Prevalence of Depression and Anxiety and Related Factors in Patients With Parkinson's Disease

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Abstract

Background: Parkinson's disease is a chronic and progressive disease in which patients show symptoms of psychiatric diseases such as anxiety and depression leading to decreased quality of life. So far, few studies have been done in this field in Iran.

Methods: The study is a cross-sectional study that investigates the prevalence of anxiety and depression and their related factors in patients with Parkinson's disease. In this study, 74 patients with Parkinson's disease and 74 healthy individuals were evaluated and using by Beck's Depression and Anxiety Inventories.

Results: The prevalence of depression and anxiety in patients with Parkinson's was 37.83% and 78.38%, respectively. The mean score of depression and anxiety was significantly higher in the patient group ($P<0.001$). Older age, female sex, a higher level of education and a longer duration of illness were significantly associated with more depression and anxiety ($P<0.05$). Multiple regression models showed that age was a predictive factor in depression. With respect to anxiety, age and duration of the disease were predictive factors.

Conclusion: The severity of depression and anxiety were significantly higher in patients with Parkinson's disease compared to healthy individuals. Age and duration of the disease play a significant role in predicting the severity of depression and anxiety in such patients.

Keywords: Parkinson's disease; Depression; Anxiety; Prevalence; Beck Depression Inventory-II; Beck's Anxiety Inventory

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Introduction

Parkinson's disease, the most common neurodegenerative disease after Alzheimer's, has a chronic and progressive nature.[1] It usually appears after the age of 60, and one in 100 people over the age of 60 develop Parkinson's disease.[2] The prevalence of this disease in Iran is 2 in 1000, and this ratio increases ten times in individuals over 60.[3] Parkinson's disease is usually characterized by the presence of two or more of the four main symptoms, namely resting tremor, bradykinesia, rigidity, and impaired balance and coordination.[1]

Although Parkinson's disease is a movement disorder, it can also have non-motor aspects such as dementia, depression, and functional and cognitive impairments.[4,5] Among the non-motor complications, depression and anxiety are the most common psychiatric disorders in Parkinson's disease.[5] The prevalence of depression ranges from 7.2% to 90%, but studies on the prevalence of anxiety in Parkinson's disease are scarce and a few number of studies have reported a prevalence of 25%-52%.[6,7] As Parkinson's disease progresses, the health-related quality of life (HRQOL) of patients and their caregivers gradually decrease.[2] Some of the most important factors that reduce the quality of life of patients are psychiatric disorders such as depression and anxiety, which are also associated with increased mortality in these patients.[5,8]

Despite the importance of these issues, few studies have explored this area. In Iran, one study on patients with Parkinson's disease reported the prevalence of depression and cognitive disorders in these patients to be 45.6% and 32.9%, respectively.[9] Moreover, another study on patients with Parkinson's disease showed a prevalence of 44% for major depression.[10] Lack of sufficient research on the prevalence of depression and anxiety in patients with Parkinson's disease, especially in Iran, encouraged us to conduct a study in this area. By better understanding the role of these factors in these patients, we can find a more effective way to control the disease and improve patients'

quality of life.

Materials and Methods

This cross-sectional study was done in Hazrat Rasoul Akram hospital, Tehran, during the first six months of 2019, to assess the prevalence of anxiety and depression and their related factors in patients with Parkinson's disease. Convenient sampling was used for patient selection. Beck's Depression Inventory-II (BDI-II) and Beck's Anxiety Inventory (BAI) were used to assess patients' depression and anxiety, respectively.

Beck's Depression Inventory-II

This questionnaire consists of 21 items, and the cumulative score can vary between zero and 63. A cumulative score between 0-18 represents no depression, 18-28 shows mild depression, 29-35 shows moderate depression, and 36-63 represents severe depression.[11] The validity and reliability of the questionnaire have been previously confirmed.[12-14] In Iran, Rajabi and Karju Kasmai confirmed the validity and reliability of the Persian versions of these inventories.[11] Beck's Anxiety Inventory

This questionnaire consists of 21 items that each examines one of the symptoms of anxiety. The final score of this questionnaire ranges from zero to 63 that can represent one of the following: 0-7=minimal anxiety, 8-15=mild anxiety, 16-28=moderate anxiety, 29-63=severe anxiety.[15] The validity and reliability of this questionnaire has been previously proven.[14] The validity

and reliability of the Persian version of this questionnaire was confirmed by Kaviani and Mousavi in 2008.[16]

Sample Size Calculation and Statistical Analysis

Based on Bahrami and colleagues' study, the sample size of the present study was calculated to be 74 for both case and control groups.[9] Analysis was performed using SPSS software (IBM SPSS Statistics for Windows, version 22.0. Armonk, NY: IBM Corp). Quantitative data were reported as mean and standard deviation and qualitative data as percentages. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to investigate normal data distribution. Multivariate analysis of variance (MANOVA) was used to evaluate the effect of anxiety and depression between the patient group and healthy individuals. Chi-square test, Pearson's correlation, and Cramer's V method were used to examine the correlation between age, sex, level of education, and duration of the disease with the results of Beck's depression and anxiety inventories. Multiple regression analysis was also used to determine the predictive value of age, sex, level of education, and the duration of disease on the dependent variables of anxiety and depression.

Results

In this study, 74 patients with Parkinson's disease were compared with 74 healthy individuals. There was no significant difference between the two groups in terms of sex and the level of education ($P>0.05$, Table 1).

Table 1. Demographic data and the results of Beck's depression and anxiety inventories

		Patients With Parkinson's Disease (n=74)	Healthy Individuals (n=74)	P value
Age, year, n (%)	20-40	10 (13.50)	19 (25.70)	<0.001
	41-60	27 (36.50)	41 (55.40)	
	61-80	37 (50.00)	14 (18.9)	
Sex, n (%)	female	26 (35.1)	35 (47.3)	0.133
	male	48 (64.9)	39 (52.7)	
Education, n (%)	Less than high school diploma	18 (24.30)	12 (16.20)	0.630
	High school diploma	28 (37.80)	33 (44.60)	
	Associate degree	4 (5.40)	7 (9.50)	
	Bachelor's degree	14 (18.90)	14 (18.50)	
	Master's degree	10 (13.50)	8 (10.80)	
Duration of disease, n (%)	Less than one year	25 (33.80)	-	0.292
	1-2 years	14 (18.90)	-	
	3-4 years	16 (21.6)	-	
	≥5 years	19 (25.7)	-	
Anxiety, n (%)		28 (37.83)	21 (28.38)	0.295
Depression, n (%)		58 (78.38)	37 (50.00)	0.005
Anxiety, (SD)		28.83 (11.18)	11.81 (9.72)	<0.001
Depression, M (SD)		28.76 (10.76)	12.78 (9.51)	<0.001

Significantly more individuals in the patient group were older than 60 (*P*<0.001, Table 1). Most patients had a disease duration of less than 2 years. The prevalence of depression and anxiety in the patient group were 37.83% and 78.38%, respectively. The prevalence of anxiety was higher among patients with Parkinson's disease compared to healthy individuals (*P*=0.005), but the prevalence of depression was not significantly different between the two groups (*P*=0.295). However, the mean score of depression and anxiety in the patient group was significantly higher than the healthy group (*P*<0.001).

Table 2 shows the mean cumulative scores of Beck's depression and anxiety inventories as categorized by age, sex, level of education, and the duration of disease. The results showed that there was a significant correlation between an older age, female sex, a higher level of education and a longer duration of disease and higher levels of depression and anxiety (*P*<0.05, Table 3). Given the correlation between independent variables of age, sex, level of education and duration of the disease with depression and anxiety, as well as a lack of multicollinearity, we performed a multiple regression analysis. The results showed that older age was a significant predictor of depression (β=5.48, *P*=0.004). Our model also showed that older age (β=4.64, *P*=0.006) and longer duration of illness (β=3.30, *P*=0.001) were significant predictors of anxiety (Table 4).

Discussion

Parkinson's disease is a disease of the central nervous system that is commonly seen in the elderly and causes symptoms such as resting tremor, bradykinesia, rigidity,

Table 2. Mean Scores of Depression and Anxiety by Demographics Variables

		Depression (n=74)	Anxiety (n=74)
		Mean (SD)	Mean (SD)
Age, year	20-40	23.20 (10.43)	21.40 (13.57)
	41-60	25.81 (10.90)	26.88 (11.95)
	61-80	32.62 (9.56)	32.27 (8.60)
Sex	Female	29.03 (8.59)	28.92 (8.28)
	Male	28.77 (11.85)	28.79 (12.55)
Education	Less than high school diploma	27.66 (9.02)	29.33 (10.23)
	High school diploma	28.71 (11.13)	27.00 (11.07)
	Associate degree	27.75 (17.28)	27.75 (10.99)
	Bachelor's degree	26.00 (12.20)	26.85 (15.02)
	Master's degree	35.90 (5.27)	36.30 (1.70)
Duration of disease	Less than one year	23.96 (11.59)	26.00 (10.79)
	1-2 years	27.57 (8.30)	27.50 (12.79)
	3-4 years	30.12 (10.74)	29.75 (11.09)
	≥5 years	35.21 (8.21)	32.78 (10.05)

Table 3. Correlation Between Depression and Anxiety With Demographic Variables

Test type	Independent Variable	Depression		Anxiety	
		R	*P* Value	R	*P* Value
Pearson correlation	Age	0.349	0.002	0.346	0.003
Cramer's V	Sex	0.750	0.046	0.745	0.041
Chi-square	Level of education	176.02	<0.001	137.32	0.030
Pearson correlation	Duration of disease	0.406	<0.001	0.240	0.039

Table 4. Results of Multiple Regression Models

	Predictable variables	β	T	*P* Value
Anxiety	Constant	3.19	0.439	0.662
	Sex	3.43	1.28	0.202
	Age	5.48	3.02	0.004
	Education	1.56	1.77	0.080
	Duration of disease	1.65	1.53	0.129
Depression	Constant	0.176	0.027	0.979
	Sex	4.36	1.81	0.074
	Age	4.64	2.82	0.006
	Education	1.50	1.88	0.063
	Duration of disease	3.30	3.39	0.001

and postural instability.[1] In addition to movement disorders, this disease is also associated with psychiatric disorders.[4,5] The most common psychiatric disorders in patients with Parkinson's disease are depression and anxiety.[5] Since no extensive studies in Iran have thoroughly explored this area, we aimed to investigate the prevalence of anxiety and depression and their related factors in Iranian patients with Parkinson's disease.

The results of this study showed that the prevalence of depression and anxiety in patients with Parkinson's disease were 37.83% and 78.38%, respectively, and the comparison of depression and anxiety scores between the two groups showed higher scores in the patient group. In Bahrami and colleagues' study with 79 patients, the prevalence of depression and cognitive disorders were 45.6% and 32.9%, respectively.[9] In another study in Iran with 350 patients with Parkinson's disease, the prevalence of major depressive disorder was 44%.[10] Other studies also reported a prevalence of 16%-17.11% for depression and 19%-81.25% for anxiety in patients with PD.[17,18]

In the present study, we concluded that older age, female sex, a higher education level, and a longer duration of illness were significantly correlated with higher depression and anxiety levels. Multiple regression models also showed that older age was a significant predictor of depression and that an older age and a longer duration of illness were significant predictors of anxiety. Wee et al conducted a prospective longitudinal study of 89 patients with Parkinson's disease over 6 months, that showed the severity of depression was correlated with the severity of

movement disorders, apathy and anxiety, and was also higher in female patients; while the severity of anxiety was correlated with older age, higher levels of education, a shorter illness duration, illness onset at a younger age, and higher daytime sleepiness. They also concluded that despite the coexistence of anxiety and depression, both have a separate and different longitudinal correlation with demographic variables and motor and non-motor factors.[5] Other studies found a correlation between marital status, more severe movement disorders, dyskinesia, higher Hamilton anxiety rating scale, higher Parkinson's disease sleep scale, female sex, more severe cognitive impairment, insomnia, and daily drowsiness with depression. They also mentioned a correlation between anxiety and factors such as female sex, a higher C2 score, and a higher Hamilton score.[17,18]

According to the results of the present study and previous ones, the prevalence and severity of depression and anxiety in patients with Parkinson's disease is higher than healthy individuals and the severity and prevalence are related to factors such as old age, female sex, a higher education level and the duration of disease. As a result, physicians should pay more attention to this group of patients to improve their HRQOL through a timely diagnosis and simultaneous treatment of depression and anxiety.

Limitations of the Study
This study was performed in one hospital in Tehran for a limited period of time, so we should be cautious about generalizing the results of this study, and we also recommend more extensive, longitudinal studies with larger sample sizes be conducted in this area.

Conclusion
The severity of depression and anxiety in patients with Parkinson's disease was significantly higher than those of healthy individuals, and factors such as an older age, female sex, a higher level of education and a longer duration of disease were associated with higher levels of depression and anxiety.

Conflict of Interest
The authors declare that they have no conflict of interests.

Authors' Contribution
MPH performed the date gathering and analysis, NE drafted the primary manuscript, MK edited the manuscript for its intellectual contents, and HFTB supervised the project and provided critical feedback regarding the paper.

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None.

Informed Consent
Informed consent was obtained from all patients.

Ethical Statement
This study was approved by Iran University of Medical Sciences (IR.IUMS.FMD.REC.1398.320) and all participants provided informed consent prior to participation. This research involved human participants; however, none were exposed to any potential harm since we used questionnaires.

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