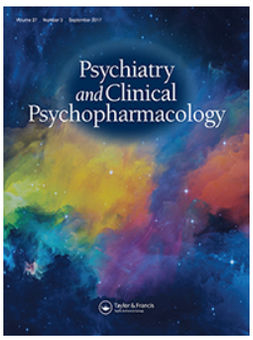

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Schizotypality and neurological soft signs in patients with obsessive–compulsive disorder

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ABSTRACT

OBJECTIVES: The broad description of schizotypy includes cognitive, sensitive, and information processing deficits connected with thought disorder symptoms. Recently, the term of schizotypy has started to be researched, not only in schizophrenia patients and their relatives but also in other psychiatric populations. Neurological soft signs (NSS) are known as abnormal motor or sensorial findings in the absence of a localized neurological disorder. There are some studies referring to the association between obsessive–compulsive disorder (OCD) and NSS, and vice versa. In this study, we aimed to examine the differences between OCD patients and healthy control groups in terms of schizotypality and NSS. We also aimed to predict risk factors affecting OCD patients with schizotypal features.

METHODS: Overall, 92 OCD patients and 91 healthy controls were included in this study. Chapman's Scales (Physical and Social Anhedonia Scales, Perceptual Aberration Scale, and Magical Ideation Scale) and Schizotypal Personality Questionnaire (SPQ) were administered to patient group. Symptom severity of OCD was recorded using the Yale-Brown Obsessive Compulsive Scale. The neurological portion of the Physical and Neurological Examination for Soft Signs (PANESS) and a Brief Psychiatric Rating Scale were administered to patient and control groups.

RESULTS: The patient group had higher scores on total PANESS scale ($p < .001$) and synergie ($p = .012$), graphestesia ($p < .001$), posture ($p < .001$), topognosia ($p < .001$), and repetitive movement ($p < .001$) subscales. There were no statistically significant differences in terms of stereognosis ($p = .056$) or continuity of movement ($p = .79$) subscales. We found that the sexual, religious, and order–symmetry obsessions and pathological doubt effects of schizotypality were independent risk factors for schizotypality in OCD.

CONCLUSIONS: Both the schizotypal features and NSS worsen the course of OCD and may point out the neurodevelopmental basis of the disease. We can say that OCD patients with high schizotypality should take a separate place on the schizo-obsessive spectrum.

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Obsessive–compulsive disorder; neurological soft signs; schizotypality

Introduction

Obsessive–compulsive disorder (OCD) is a chronic neuropsychiatric disorder, characterized by obsessions and compulsions, and often associated with high levels of anxiety and deterioration in functionality. Obsessive–compulsive symptoms (OCS) are more common among patients with schizophrenia than in the general population, and patients with OCD may also exhibit psychosis-like symptoms [1,2]. These findings suggest that there exists a spectrum of disorders between OCD and schizophrenia including OCD, OCD with poor insight, OCD with schizotypal personality disorder, schizophrenia with OCS, schizophrenia with OCD and schizophrenia [2].

Comparative studies of schizophrenia and OCD point out the neurobiological basis, but in spite of all the epidemiological and biological evidence, the relationship between schizophrenia and OCD is poorly understood [3].

Neurological soft signs (NSS) are defined as motor or sensory disorders (e.g. difficulties in two-point discrimination, graphestesia, impaired involuntary movements, sensory areas, and visuospatial areas) without a structural lesion in the central nervous system (CNS) [4,5]. Soft signs may reflect small lesions in the brain that manifest themselves by evoking minor neurological abnormalities, as opposed to large lesions, which lead to gross physical and/or computed tomography (CT) or magnetic resonance imaging (MRI) findings [6]. There is a documented link between NSS and psychiatric illness [4,6–9].

Individuals with OCD had raised levels of soft signs as compared with non-clinical controls in many categories such as motor coordination, sensory integration, and primitive reflexes [10]. In OCD, increased NSS have been found to correlate with increased OCS [10,11].

Schizotypy is similar to schizophrenia, but refers to a milder clinical state [12]. Schizotypal symptoms are

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associated with relatively high probability of occurrence of psychotic disorder [11]. In addition, genetic epidemiological study results pointing to a possible relationship between schizotypy with schizophrenia are available [13].

Higher correlations have been found between symptom severity and magical ideation in OCD patients [14]. It suggests that there is a fundamental link between OCD symptoms and a variable of schizotypy. This is an important finding, because most OCD patients suffer from the symptomatic effects in daily living and have difficulties in expressing themselves in everyday language. There are many detailed studies investigating the connection between schizotypy and OCD.

A 2002 study showed that schizotypal symptoms were higher in patients with OCD as compared to other psychiatric disorders [15]. In non-clinical samples, obsessive–compulsive and schizotypal symptoms were found to overlap [16]. Sobin et al. found that almost half of 119 OCD patients had moderate schizotypal symptoms. They reported that schizotypal-featured OCD patients had earlier onset of the disease, more comorbid diagnoses, higher rates of learning disabilities, more severe aggressive and somatic obsessions, and counting compulsions. With these findings, they suggested that OCD may have a schizotypal subtype [17].

Based on these data, it can be said that the presence of schizotypy aggravates obsessions and compulsions and complicates OCD treatment.

In this study, we aimed to examine whether the schizotypality and NSS are predictors of OCD or not. We also aimed to predict risk factors affecting OCD patients with schizotypal features.

Methods

Participants

This study was performed at the Department of Psychiatry of Ankara Numune Training and Research Hospital, Turkey. We recruited 92 patients with OCD who came to our inpatient and outpatient clinic between December 2010 and June 2011, as well as 91 age- and sex-matched controls with no psychiatric disorders.

Inclusion criteria for the patient group were: a diagnosis of OCD according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision (DSM-IV-TR), 18–65 years of age, and possessing at least 5 years of primary school education.

The exclusion criteria included anoxia or hypoxia during birth; the presence of a major medical disorder or neuropsychiatric symptoms secondary to a metabolic disorder or structural lesion; consuming alcohol or other substances for the last 2 months; a history of receiving any medications including antidepressant and anxiolytics in the control group; a family history of any psychiatric disorder in the control group; any comorbid psychiatric disorders in the patient group; and the presence of abnormal findings in routine blood examinations and on CT scans.

Design and procedure

We did a case–control study to examine the differences between OCD patients and healthy control groups about schizotypy and NSS. We also aimed to predict risk factors affecting OCD patients with schizotypal features. The study was approved by the local Ethics Committee.

Instruments

Trained physicians administered all clinical assessments. All patients and controls provided informed consents and sociodemographic data forms. Diagnostic assessment included a structured clinical interview for DSM-IV (SCID-CV) [18].

Chapman's Scales (Physical Anhedonia Scale (PhA), Perceptual Aberration Scale (PAS), and Magical Ideation Scale (MIS)) and Schizotypal Personality Questionnaire (SPQ) were administered to patient group. Symptom severity of OCD was recorded using the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) [19]. The neurological portion of the Physical and Neurological Examination for Soft Signs (PANESS) and a Brief Psychiatric Rating Scale (BPRS) were administered to patient and control groups.

Sociodemographic data form

The form included age, gender, education in years, marital status, first administration date, drugs used, a history of frequent throat (HFT) infection, a history of tics, physical and psychiatric diseases, and family history.

Structured Clinical Interview for the DSM-IV Axis I Disorders

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) is a semistructured interview for making the major DSM-IV Axis I diagnoses which was developed by First et al. [20]. The instrument was designed to be administered by a clinician or trained mental health professional. Ideally, this would be someone with experience performing semistructured diagnostic evaluations.

Chapman's Scales: PAS, MIS, Physical and Social Anhedonia Scales (PhA-SoA)

Perceptual Aberration Scale [21]. The PAS has been used for the assessment of perceptual distortions

associated with body image (e.g. "I sometimes have had the feeling that my body is abnormal") [22–27].

Magical Ideation Scale [28]. This is a scale used for the assessment of superstitious and magical beliefs and thoughts, as well as of the capacity of thought reading or broadcasting (e.g. "I have sometimes felt strangers were reading my mind") [23–27].

Revised Physical and Social Anhedonia Scales [21]

The Revised Physical Anhedonia Scale (PhA) [29]. This 61-item scale assesses a self-reported deficit in the ability to experience pleasure from typically pleasurable physical stimuli such as food, sex, and settings (e.g. "Beautiful scenery has been a great delight to me.").

The Revised Social Anhedonia Scale (SoA) [28]. This 40-item scale assesses deficits in the ability to experience pleasure from non-physical stimuli such as other people, talking, and exchanging expressions of feelings (e.g. "A car ride is much more enjoyable if someone is with me.").

Schizotypal Personality Questionnaire

The SPQ, a 74-item self-report instrument modelled after the DSM-III-R schizotypal personality disorder diagnostic criteria (largely unchanged in DSM-IV), was developed to study schizotypal personality patterns and to screen for schizotypal personality disorder in the general community [30]. The Turkish translation of the SPQ [31] was used in this study.

Yale-Brown Obsessive Compulsive Scale

The Y-BOCS [19] is a 13-item semistructured interview to measure the severity of OCS. The scoring structure consists of obsession (range = 0–20), compulsion (range = 0–20), and total score (range = 0–20). A total score of 10–20 indicates mild OCS, 21–30 indicates moderate OCS, and 31–40 indicates severe OCS. The Turkish translation of the Y-BOCS [32] was used in this study.

Physical and Neurological Examination for Soft Signs

The PANESS is a structured, scripted assessment tool developed by Close [33]. This scale has two sections consisting of physical and neurological assessments. Only the neurological section of this scale was used in this study. The neurological section consists of 43 items: 1–8: synergie (coordination), 9–16: graphestesia, 17–20: stereognosis, 21–26: posture, 27–29: topognosia, 30–36: continuity of movement, and 37–42: repetitive movement assessment. Items 21–29 are rated from 0 to 3, and the other items are rated from 1 to 4.

The Brief Psychiatric Rating Scale

BPRS is a rating scale which a clinician or researcher may use to measure psychiatric symptoms such as depression, anxiety, hallucinations, and unusual behaviour. Each symptom is rated 1–7 and, depending on the version, a total of between 18 and 24 symptoms are scored. The scale is one of the oldest, most widely used scales to measure psychotic symptoms and was first published in 1962 [34].

Statistical analyses

Statistical Package for the Social Sciences (SPSS) Version 15.0 for Windows was used for the analyses. In the statistical review of the results; the Kolmogorov–Smirnov test was used to determine whether the parameters were normally distributed. While descriptive statistics for continuous variables were shown as means ± standard deviations, categorical variables were expressed as number of cases (n) and %. The Student's t-test was used for the comparison of the two groups, while multiple logistic regression analysis was applied to identify independent risk factors. The Mann–Whitney U test and Kruskal–Wallis test were used for nonparametric variables. The Pearson correlation test was used to determine the association between the continuous parametric variables, and the Spearman's correlation test was used to determine the association between the continuous nonparametric variables. The results were evaluated for a significance level of $p < .05$.

Results

Overall, 92 patients with OCD and 91 healthy controls were enrolled. Demographic and clinical characteristics of the two groups are presented in Table 1. There were no significant differences among the groups in age, gender, or educational level. The history of tic disorders

Table 1. Sociodemographic characteristics of participants.

Variable	Patient	Control	p
Number of patients	92	91	
Age, mean (min–max)	36.0 (12–56)	34.0 (17–56)	.633
Gender			.668
Male	30 (32.6%)	27 (29.7%)	
Female	62 (67.4%)	64 (70.3%)	
Education			.909
Primary school	38 (41.3%)	38 (41.8%)	
Secondary school	13 (14.1%)	16 (17.6%)	
High school	23 (25%)	20 (22%)	
College/University	18 (19.6%)	17 (18.7%)	
Marital status			.223
Married	53 (57.6%)	58 (63.7%)	
Single	33 (35.9%)	23 (25.3%)	
Other	6 (6.5%)	10 (11%)	
Working status			.010*
Working	39 (42.4%)	56 (61.5%)	
Unemployed	53 (57.6%)	35 (38.5%)	
History of frequent throat infections			.056
Yes	26 (28.3%)	15 (16.5%)	
No	66 (71.7%)	76 (83.5%)	
History of tic disorder			<.001*
Yes	14 (15.2%)	1 (1.1%)	
No	78 (84.8%)	90 (98.9%)	

*$p < .05$.

and the unemployment rate were higher in the patient group ($p < .001$ and $p = .010$, respectively).

As shown in Table 2, OCD patients had significantly higher scores on total SPQ, PhA, PAS, MIS, and each subscale of SPQ.

PANESS subscale scores showed differences between patient and control groups (Table 3). The patient group had higher scores on total PANESS scale ($p < .001$) and synergie ($p = .012$), graphestesia ($p < .001$), posture ($p < .001$), topognosia ($p < .001$), and repetitive movement ($p < .001$) subscales. There were no statistically significant differences on stereognosis ($p = .056$) and continuity of movement ($p = .79$) subscales.

SPQ total score of the patients with OCD was 26 (min: 0 and max: 61). The patient group was divided into two groups according to their total SPQ scores: high schizotypality (HS) group (≥26) and low schizotypality (LS) group (<26). In the HS group, the mean age of onset of the OCD was 21.4 (±7.7) and the disorder began earlier, compared to the LS group with a statistically significant difference ($p = .040$).

Fifty-nine of 92 patients were on an antidepressant monotherapy, while 33 of them were taking a combination therapy. In all, 81.8% of the patients on combination therapy had a higher schizotypality, with a significant statistical difference ($p = .019$).

HFT infections were associated with HS scores ($p = .020$). In the patient group, 26 of 92 had HFT and 22 of these (84.6%) had HS scores.

Fifteen (88.2%) of 17 patients with sexual obsessions had HS scores, and this was statistically significant ($p = .034$). Also, 30 (83.3%) of 36 patients with order and symmetry obsessions had HS scores, and this was statistically significant ($p = .006$). Likewise, 28 (80%) of 35 patients with ordering/arranging compulsions had HS scores, and this was statistically significant ($p = .029$).

Along with these findings, some variables were found to be predictive for schizotypality in OCD patients. These predictive variables were: gender, education, age of onset of disease, combination therapy, history of tic disorder, and frequent throat infections. Furthermore, contamination obsessions, religious and sexual obsessions, symmetry obsessions, cleaning compulsions, and ordering/arranging compulsions were predictive for schizotypality in OCD patients.

Additionally, high total Y-BOCS scores, high Y-BOCS overvalued sense of responsibility scores, high Y-BOCS pathological doubting scores, high total PhA, MIS, PAS scores, and high PANESS graphestesia subscale scores are predictors for schizotypality in OCD patients. When we applied multiple logistic regression analysis to identify independent risk factors in these variables, with a 78.3% validation rate, sexual obsessions (OR: 12.685; $p = .004$), religious obsessions (OR: 13.304; $p = .027$), order–symmetry obsessions (OR: 10.040; $p < .001$), and Y-BOCS pathological doubting scores (OR: 4.963; $p = .005$) were found to be independent risk factors for schizotypality in OCD patients (Table 4).

Table 2. Comparison of scale and subscale scores between the groups.

Variables	Patient Median (min–max)	Control Median (min–max)	p
SPQ subscales			
Ideas of reference	4 (0–9)	1 (0–8)	<.001
Social anxiety	6 (0–8)	3 (0–8)	<.001
Odd beliefs	1 (0–7)	1 (0–5)	.039
Unusual perception	3 (0–9)	1 (0–7)	.004
Odd behaviour	3 (0–7)	0 (0–6)	<.001
No close friends	5 (0–9)	3 (0–8)	<.001
Odd speech	4 (0–9)	1 (0–7)	<.001
Blunted affect	4 (0–8)	2 (0–6)	<.001
Paranoid ideation	4 (0–8)	3 (0–6)	<.001
SPQ total score	36 (1–61)	19 (0–44)	<.001
MIS total score	8.5 (0–21)	5 (0–19)	<.001
PAS total score	7.5 (0–32)	3 (0–21)	<.001
PhA total score	21 (1–43)	14 (0–31)	<.001

Table 3. PANESS scores between the patient and control groups.

Variables	Patient Median (min–max)	Control Median (min–max)	p
Synergie	8 (8–22)	8 (8–12)	.012
Graphestesia	9 (8–22)	8 (8–12)	<.001
Stereognosis	4 (4–9)	4 (4–5)	.056
Posture	1 (0–14)	0 (0–6)	<.001
Topognosia	1 (0–9)	0 (0–6)	<.001
Continuity of movement	7 (7–18)	7 (6–10)	.079
Repetitive movement	6 (6–20)	6 (6–6)	<.001
Total	44 (37–80)	38 (36–48)	<.001

Discussion

OCD is a psychiatric disorder that leads to a high rate of disability and restricts people's activities and social lives severely. In our study, almost half of the patients (42.4%) were unemployed for at least one year. Findings, especially in early-onset cases of OCD and those with comorbid tic disorders, point out the hereditary nature of the disease [35,36]. We found higher rates of tic disorders in OCD patients as compared to healthy controls, consistent with previous studies [37].

We used SPQ, MIS, PAS, and PhA scales to examine schizotypality in OCD patients. Overall, total SPQ scores, SPQ subscale scores, MIS, PAS, and PhA scores

Table 4. Independent risk factors identified by multiple logistic regression analysis.

Independent variables	p	OR (95% CI)
Sexual obsessions	.004	12.685 (2.247–71.630)
Religious obsessions	.027	13.304 (1.335–132.550)
Order–symmetry obsessions	<.001	10.040 (2.966–33.987)
Y-BOCS pathological doubting	.005	4.963 1.631–15.102)

Note: Dependent variable: total PANESS score.

were higher in OCD patients as compared to healthy controls. MIS and PAS are related to positive symptoms of schizotypality and PhA is related to negative symptoms of schizotypality [38]. Previous studies have shown that there has been an association between OCD and positive schizotypality [14,39–41]. In our study, we found that negative schizotypality is also associated with OCD. OCD is a disorder that prevents patients from enjoying life and makes it difficult to lead a normal life. The patient cannot get rid of bothersome and haunting thoughts and does not want to be found in any activity, and for that reason closes him or herself to the outside world. So, the presence of negative schizotypal symptoms in OCD can be explained by the nature of the disorder.

Magical ideation is the attribution of causal or synchronistic relationships to actions and events which seemingly cannot be justified by reason and observation. A tendency to have magical ideation is associated with environmental, cultural, and biological factors [42,43]. In Turkey, culturally, examples of magical ideation are very common, such as evil eye, spells, superstitions, and luck symbols and rituals. However, beyond cultural influence, OCD is thought to have a biological effect on magical ideation [42,43]. In our study, the patient group had higher rates of magical ideation as compared to the healthy controls, consistent with previous studies [42,43].

We found that OCD patients with HS tended to be younger than patients with LS, consistent with data [17] and these patients were using more combination drug therapies than the LS group. HS was associated with a lack of response to treatment and led to a need for combination therapies such as adding psychotropic agents like SSRI, TCA, antipsychotics, and mood stabilizers such as lithium. We can say that schizotypality complicates the treatment in OCD patients. Clinicians treat the HS patients with more than one drug to achieve remission and try to treat multiple mechanisms of actions in the CNS. Y-BOCS total score was also found to be higher in the HS patient group. The disorder was more severe and HS led to more complaints and more disability.

In this present study, HS patients had more sexual, religious, contamination, and order–symmetry obsessions and cleaning, ordering/arranging compulsions. Previous studies found that schizophrenia patients have more aggressive, contamination, somatic, and sexual obsessions in addition to cleaning, counting, ordering/arranging, and hoarding compulsions [44–46]. Schizo-obsessive groups and OCD groups with schizotypal features seem to be dominated by clusters of similar symptoms; that is to say, what is considered a separate schizotypal-featured group can take place in the spectrum between OCD and the schizo-obsessive group.

Of all the variables, the results of our analysis showed that the presence of sexual, religious, and order–symmetry obsessions seems to increase schizotypality.

Eventually, schizotypality is a psychological condition related to a neurodevelopmental basis and it is a risk factor for schizophrenia development. Additionally, the relationship between other psychiatric disorders such as OCD and schizotypality is being studied. The relationship between OCD and schizotypality may help us to understand the schizo-obsessive spectrum.

Another factor that can help us in understanding the neurodevelopmental structure of OCD includes NSS. There are many controversial articles in the literature concerning OCD and NSS. Stein et al. reported that OCD patients and healthy controls did not differ in having NSS [5]. But, many studies have found association between OCD and total NSS scores and subscale scores [4,47,48]. Hollander et al. found that OCD patients have had higher scores of total NSS and motor coordination scores as compared to healthy controls [4]. In this study, there were no statistically significant differences between the patients and controls in terms of sensorial abnormalities; however, OCD patients had a poorer performance in writing graphestesia.

Karadag et al. reported that OCD patients had higher total NSS scores than controls, and OCD patients with poor insight exhibited more extensive neurodevelopmental impairments [49]. OCD patients with poor insight performed significantly worse on all NSS subscales, and they had significantly more NSS on motor coordination and sensory integration subscales compared to the OCD with good insight group [49].

Peng et al. reported that OCD was associated with higher NSS rates, particularly in motor coordination signs [50]. Guz and Aygun found significant differences in total NSS scores, graphesthesia, and two-point discrimination between the OCD patients and the healthy controls [51]. The graphesthesia, two-point discrimination, and total PANESS scores were significantly higher in the OCD group than in the control group [51].

In this present study; OCD patients demonstrated higher total PANESS scores and synergie, graphestesia, posture, topognosia, and repetitive movement scores compared to healthy controls. The data suggested that there had been a strong link between OCD and, especially, the graphesthesia subscale of NSS consistent with our findings. The aetiology of NSS is not yet fully understood. Future studies might utilize concurrent neuroimaging measures such as positron emission tomography [43], functional MRI, and diffusion tensor imaging with examination of NSS for more specific localization. Evaluation of family members of OCD

patients should be undertaken to determine the familial nature of NSS.

Meanwhile, some studies suggest that the NSS could reflect a genetic predisposition that leads to development of OCD and schizophrenia [52,53]. So, the presence of NSS and movement disorders like tic disorders contributes to the genetic aetiological aspects of OCD and are attributed to the idea that OCD is related to an organic-structural defect.

Conclusions

In conclusion, our results suggest that OCD patients have high schizotypal features and higher levels of NSS which are associated with poor prognosis. The presence of sexual, religious, and order–symmetry obsessions and pathological doubt affects schizotypality and schizotypal features and worsens the course of OCD. Early detection of NSS and schizotypal features can help clinicians to understand the process and manage the treatment. Obsessive symptoms in schizotypal patients should be treated, and OCD patients with sexual, religious, order–symmetry obsessions, and pathological doubt should be evaluated for schizophrenia spectrum, and these patients should be asked for a family history and functionality.

Our study is a cross-sectional study and it is limited to clarifying the course of the disease. Longitudinal and detailed future studies with longer follow-up might investigate schizotypality in OCD patients in order to understand the connection between OCD, schizotypal features, and the schizo-obsessive spectrum.

Disclosure statement

No potential conflict of interest was reported by the authors.

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