

## COMPARISON OF BIPOLAR DISORDER SYMPTOMS WITH PARKINSON'S DISEASE PATIENTS, ANXIETY DISORDER PATIENTS AND HEALTHY CONTROLS

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**BACKGROUND AND AIM:** Parkinson's disease (PD) is the most common neurodegenerative movement dysfunction. As the world's population continues to age, the incidence of the disease is expected to rise significantly, doubling in the next two decades (Simon et al., 2020). Motor symptoms are at the forefront for the diagnosis of PD. However, with recent developments, it is now considered as a complex neuropsychiatric dysfunction (Weintraub et al., 2022). Recognizing the non-motor symptoms of PD is crucial, as it increases the likelihood of earlier treatments to improve the prognosis of patients (Leite Silva et al., 2023). PD is associated with a variety of neuropsychiatric disorders. Neuropsychiatric symptoms are the most common nonmotor symptoms in PD. At the time of PD diagnosis, the most common neuropsychiatric symptoms accompanying PD are depression and anxiety. Depression shows a more correlated course with the severity of PD, whereas anxiety is more stable in the course of PD compared to depression. There are recent studies showing a genetic, transcriptional, ion channel, protein, enzymatic, mitochondrial and ER level relationship between PD and Bipolar Disorder (BD). There is increasing evidence that BD may be a predictor of the development of PD later in life. A study conducted in 2024 investigating whether BD patients develop PD in the future found an increased risk (Xu et al., 2024). Only the BD group was evaluated, and the relationship with anxiety patients and PD was not examined. In addition, the diagnosis of dementia was not excluded. In 2020, a meta-analysis published in the *Jama Network* aimed to evaluate the association of BD with a subsequent diagnosis of idiopathic PD. It was found that a previous diagnosis of BD increased the likelihood of a subsequent diagnosis of idiopathic PD (Faustino et al., 2020). In this study, anxiety patients were not included and comorbid anxiety depression dementia diagnosis was not excluded in the group who developed PD. This study included patients diagnosed with PD according to the British Parkinson's Disease Society Brain Bank clinical diagnostic criteria who were admitted to the general neurology outpatient clinic, patients diagnosed with anxiety according to DSM V in the psychiatry outpatient clinic, and healthy controls. There are publications indicating that Parkinson's disease symptoms are increased in patients with bipolar disorder and anxiety group before the onset of Parkinson's disease. However, the results of these publications, which were not controlled for depression, age, and different phenomenological features of bipolar disorder symptoms, are

inconsistent. We investigated whether the symptoms seen in BD are frequently seen in PD by comparing them with anxiety disorders and healthy control groups.

**METHODS:** The study included 39 PD patients, 39 anxiety patients and 30 healthy controls. Study groups were matched for age, gender and years of education. Past diagnoses of depression, anxiety and dementia were excluded in the PD group. In the anxiety patients group, past depression and dementia diagnoses were excluded. Sociodemographic data of the study groups were evaluated with a sociodemographic data form. In addition, HAD scale was applied for anxiety and depression levels of the study groups. Young Mania Rating scale (YMRS), Brief Psychiatric Rating Scale (BPRS), Nonmotor Symptoms Scale (NMSS) and Symptom Checklist-90 (SCL-90) scales were applied for mental symptoms and nonmotor symptoms. Chi-square analysis was used to compare non-numerical data between groups. In the comparisons of numerical data, Kruskal-Wallis analysis was used since there was no normal distribution. Mann Whitney U was used to determine the source of the difference. Spearman Correlation analyses were performed separately for each group. The results were compared between the groups.

**RESULTS:** In the evaluation between Parkinson's patients, anxiety patients and healthy control groups, YMRS scores were found to be statistically significantly higher in the PD group compared to the other groups ( $p < 0.001$ ). In the Parkinson's patients group, a significant positive correlation was found between YMRS scores and NMSS ( $p < 0.05$ ,  $r = 0.378$ ). In the anxiety and healthy control groups, no correlation was found between YMRS scores and NMSS ( $p > 0.05$ ). In the Parkinson's disease group, a significant positive correlation was found between CFS-A and NMSS ( $p < 0.05$ ,  $r = 0.537$ ). The strength of this relationship was found to be higher in the PD group than in the anxiety group ( $p < 0.05$ ,  $r = 0.495$ ). In the healthy control group, no correlation was found between CFS-A and NMSS ( $p > 0.05$ ). In the Parkinson's patients group, a moderate positive correlation was found between the HAD-D and NMSS scores ( $p < 0.05$ ,  $r = 0.461$ ). In the correlation analysis between the CFS-D and SCL-90 total score in the Parkinson's disease group, a moderate positive correlation was found ( $p < 0.05$ ,  $r = 0.431$ ). In the PD group, positive correlations were found between YMRS scores and somatization ( $p < 0.05$ ,  $r = 0.376$ ), obsessive-compulsive features ( $p < 0.05$ ,  $r = 0.353$ ) and paranoid ideation ( $p < 0.05$ ,  $r = 0.498$ ). In the Parkinson's patients

group, although depression and anxiety diagnoses were excluded, a moderate positive correlation was found between HAD-A and HAD-D scores ( $p<0.05$ ,  $r=0.453$ ).

**CONCLUSIONS:** To the best of our knowledge, our study is the first study to compare the symptoms of BD in PD without a psychiatric diagnosis compared to anxiety patients without a past diagnosis of depression and healthy controls. Our hypothesis that “Parkinson’s patients have more symptoms of BD than patients with anxiety” was confirmed in more specific diagnostic samples than in the literature. Based on our findings regarding the relationship between anxiety and PD, further clinical studies between these groups are needed. Our hypothesis that “Parkinson’s patients have more symptoms of BD compared to healthy controls” was confirmed and data were presented to the literature. Recognizing the findings related to BB and PD in the healthy population will contribute to the development of treatment methods that will minimize the development of these diseases in the future. Strong findings were found to support our

hypothesis that ‘In PD, BD symptoms are higher than anxiety disorders and healthy controls even when depression symptoms are controlled’. Significant associations for our hypothesis that ‘BD symptoms are associated with nonmotor symptoms in PD’ were found in PD, anxiety and healthy controls.

#### REFERENCES

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**Keywords:** Anxiety, bipolar, parkinson

**Table.** BPRS, YMRS, HAD and NMSS comparisons of Parkinson’s patients, anxiety patients and healthy control groups

	groups	groups	groups	p	difference
	parkinson	anxiety	healthy	p	difference
	n=39	n=39	n=30	p	difference
BPRS	5(6)	5(7)	2.5(11)	$p=0.196^*$	
YMRS	7(8)	0(2)	0(1)	$p<0.001^*$	1>2,3**
HAD-D	5(6)	5(7)	4(5)	$p=0.471^*$	
HAD-A	3(6)	7(7)	5.5(5.25)	$p=0.003^*$	2>1,3**
NMSS	9(8)	10(7)	5(4.25)	$p<0.001^*$	1,2>3**
$p<0.05$	*Kruskal Wallis	**Mann-Whitney U	1:Parkinson, 2:Anxiety, 3: Healthy		

The median value of the YMRS scores of the Parkinson’s patient group was higher than the median values of the anxiety patient group and the healthy control group. There was a significant difference between the groups in terms of YMRS total score ( $p<0.05$ ). YMRS total score was statistically higher in Parkinson’s disease patients compared to anxiety and healthy control groups ( $p<0.05$ ). No significant difference was found between anxiety and healthy control groups ( $p>0.05$ )