



DISRUPTED SLEEP ARCHITECTURE IN OCD: CAUSE, CONSEQUENCE, OR COMORBIDITY

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ABSTRACT

Background: Obsessive-compulsive disorder (OCD) is a chronic psychiatric condition often accompanied by sleep disturbances, which may exacerbate symptom severity and functional impairment. However, the relationship between OCD symptom dimensions and sleep quality, particularly the presence of Delayed Sleep Phase Disorder (DSPD), remains underexplored. **Aim:** To assess sleep quality in individuals with OCD compared to healthy controls, examine correlations between OCD severity and sleep quality, and identify predictors of DSPD within the OCD population. **Methods:** A cross-sectional study was conducted involving 194 participants—97 OCD patients and 97 matched healthy controls. Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI), and OCD severity was assessed using the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). Statistical analyses included t-tests, Pearson correlations, ANOVA, and logistic regression to examine group differences, associations, and predictors. **Results:** OCD patients reported significantly poorer sleep quality across all PSQI components compared to controls ($p < 0.001$). Global PSQI scores were positively correlated with Y-BOCS total ($r = 0.62$), obsession ($r = 0.58$), and compulsion ($r = 0.51$) subscale scores. Among OCD symptom dimensions, individuals with symmetry/ordering symptoms exhibited the worst sleep quality ($p = 0.018$). Younger age, unemployment, higher OCD severity, and poor sleep quality were significant predictors of DSPD. **Conclusion:** Sleep disturbances are strongly associated with OCD severity and symptom dimensions. Early identification and management of sleep-related issues, especially DSPD, may enhance treatment outcomes and improve overall functioning in individuals with OCD.

KEYWORDS : Delayed Sleep Phase Disorder, Obsessive-Compulsive Disorder, Pittsburgh Sleep Quality Index, Sleep Quality, Yale-Brown Obsessive-Compulsive Scale.

1. INTRODUCTION

Obsessive-Compulsive Disorder (OCD) is a chronic, debilitating neuropsychiatric condition characterized by intrusive, unwanted thoughts (obsessions) and repetitive behaviors or mental acts (compulsions). Affecting approximately 1–3% of the global population, OCD has a profound impact on individual functioning and quality of life [1]. Recent years have witnessed a growing body of evidence suggesting a significant link between OCD and disturbances in sleep architecture, particularly in sleep quality, circadian rhythm alignment, and overall sleep efficiency [2-4]. However, whether such sleep disruptions are a cause, a consequence, or merely a comorbid feature of OCD remains an area of active investigation. A consistent finding across multiple studies is the elevated prevalence of delayed sleep phase disorder (DSPD) among individuals with OCD [5,6]. Meta-analytic data further supports disruptions in sleep duration and timing, with individuals with OCD exhibiting reduced total sleep time (TST), prolonged sleep onset latency, and lower sleep efficiency compared to healthy controls [7]. Interestingly, these findings persist even after controlling for comorbid depression, suggesting a sleep disturbance profile intrinsic to OCD pathology rather than secondary to mood-related factors.

In pediatric populations, studies show that children and adolescents with OCD experience significantly poorer sleep quality, including shortened sleep duration and increased pre-sleep rituals and obsessions [3]. These disruptions not only correlate with OCD severity but may also vary with symptom subtypes—for instance, symmetry/ordering symptoms being more strongly associated with poor sleep than contamination/cleaning compulsions. From a mechanistic perspective, disrupted sleep has been implicated in cognitive and affective dysfunctions that mirror core features of OCD, such as impaired inhibitory control, increased intrusive thinking, and emotional dysregulation [6]. Furthermore, sleep disturbances have been shown to compromise treatment efficacy, with poor baseline sleep predicting poorer responses to cognitive-behavioral therapy in pediatric OCD cohorts [2].

Despite these converging lines of evidence, the precise nature of the relationship between sleep and OCD remains elusive. While some findings suggest that sleep disruption may precede and exacerbate OCD symptoms—possibly through mechanisms involving serotonergic dysregulation and circadian misalignment—other studies propose that OCD-driven behaviors (e.g., prolonged rituals or nighttime checking) may themselves delay sleep initiation and perpetuate insomnia. This research aims to critically examine whether disrupted sleep architecture should be conceptualized as a causative factor in the onset and maintenance of OCD, a consequence of obsessive-compulsive symptomatology, or a distinct comorbid condition. By synthesizing clinical, neurobiological, and behavioral evidence, the current study seeks to clarify this bidirectional and complex interplay, ultimately informing more integrated approaches to assessment and intervention in OCD.

2. METHODOLOGY

2.1 Study Design

This research will adopt a cross-sectional, mixed-methods design aimed at exploring the nature of disrupted sleep architecture in individuals diagnosed with obsessive-compulsive disorder (OCD). The study integrates both quantitative and qualitative approaches to assess sleep disturbances, their severity, and their relationship with OCD symptom dimensions and severity. The methodology draws on frameworks and instruments validated in prior studies on OCD and sleep disturbances.

2.2 Sample Size

A total of 194 participants were enrolled in the study, comprising 97 individuals diagnosed with obsessive-compulsive disorder (OCD) and 97 healthy controls matched for age and sex. The sample size was determined based on prior studies examining sleep disturbances in OCD populations and was considered adequate to detect statistically significant differences in sleep quality and symptom severity between groups with a power of 80% and a confidence level of 95%. The equal allocation ensured robust group comparisons across demographic and clinical

variables, and allowed for meaningful subgroup analysis of OCD symptom dimensions in relation to sleep disturbances.

2.3 Eligibility Criteria

➤ **Inclusion Criteria**

❖ **For OCD Group:**

- Individuals aged between 18 and 55 years.
- Clinically diagnosed with obsessive-compulsive disorder (OCD) as per DSM-5 criteria.
- Diagnosis confirmed using structured clinical interviews (e.g., MINI or SCID-5).
- Willingness to provide informed consent and participate in the study.
- Recruited from outpatient psychiatric clinics or mental health hospitals.

❖ **For Control Group:**

- Age- and sex-matched individuals without any current or past psychiatric disorders.
- No self-reported sleep-related complaints.
- Not currently receiving psychiatric or neurological treatment.
- Willing to provide informed consent.

➤ **Exclusion Criteria**

❖ **For Both Groups:**

- Presence of comorbid psychiatric conditions such as major depressive disorder, generalized anxiety disorder, or substance use disorders (unless otherwise specified).
- History of neurological illness, cognitive impairment, or intellectual disability.
- Use of medications known to affect sleep or circadian rhythms (e.g., sedatives, stimulants).
- Diagnosed sleep disorders other than Delayed Sleep Phase Disorder (e.g., sleep apnea, narcolepsy).
- Significant medical illnesses that may interfere with sleep or study participation.

2.4 Instruments and Measures

➤ **Obsessive-Compulsive Symptomatology**

- ❖ The Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) will be used to quantify OCD severity. Subscale scores for obsessions and compulsions will be recorded to evaluate symptom profiles.
- ❖ Symptom dimensions will be categorized (e.g., contamination, symmetry, hoarding) to assess their correlation with sleep parameters.

➤ **Sleep Quality and Architecture**

- ❖ The Pittsburgh Sleep Quality Index (PSQI) will be administered to evaluate subjective sleep quality, sleep latency, duration, disturbances, and daytime dysfunction.
- ❖ A clinical evaluation for Delayed Sleep Phase Disorder (DSPD) will be conducted using standard diagnostic criteria and 7-day sleep diaries, modeled after previous DSPD-OCD comorbidity studies.

➤ **Cognitive and Emotional Regulation**

- ❖ To explore potential mechanisms, cognitive control will be assessed using Go/No-Go tasks and Stroop tests, as impaired response inhibition has been implicated in both OCD and sleep-disrupted states.
- ❖ Measures of daytime functioning and mood, such as the Beck Depression Inventory-II (BDI-II) and Epworth Sleepiness Scale (ESS), will be included to assess potential mediators.

2.5 Data Collection Procedure

Participants will be informed about the nature and purpose of the study and written informed consent will be obtained. Structured interviews, self-report questionnaires (including PSQI), and behavioral tasks will be administered in a controlled clinical setting. Participants will also maintain a daily sleep diary for 7 consecutive nights to aid in identifying potential circadian disruptions or DSPD patterns.

2.6 Data Analysis

Quantitative data will be analyzed using SPSS v27. Descriptive statistics will summarize sample characteristics and group differences. Independent t-tests and ANCOVA will compare sleep parameters between OCD and control groups, controlling for age, sex, and medication use. Pearson correlation and regression analyses will be used to examine the associations between sleep variables (as measured by PSQI) and OCD symptom severity and subtype. Logistic regression will evaluate the predictive value of sleep disturbances for the presence of DSPD among OCD participants. Qualitative data, including sleep diary narratives and participant interviews (if available), will undergo thematic content analysis to explore subjective experiences of sleep disruption and its perceived impact on OCD symptoms.

3. RESULTS

Table 1 presents the socio-demographic characteristics of the study participants, including 97 individuals with OCD and 97 healthy controls. The mean age of participants in both groups was comparable (30.5 ± 8.6 years in the OCD group vs. 31.2 ± 9.0 years in controls), with no statistically significant difference (p = 0.523). Gender distribution was nearly equal in both groups, with males comprising 54.6% of the OCD group and 56.7% of the control group (p = 0.763). Educational levels were also similar, with a slightly higher proportion of graduates in the control group (69.1%) compared to the OCD group (63.9%), though this difference was not significant (p = 0.412). However, a significant difference was observed in employment status: only 46.4% of the OCD group were employed compared to 73.2% of the control group (p = 0.001), indicating a possible impact of OCD on occupational functioning.

Variable	OCD Group (n = 97)	Control Group (n = 97)	p-value
Age (Mean ± SD)	30.5 ± 8.6	31.2 ± 9.0	0.523
Gender			
Male	53 (54.6%)	55 (56.7%)	0.763
Female	44 (45.4%)	42 (43.3%)	
Education Level			
≤ 12th standard	35 (36.1%)	30 (30.9%)	0.412
Graduate and above	62 (63.9%)	67 (69.1%)	
Employment Status			
Employed	45 (46.4%)	71 (73.2%)	0.001
Unemployed	52 (53.6%)	26 (26.8%)	

Table 2 compares the sleep quality of participants using the Pittsburgh Sleep Quality Index (PSQI) between the OCD and control groups. Across all PSQI components, individuals with OCD reported significantly poorer sleep outcomes compared to healthy controls. The OCD group had markedly higher scores in subjective sleep quality (1.89 vs. 0.97), sleep latency (2.10 vs. 1.14), sleep duration (1.98 vs. 1.02), and sleep efficiency (1.77 vs. 0.92), indicating greater difficulties in initiating and maintaining sleep. Furthermore, they reported more frequent sleep disturbances (2.20 vs. 1.14) and higher levels of daytime dysfunction (1.91 vs. 0.86). The global PSQI score was substantially elevated in the OCD group (12.85 ± 3.42) compared to controls (6.43 ± 2.10), with all differences reaching high statistical significance (p < 0.001). These findings underscore a clear association between OCD and impaired subjective sleep quality.

PSQI Component	OCD Group (Mean ± SD)	Control Group (Mean ± SD)	p-value
Subjective Sleep Quality	1.89 ± 0.67	0.97 ± 0.41	<0.001

Sleep Latency	2.10 ± 0.72	1.14 ± 0.56	<0.001
Sleep Duration	1.98 ± 0.69	1.02 ± 0.47	<0.001
Sleep Efficiency	1.77 ± 0.81	0.92 ± 0.53	<0.001
Sleep Disturbances	2.20 ± 0.56	1.14 ± 0.42	<0.001
Daytime Dysfunction	1.91 ± 0.63	0.86 ± 0.39	<0.001
Global PSQI Score	12.85 ± 3.42	6.43 ± 2.10	<0.001

Table 3 shows a significant positive correlation between global PSQI scores and OCD symptom severity, as measured by the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS), among participants with OCD (n=97). The PSQI global score demonstrated a strong correlation with the Y-BOCS total score (r = 0.62, p < 0.001), indicating that poorer sleep quality is closely associated with greater overall OCD severity. Notably, both the obsession subscale (r = 0.58, p < 0.001) and the compulsion subscale (r = 0.51, p < 0.001) also showed significant correlations with PSQI scores, suggesting that both intrusive thoughts and repetitive behaviors contribute to sleep disturbances in individuals with OCD. These findings highlight the potential bidirectional relationship between sleep quality and symptom intensity in OCD.

Table 3: Correlation Between PSQI Global Score and Y-BOCS in OCD Group (n=97)

Variable	Pearson Correlation (r)	p-value
Y-BOCS Total Score	0.62	<0.001
Y-BOCS Obsession Subscale	0.58	<0.001
Y-BOCS Compulsion Subscale	0.51	<0.001

Table 4 presents the comparison of sleep quality across different OCD symptom dimensions within the OCD group (n=97), based on mean PSQI scores. Participants with symmetry/ordering symptoms exhibited the highest mean PSQI score (13.8 ± 3.1), indicating the poorest sleep quality among the subgroups, followed by those with hoarding symptoms (12.5 ± 2.7) and contamination/cleaning symptoms (11.4 ± 2.9). The difference in sleep quality across these symptom dimensions was statistically significant (p = 0.018), suggesting that specific OCD symptom profiles, particularly symmetry and ordering, are more strongly associated with disrupted sleep patterns. This emphasizes the importance of considering symptom subtype in evaluating and managing sleep disturbances in OCD.

Table 4: Sleep Quality by OCD Symptom Dimensions (OCD Group Only)

Symptom Dimension (n=97)	Mean PSQI Score (±SD)	p-value (ANOVA)
Contamination/Cleaning	11.4 ± 2.9	0.018
Symmetry/Ordering	13.8 ± 3.1	
Hoarding	12.5 ± 2.7	

Table 5 presents the results of a logistic regression analysis identifying predictors of Delayed Sleep Phase Disorder (DSPD) within the OCD group. Younger age was significantly associated with higher odds of DSPD (OR = 0.95, 95% CI: 0.91–0.99, p = 0.023), suggesting that younger individuals with OCD are more likely to experience circadian misalignment. Unemployment emerged as a strong predictor (OR = 2.87, 95% CI: 1.41–5.86, p = 0.004), indicating nearly threefold higher odds of DSPD among unemployed patients. Additionally, higher OCD severity (Y-BOCS total score) was significantly linked to DSPD (OR = 1.18, p = 0.005), as was poorer sleep quality (PSQI global score; OR = 1.31, p < 0.001). These findings suggest that DSPD in OCD is influenced by a combination of demographic, clinical, and sleep-related factors.

Table 5: Predictors of Delayed Sleep Phase Disorder in OCD Group (Logistic Regression)

Variable	OR (95% CI)	p-value
Age (continuous)	0.95 (0.91–0.99)	0.023
Unemployment	2.87 (1.41–5.86)	0.004
Y-BOCS Total Score	1.18 (1.06–1.33)	0.005
PSQI Global Score	1.31 (1.15–1.49)	<0.001

4. DISCUSSION

The present study found a strong association between obsessive-compulsive disorder (OCD) and clinically and functionally significant disruption of subjective sleep quality, including both clinical severity and functional impairment. Although the OCD and control groups were similar on demographic variables such as age, gender, and education, the significantly higher rate of unemployment in the OCD sample could indicate a greater psychosocial impairment from the disorder, which may be compounded by poor sleep and functional impairment. These findings support the previous research by Eisen et al., (2006), who noted significant impairment in occupational and social functioning among OCD individuals [8].

In accordance with previous literature, the OCD group reported significantly more distress on all components of the Pittsburgh Sleep Quality Index (PSQI), indicating higher difficulty in sleep initiation, sleep maintenance, and daytime functioning. This effect was congruent with Nota et al., (2015), who indicated patients with OCD had significantly disrupted sleep patterns in comparison to controls, stressing the pervasive presence of sleep difficulties for these patients [7]. Sleep difficulties may be detrimental for these patients and have the potential to reinforce a vicious cycle of continued symptoms making treatment more complicated.

However, the significant positive correlation observed between PSQI global scores and the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) further emphasizes the association between poorer sleep and greater severity of OCD symptoms. Notably, Cox and Olatunji (2016) found that there was a significant association between poor sleep quality (as measured by PSQI) and higher OCD symptom scores in a meta-analysis [9]. In our study both obsessions and compulsive behavior were significantly related to disrupted sleep, suggesting that having cognitive agitation at night or performing nocturnal compulsive rituals may interfere with sleep continuity.

In addition, analysis of the dimensions of OCD symptoms found that individuals with symmetry/ordering symptoms had the worst sleep disturbance. This was consistent with findings from Schubert et al. (2013) that certain dimensions of symptoms; symmetry/ordering and hoarding symptoms, were more reliably predictive of poor sleep quality than other subtypes of OCD [6]. These findings demonstrate that it is necessary to assess symptom profiles next to sleep-related dysfunction in individuals with OCD.

Furthermore, logistic regression analysis indicated that younger age, unemployment, OCD severity, and sleep quality were significant predictors of Delayed Sleep Phase Disorder (DSPD) within the OCD sample. This is in line with the finding by Paterson, K. et al., (2013), who argued that the dysregulation of circadian rhythms was a common finding across studies of OCD, particularly amongst younger and socially withdrawn individuals [10]. In conclusion, the findings of this research contribute to the burgeoning recognition that sleep dysfunction is both an outcome of, and potential contributor to, the symptomology of OCD, which reinforces the necessity of assessing and managing sleep dysfunction in practice.

➤ CONCLUSION

The present research showed a strong relationship between obsessive-compulsive disorder (OCD) and substantial sleep quality disturbances, with scores on the Pittsburgh Sleep Quality Index (PSQI) increasing with the severity of OCD symptoms. The specific symptom dimensions of symmetry/ordering symptoms were found to have a stronger association with sleep disruptions. The ages of patients, employment status, and severity of OCD symptoms were the

most prevalent predictors of Delayed Sleep Phase Disorder (DSPD) in patients with OCD. The results of this research show the significance of screening and management of sleep disturbances in OCD patients, and to develop cognitive behaviour therapy that addresses sleep issues, as these changes may facilitate treatment outcomes and quality of life for affected individuals.

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