associated with a deterioration in quality of life.

Conclusion There is a significant positive relationship between emotional dysregulation and impulsivity in OCD patients. These clinical parameters may serve as important targets for treatment approaches in OCD patients and thus should be considered in the future work.

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Keywords Obsessive-compulsive disorder; Disease severity; Emotion regulation; Impulsivity; Quality of life.

INTRODUCTION

Obsessive-compulsive disorder (OCD) is a disorder characterized by the presence of obsessions and/or compulsions. OCD is often chronic, and sometimes episodically exacerbated. It significantly limits an individual's daily life and functioning.[1] The dysfunctional use of emotion regulation strategies and difficulty in emotion regulation have a significant impact on the onset and persistence of OCD.[2] According to a study conducted by Fergus and Bardeen,[3] the motivation to avoid emotions may underlie the onset of OCD and this motivation might be used to reduce the emotional distress caused by intrusive thoughts that are perceived as uncontrollable. Impulsivity in response to negative emotions is associated with maladaptive behaviors conceptualized as attempts to reduce or avoid negative emotional experiences.[4] Studies have reported a decrease in impulsivity following the successful treatment of obsessive-compulsive symptoms.[5]

In the onset and persistence of OCD, the use of inappropriate emotion regulation strategies and the difficulties experienced in this process have significant benefits.[2] When OCD patients encounter situations, thoughts, or objects related to

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the illness, they respond with negative emotions such as disgust, fear, guilt, or anxiety. To cope with these emotions, they engage in repetitive behaviors.[6] Negative emotions cause OCD symptoms to intensify, and patients struggle more in the emotion regulation process, which in turn increases the severity of OCD.[7]

According to the cognitive-behavioral model of OCD, the catastrophic interpretation of obsessions and the use of compulsions as dysfunctional emotion regulation strategies play a role in the persistence of this disorder.[6] There is a significant relationship between emotional dysregulation (ED) and the disease severity.[3,8]

Hollander and Stein[9] have introduced a view of impulsivity and compulsivity as being the two ends of the same spectrum: Those behaviors involve an inability to refrain from repetitive behaviors; however, the motivation for the behavior differs. Impulsive behavior aims at achieving pleasure and reward, while compulsion aims at reducing anxiety. Impulsive behavior is ego-syntonic, whereas compulsion is ego-dystonic.

Studies investigating the relationship between OCD and increased impulsivity have mixed results.[10-14] In one study, OCD patients were reported to have higher total scores on the Barratt Impulsiveness Scale-11 (BIS-11), with impulsivity in the attention domain being particularly prominent.[15] In a study evaluating impulsivity with the BIS-11 scale, OCD patients were found to have significantly higher total and attention subscale scores compared to healthy volunteers.[16] While some studies have identified higher scores in all BIS-11 subscales (attention, motor, and non-planning) in OCD patients, other studies have found significant differences only in the planning subscale or only in the attention subscale.[16-19]

Research has shown significant impairment in quality of life (QOL) in OCD.[20,21] Although there are studies in the literature suggesting that OCD impacts physical health, some other studies report no relationship between these parameters.[22] In studies comparing the QOL of OCD patients and healthy volunteers, OCD patients have lower scores in psychological health and social relationships.[22-24] In a study evaluating the relationship between obsession and compulsion scores and QOL in OCD, a significant relationship was found between obsession scores and all domains of QOL except for social relationships.[24]

Several studies examined the relationship between disease severity in OCD and ED, impulsivity, and QOL.[17,20,25] It has been shown that ED and impulsivity are associated with mental disorders.[26-28] In a study examining ED and impulsivity-compulsivity in eating-related addictive-like behaviors, alcohol use, and compulsive exercise, it was shown that ED was associated with higher levels of compulsivity in addictive-like behaviors and that ED, together with impulsivity, had an effect on all behaviors.[29]

To our knowledge, there is no study investigating the relationship between impulsivity, ED, and QOL in OCD patients. We hypothesize that there is relationship between these parameters and disease severity in OCD patients. The main goal of our study is to investigate those relationships in untreated OCD patients.

METHODS

Subjects

Patients who agreed to participate in the study were clinically interviewed based on the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition diagnostic criteria to confirm their diagnosis. Clinical interviews were conducted by a single researcher. A total of 87 patients were interviewed. Of those, 47 were not included in the study population. The majority of those patients (n=27) were excluded due to undergoing active psychiatric treatment. In addition, patients with a history of alcohol use disorder (n=2) or Axis-1 psychiatric illness other than OCD (n=11), and those who declined to participate in the study after being informed (n=7) were excluded. Forty patients were included in the study. Those patients presented to the psychiatry outpatient clinic of Erenköy Mental and Neurological Diseases Training and Research Hospital between January 2023 and March 2023.

The sample size calculation, performed using G Power 3.1.9.7 (Franz Faul), was based on the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) and the Difficulties in Emotion Regulation Scale (DERS) data from the reference study.[30] The effect size was found to be 0.49 (r). According to calculations performed with a 95% power, an alpha value of 0.05, and a 5% margin of error, it was determined that the study needed to include 40 patients.

Sociodemographic and clinical data form, the Y-BOCS, and self-report scales; including the DERS, the Barratt Impulsiveness Scale Short Form (BIS-11-SF) and the World Health Organization Quality of Life Scale Short Form (WHOQOL-BREF) were administered to the participants. Participants included those who were diagnosed with OCD for the first time, those who had been previously diagnosed but were not undergoing psychiatric treatment, or those who were undergoing treatment but had been on antidepressants for no longer than 1 month. Additional inclusion criteria consisted of literacy and an age range of 18−65 years. Treatment guidelines state that significant improvement in OCD is typically not observed until 4−6 weeks after medication use, with some patients showing minimal improvement up to 10−12 weeks.[31] To prevent the confounding effects of pharmacotherapy, patients who had been on antidepressants for longer than 1 month were exclud-

ed from the study. The following categories of patients were excluded from the study: Those under the age of 18 or over 65, those with a history of head trauma, neurological and/or medical conditions that could impair cognition and motor functions (e.g., amnestic disorders, multiple sclerosis, rheumatic diseases, human immunodeficiency virus, mental retardation), observable mental retardation or cognitive impairment, severe general medical conditions, alcohol and/or substance use disorders, the presence of Axis-1 psychiatric disorders other than OCD, and active psychiatric treatment (psychotherapy, antipsychotic medication, mood stabilizers, anxiolytics), except for the first month of antidepressant treatment, and those who declined to participate after being informed. The ethics committee application for the study was approved by the University of Health Sciences Erenköy Mental Health and Neurological Diseases Training and Research Hospital Clinical Research Ethical Committee on 13/01/2023 with decision number 05 and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All respondents provided informed consent at the beginning of the survey by confirming their willingness to participate in this study.

Data collection tools

Sociodemographic and clinical data form

This form was prepared by the researchers to collect information pertaining to the patients' life histories, clinical course of the illness, self-mutilative behaviors, and suicidal behaviors. It includes items asking about age, sex, educational level, marital status, occupation, socio-economic status, alcohol and substance use, personal and family medical history, and medications used by the patients.

Y-BOCS

Y-BOCS is a semi-structured scale administered by an interviewer knowledgeable in psychopathology, designed to measure the type and severity of obsessive-compulsive symptoms in patients diagnosed with OCD.[32] It consists of 19 items, but only the first 10 items are used to measure symptom severity. Accompanying the scale is the Y-BOCS Symptom Checklist, which helps in recognizing past and present symptoms. The validity and reliability study of the Turkish version was conducted by Karamustafalıoğlu et al.[33] and Tek et al.[34] In this study, the Cronbach's alpha reliability coefficient for the Y-BOCS obsession, Y-BOCS compulsion, and Y-BOCS total were 0.80, 0.85, and 0.89, respectively.

DERS

DERS was developed by Gratz and Roemer[2] to assess difficulties in emotion regulation. The scale consists of 36 items and includes six subscales: clarity, awareness, acceptance, impulse, goals, and strategies. Higher scores indicate greater difficulties in these areas. The internal consistency coefficient for the entire DERS is 0.93, and for the subscales, it ranges between 0.80 and 0.89. The Turkish validity and reliability study of the scale was conducted by Ruganci and Gençöz.[35] In this study, the Cronbach's alpha reliability coefficient for the entire scale was 0.8, and for the subscales, it ranged between 0.67 and 0.84.

BIS-11-SF

BIS was developed by Barratt in 1959 to measure individual impulsivity.[36] The BIS-11 was adapted into Turkish, and its validity and reliability were established by Tamam et al. (2013).[37] The scale consists of 15 items in a 4-point Likert format. The response options for each item are: 1, rarely; 2, sometimes; 3, often; and 4, always, with a score of 4 indicating high impulsivity. The Cronbach's alpha reliability coefficient was found to be 0.78 for students and 0.81 for patients. The BIS-11-SF includes three subscales: attentional impulsiveness, motor impulsiveness, and non-planning impulsiveness. Four different scores can be obtained from the scale, addressing the overall scale and its subscales: total score, non-planning, attention, and motor impulsiveness. Some items are reverse-coded to avoid response bias. The total score is calculated by summing the scores of the individual items, with higher total scores indicating a greater degree of impulsivity. In this study, the Cronbach's alpha reliability coefficient for the entire scale was 0.74, and for the subscales, it ranged between 0.63 and 0.82.

WHOQOL-BREF

The WHOQOL-BREF is an assessment tool developed by the WHO with contributions from 15 centers across various countries to subjectively evaluate QOL.[38] It consists of 26 questions, derived from two items in the general section and one item from each of the remaining 24 sections of the original WHOQOL-100 scale. Unlike the long scale, the WHOQOL-BREF comprises four domains: physical health, psychological health, social relationships, and environment. The WHOQOL-BREF does not have the separate 34 sections present in the WHOQOL-100, nor does it provide a total score. Each domain can be scored on a maximum of 20 points or 100 points, at the researcher's discretion. There are no cut-off points for the scores; higher scores indicate a higher QOL. The validity and reliability of the Turkish version were established by Eser et al.[39] The Cronbach's alpha coefficient for the whole WHOQOL-BREF scale was 0.78 and when considered separately for physical health, psychological, social relationships, and environmental domains, it ranged between 0.69 and 0.80.

Statistical analysis

IBM SPSS Statistics version 25 (IBM Corp.) was used for all statistical analyses. The normality of the distribution of variables was examined using histogram graphs and the Kolmogorov-Smirnov test. Mean, standard deviation, and median values were used in descriptive analyses. Pearson correlation test was utilized for the analysis of relationships between measurement variables. A significance level of $p<0.05$ was considered in all analysis results.

RESULTS

Sociodemographic characteristics

A total of 40 patients, including 26 females and 14 males, between the ages of 18 and 52, who were diagnosed with OCD and applied to the Erenköy Mental and Neurological Diseases Training and Research Hospital outpatient clinics and agreed to participate in the study, were included. The mean age of the patients was 29.23±9.32 years. The average duration of education was 11.50±3.28 years. Of the patients, 23 were single and 17 were married. The sociodemographic characteristics of the participants are summarized in Table 1.

Table 1. Sociodemographic characteristics of the participants

Variables	Value
Age (yr)	29.23±9.32
Sex	
Female	26 (65.0)
Male	14 (35.0)
Educational level	
Primary/high school	28 (70.0)
University/Master's/Doctoral	12 (30.0)
Working status	
Unemployed	11 (27.5)
Full-time	19 (47.5)
Other	10 (25.0)
Monthly-income (Turkish lira)	
5,000 or less (low)	22 (55.0)
Between 5,000−10,000 (medium)	8 (20.0)
10,000 or more (high)	10 (25.0)
Marital status	
Single	23 (57.5)
Married	17 (42.5)
Having a child	
No	29 (72.5)
Yes	11 (27.5)
People he/she lives with	
Lives alone	3 (7.5)
Lives with parents	16 (40.0)
Lives with spouse and children	11 (27.5)
Lives with spouse	6 (15.0)
Other	4 (10.0)

Values are presented as mean±standard deviation or number (%)

Data on psychometric measurements of the sample

Regarding psychometric measurements, mean Y-BOCS obsession, compulsion, and total scores were 10.28±3.00, 9.85±2.73, and 20.12±5.37, respectively. Mean BIS-11-SF total scores of the participants were 29.72±6.79. As for the mean WHOQOL-BREF subscale scores, physical health, psychological health, and social relationships were 56.43±18.81, 45.00±20.04, and 43.13±27.66, respectively. DERS includes six subscales; participants' mean scores of clarity, awareness, acceptance, impulse, goals, and strategies were 13.28±4.36, 14.37±3.62, 16.20±7.59, 17.25±6.20, 18.25±5.21, and 23.83±8.46, respectively. Data on psychometric measurements of the sample on the Y-BOCS, BIS-11-SF, WHOQOL-BREF, and DERS are summarized in Table 2.

Relationship between disease severity and difficulties in emotion regulation, impulsivity, and QOL

We investigated the relationship between Y-BOCS scores, DERS subscales and total scores, BIS-11-SF subscales and total scores, and WHOQOL-BREF scores. We have found that there is a statistically significant inverse relationship between Y-BOCS obsession scores and WHOQOL-BREF general health ($p<0.001$), physical health ($p=0.001$), and psychological health subscale scores ($p<0.001$). Similarly, there is a statistically significant inverse relationship between Y-BOCS compulsion scores and WHOQOL-BREF general health ($p=0.003$), physical health ($p=0.018$), and psychological health subscale scores ($p<0.001$). Similar to previous results, there is a statistically significant inverse relationship between Y-BOCS total scores and WHOQOL-BREF general health ($p<0.001$), physical health ($p=0.002$), and psychological health subscale scores ($p<0.001$). Additionally, a statistically significant inverse relationship ($p=0.041$) exists between the Y-BOCS total score and the WHOQOL-BREF environment subscale score. There is a statistically significant positive relationship between the Y-BOCS obsession score and the DERS total score ($p=0.001$) and the subscale scores for awareness ($p=0.024$), non-acceptance ($p=0.001$), impulse control ($p=0.009$), goals ($p=0.033$), and strategies ($p=0.001$). Similarly, there is a statistically significant positive relationship between the Y-BOCS compulsion score and the DERS total score ($p=0.023$) and the subscale scores for non-acceptance ($p=0.013$), impulse control ($p=0.033$), and strategies ($p=0.031$). Furthermore, a statistically signifi-

Table 2. Participants' total and subscale score

	Mean±SD	Median (Min–Max)
Y-BOCS		
Obsession	10.28±3.00	10 (3–17)
Compulsion	9.85±2.73	10 (3–15)
Total	20.12±5.37	20 (6–31)
BIS-11-SF		
Non-planning	10.02±2.54	10 (5–15)
Attentional impulsiveness	9.95±3.41	9 (5–18)
Motor impulsiveness	9.75±3.09	9.5 (5–17)
Total	29.72±6.79	29 (17–46)
WHOQOL-BREF		
General health	33.44±24.90	25 (0–75)
Physical health	56.43±18.81	55.36 (21.43–96.43)
Psychological health	45.00±20.04	45.83 (12.50–87.50)
Social relationships	43.13±27.66	41.67 (0–100)
Environment	54.86±16.13	54.29 (25.71–82.86)
DERS		
Awareness	14.37±3.62	14 (6–24)
Clarity	13.28±4.36	13 (5–25)
Non-acceptence	16.20±7.59	14.5 (6–30)
Impulse control	17.25±6.2	17.5 (7–29)
Goals	18.25±5.21	19 (8–25)
Strategies	23.83±8.46	23.5 (8–40)
Total	103.18±29.78	106.5 (47–163)

Mean±SD was used instead of number, and median (Min–Max) was used instead of %. Y-BOCS, Yale-Brown Obsessive Compulsive Scale; BIS-11-SF, Barratt Impulsiveness Scale Short Form; WHOQOL-BREF, World Health Organization Quality of Life Scale Short Form; DERS, Difficulties in Emotion Regulation Scale; SD, standard deviation

cant positive relationship is observed between the Y-BOCS total score and the DERS total score (p=0.003) and the subscale scores for impulse control (p=0.011), goals (p=0.047), and strategies (p=0.003). The relationship between disease severity and ED, impulsivity, and QOL are summarized in Table 3.

Relationship between impulsivity and difficulties in emotion regulation and QOL

There is a statistically significant positive relationship between the BIS-11-SF non-planning subscale and the DERS subscales for awareness (p=0.034) and impulse control (p=0.036). A statistically significant inverse relationship exists between the BIS-11-SF total score and the WHOQOL-BREF psychological (p=0.008) and environment subscale scores (p=0.002). Similarly, there is a statistically significant inverse relationship between BIS-11-SF attentional impulsiveness subscale score and WHOQOL-BREF psychological (p=0.037) and environment subscale scores (p=0.004). Furthermore, there exists a statistically significant inverse relationship between BIS-11-SF motor impulsiveness subscale score and WHOQOL-BREF psychological (p=0.020) and environment subscale scores (p=0.013).

There is a statistically significant positive relationship between the BIS-11-SF attentional impulsiveness subscale score and the DERS total score (p<0.001) and the subscales for clarity (p<0.001), non-acceptance (p=0.005), impulse control (p<0.001), goals (p=0.001), and strategies (p<0.001). Similarly, there is a statistically significant positive relationship between the BIS-11-SF motor impulsiveness subscale score and the DERS total score (p<0.001) and the subscales for clarity (p<0.001), non-acceptance (p=0.001), impulse control (p<0.001), goals (p=0.002), and strategies (p<0.001). Furthermore, a statistically significant positive relationship is observed between the BIS-11-SF total score and the DERS total score (p<0.001) and the subscales for awareness (p=0.014), clarity (p<0.001), non-acceptance (p=0.001), impulse control (p<0.001), goals (p<0.001), and strategies (p<0.001). The relationship between impulsivity, ED and QOL are summarized in Table 4.

Relationship between difficulties in emotion regulation and QOL

There is a statistically significant inverse relationship between the WHOQOL-BREF general health subscale score and the DERS total score (p=0.002) and the subscales for awareness (p=0.014), non-acceptance (p=0.012), impulse control (p=0.007), goals (p=0.014), and strategies (p=0.001). A statistically significant inverse relationship (p=0.047) is also present between the WHOQOL-BREF physical health subscale score and the DERS total score and strategies subscale score. Furthermore, there is a statistically significant inverse relationship between the WHOQOL-BREF psychological subscale score and the DERS total score (p<0.001) and the subscales for awareness (p=0.043), clarity (p=0.001), non-acceptance (p=0.017), impulse control (p=0.001), goals (p<0.001), and strategies (p<0.001). The WHOQOL-BREF social relationships subscale score is significantly inversely related to the DERS subscales for clarity (p=0.040) and goals (p=0.031). Additionally, the WHOQOL-BREF environment subscale score has a statistically significant inverse relationship with the DERS total score (p=0.002) and the subscales for clarity (p=0.001), impulse control (p=0.003), goals (p=0.010), and strategies (p=0.001). The relationship between ED and QOL are summarized in Table 5.

DISCUSSION

The purpose of the present study was to investigate the re-

Table 3. Relationship between disease severity and impulsivity, quality of life, and difficulties in emotion regulation

	Y-BOCS-Obsession	Y-BOCS-Compulsion	Y-BOCS-Total
BIS-11-SF			
Non-planning			
r	0.127	0.004	0.073
p	0.434	0.979	0.654
Attentional impulsiveness			
r	0.154	0.197	0.187
p	0.341	0.222	0.249
Motor impulsiveness			
r	0.171	0.226	0.210
p	0.292	0.161	0.193
Total			
r	0.203	0.204	0.217
p	0.209	0.207	0.179
WHOQOL-BREF			
General health			
r	-0.612	-0.452	-0.571
p	<0.001	0.003	<0.001
Physical health			
r	-0.495	-0.373	-0.466
p	0.001	0.018	0.002
Psychological health			
r	-0.594	-0.529	-0.601
p	<0.001	<0.001	<0.001
Social relationships			
r	-0.067	-0.155	-0.116
p	0.682	0.338	0.475
Environment			
r	-0.302	-0.307	-0.325
p	0.058	0.054	0.041
DERS			
Awareness			
r	0.357	0.060	0.230
p	0.024	0.712	0.154
Clarity			
r	0.273	0.285	0.297
p	0.089	0.074	0.062
Non-acceptence			
r	0.506	0.389	0.480
p	0.001	0.013	0.002
Impulse control			
r	0.409	0.337	0.400
p	0.009	0.033	0.011
Goals			
r	0.339	0.249	0.316
p	0.033	0.121	0.047
Strategies			
r	0.510	0.341	0.458
p	0.001	0.031	0.003
Total			
r	0.502	0.359	0.462
p	0.001	0.023	0.003

Pearson correlation test was performed. It is significant at the $p<0.05$ level. $r<0.29$ is very weak, $0.30\leq r<0.50$ is weak, $0.50\leq r<0.70$ is moderate, $0.70\leq r<0.90$ is high, $r\geq 0.90$ indicates a very high degree of association. Y-BOCS, Yale-Brown Obsessive Compulsive Scale; BIS-11-SF, Barratt Impulsiveness Scale Short Form; WHOQOL-BREF, World Health Organization Quality of Life Scale Short Form; DERS, Difficulties in Emotion Regulation Scale

lationship between ED, impulsivity, and QOL in untreated OCD patients while also evaluating the relationship between disease severity and these parameters. Results suggested that ED is positively associated with impulsivity; moreover, ED and impulsivity are also associated with a deterioration in QOL. Concerning the ED and impulsivity, we found that attentional and motor impulsiveness subscales of the BIS-11-SF were positively associated with all subscales of the DERS (clarity, non-acceptance, impulse control, goals, and strategies) except awareness. Non-planning subscale of the BIS-11-SF was also positively associated with DERS awareness and impulse control subscales. The relationship between ED and impulsivity has so far been studied in contexts other than OCD: A study on patients with bipolar disorder, investigating suicide, found a relationship between impulsivity and ED.[26] Similarly, studies involving adolescents with multiple motor vehicle accidents and university students that binge drink showed a relationship between impulsivity and ED.[27,28] In a study examining ED and impulsivity-compulsivity in eating-related addictive-like behaviors, alcohol use and compulsive exercise, it was shown that ED was associated with higher levels of compulsivity in addictive-like behaviors and that ED, together with impulsivity, had an effect on all addictive-like behaviors.[29] Similarly, we have found that ED is associated with impulsivity and these two parameters are also associated with poor QOL in OCD patients.

Fergus and Bardeen[3] have found in their study with OCD patients that disease severity is associated with ED as measured by the DERS and the Emotion Regulation Questionnaire.[7] In our study, we observed a positive relationship between disease

severity and total difficulties in emotion regulation, as well as the subscales for awareness, non-acceptance, impulse control, goals, and strategies. This indicates that increased disease severity is associated with increased ED. In this context, our results are consistent with the literature. Studies have found a positive relationship between disease severity and ED in OCD.[40]

Table 4. Relationship between impulsivity and quality of life and difficulties in emotion regulation

	BIS-11-SF-Non-planning	BIS-11-SF-Attentional impulsiveness	BIS-11-SF-Motor impulsiveness	BIS-11-SF-Total
WHOQOL-BREF				
General health				
r	-0.115	-0.172	-0.238	-0.238
p	0.480	0.288	0.139	0.139
Physical health				
r	0.043	0.071	-0.193	-0.037
p	0.794	0.664	0.232	0.822
Psychological health				
r	-0.218	-0.330	-0.367	-0.415
p	0.176	0.037	0.020	0.008
Social relationships				
r	-0.177	-0.171	-0.155	-0.223
p	0.274	0.291	0.338	0.166
Environment				
r	-0.178	-0.450	-0.391	-0.471
p	0.273	0.004	0.013	0.002
DERS				
Awareness				
r	0.337	0.286	0.253	0.385
p	0.034	0.074	0.115	0.014
Clarity				
r	0.196	0.587	0.604	0.644
p	0.225	<0.001	<0.001	<0.001
Non-acceptence				
r	0.141	0.436	0.504	0.502
p	0.386	0.005	0.001	0.001
Impulse control				
r	0.332	0.597	0.552	0.676
p	0.036	<0.001	<0.001	<0.001
Goals				
r	0.267	0.503	0.475	0.569
p	0.096	0.001	0.002	<0.001
Strategies				
r	0.286	0.576	0.564	0.654
p	0.074	<0.001	<0.001	<0.001
Total				
r	0.303	0.608	0.606	0.695
p	0.058	<0.001	<0.001	<0.001

Pearson correlation test was performed. It is significant at the $p<0.05$ level. $r<0.29$ is very weak, $0.30\leq r<0.50$ is weak, $0.50\leq r<0.70$ is moderate, $0.70\leq r<0.90$ is high, $r\geq 0.90$ indicates a very high degree of association. BIS-11-SF, Barratt Impulsiveness Scale Short Form; WHOQOL-BREF, World Health Organization Quality of Life Scale Short Form; DERS, Difficulties in Emotion Regulation Scale

Table 5. Relationship between quality of life and difficulties in emotion regulation

DERS	WHOQOL-BREF-General health	WHOQOL-BREF-Physical health	WHOQOL-BREF-Psychological health	WHOQOL-BREF-Social relationships	WHOQOL-BREF-Environment
Awareness					
r	-0.384	-0.282	-0.321	0.022	-0.302
p	0.014	0.078	0.043	0.892	0.058
Clarity					
r	-0.285	-0.073	-0.495	-0.326	-0.519
p	0.075	0.652	0.001	0.040	0.001
Non-acceptence					
r	-0.393	-0.302	-0.374	-0.143	-0.226
p	0.012	0.058	0.017	0.379	0.161
Impulse control					
r	-0.421	-0.280	-0.504	-0.212	-0.457
p	0.007	0.080	0.001	0.190	0.003
Goals					
r	-0.385	-0.264	-0.545	-0.342	-0.404
p	0.014	0.099	<0.001	0.031	0.010
Strategies					
r	-0.498	-0.315	-0.611	-0.304	-0.518
p	0.001	0.047	<0.001	0.057	0.001
Total					
r	-0.485	-0.316	-0.581	-0.272	-0.483
p	0.002	0.047	<0.001	0.090	0.002

Pearson correlation test was performed. It is significant at the $p<0.05$ level. $r<0.29$ is very weak, $0.30\leq r<0.50$ is weak, $0.50\leq r<0.70$ is moderate, $0.70\leq r<0.90$ is high, $r\geq 0.90$ indicates a very high degree of association. WHOQOL-BREF, World Health Organization Quality of Life Scale Short Form; DERS, Difficulties in Emotion Regulation Scale

Moreover, the use of inappropriate emotion regulation strategies and ED have been implicated in the onset and persistence of OCD.[2] The relationship between disease severity and ED in OCD aligns with the cognitive model of OCD, which suggests that ED increases the severity of OCD symptoms.

A study investigating QOL in OCD patients found an inverse relationship between Y-BOCS scores and the psychological, physical, and environmental domains of the WHOQOL-BREF, indicating that increased severity of OCD symptoms is associated with decreased QOL.[24] A study by Ekinci and Ekinci[41] assessing QOL in OCD patients using WHOQOL-BREF reported that QOL is negatively affected by disease severity, which is also corroborated by the findings of Velloso et al.[42] In a 5-year follow-up study using the Y-BOCS scale, Eisen et al.[20] found a higher correlation between obsession scores and QOL than between compulsion scores and QOL. In our study, we found an inverse relationship between Y-BOCS scores (determining disease severity) and WHOQOL-BREF general health, physical health, environmental, and psychological health scores, indicating that increased disease severity is associated with decreased QOL.

In our study, we found no relationship between disease severity and impulsivity in OCD. The literature presents mixed results, with some studies finding a relationship between impulsivity and disease severity; whereas others do not, and report that impulsivity affects the course of OCD symptoms.[16,17,43] The small sample size of our study may have caused a lack of significant relationship between disease severity and impulsivity. The differing results in the literature suggest that further studies with larger samples are needed in this area.

We found an inverse relationship between impulsivity and QOL in our study. A review of the literature did not reveal any studies specifically examining the relationship between impulsivity and QOL in OCD patients to our knowledge. However, studies on patients with Parkinson's disease and those with suicide attempts found that impulsivity negatively affects the QOL.[44,45] Data from a study conducted with patients diagnosed with bipolar disorder showed that impulsivity, especially positive urgency, is significantly associated with QOL and that interventions targeting impulsivity in treatment may help to improve QOL in bipolar disorder patients.[46] Similarly, in studies conducted with patients undergoing treatment for alcohol

and substance use disorders, a negative relationship between health-related QOL and impulsivity was found, and the significance of treatment approaches aimed at reducing impulsivity in the recovery process was emphasized.[47,48]

This study also found an inverse relationship between QOL and ED. The literature does not include studies specifically examining the relationship between QOL and ED in OCD patients to our knowledge. However, studies on adolescents with chronic diseases and patients with epilepsy have found a negative relationship between ED and QOL.[49,50] A study with post-traumatic stress disorder (PTSD) patients found that increased ED and impulsivity were associated with poor QOL and suggested that ED aspects may represent novel treatment targets for psychosocial interventions to improve QOL in PTSD patients.[51]

Although this is, to our knowledge, the only available study to date investigating the relationship between ED and impulsivity in OCD patients, there are several limitations. These include it being a single-center study with participants only from a specialized hospital. The lack of a larger sample is a significant limitation. Another limitation is the use of self-report scales to assess impulsivity, QOL, and ED, as responses can be influenced by various factors. Participants with additional psychiatric diagnoses were excluded, but sub-threshold anxiety and depressive symptoms may still complicate the interpretation of the results. The absence of a control group is another limitation. Additionally, correlation analysis is inadequate to evaluate the relationship of prediction. The cross-sectional design of the study prevents us from determining the direction and causality of the relationships between the variables. Prospective, longitudinal studies are needed to confirm our findings. On the other hand, no other study so far has been as comprehensive as ours in terms of the parameters that it investigates. We investigated the relationships between all four of ED, impulsivity, QOL, and disease severity, while existing studies considered only subsets of those parameters. A novel aspect of our work is the use of untreated OCD patients as subjects; in general, OCD studies work with patients undergoing active treatment.

In conclusion, our study found a significant positive relationship between ED and impulsivity in OCD patients. Additionally, a positive relationship was identified between disease severity and ED, while an inverse relationship was observed between disease severity and QOL. Increased impulsivity and ED were also associated with a deterioration in QOL.

This study contributes to the literature by highlighting relationships between ED, impulsivity and QOL in OCD patients. The combination of ED and impulsivity could have important implications for understanding the persistence of OCD, and they will serve as important targets for treatment approaches in OCD patients. Future research should examine the casual links between ED and impulsivity in OCD; also, ED and impulsivity should be carefully studied to develop effective therapeutic strategies.

Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Sinem Yolcu Uzunoğlu, Engin Emrem Beştepe. Data curation: Sinem Yolcu Uzunoğlu, Engin Emrem Beştepe. Formal analysis: Sinem Yolcu Uzunoğlu, Engin Emrem Beştepe. Investigation: Sinem Yolcu Uzunoğlu. Methdology: Sinem Yolcu Uzunoğlu, Engin Emrem Beştepe. Project administration: Sinem Yolcu Uzunoğlu, Engin Emrem Beştepe. Resources: Sinem Yolcu Uzunoğlu. Visualization: Sinem Yolcu Uzunoğlu. Writing—original draft: all authors. Writing—review & editing: all authors.

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