Chapter 33
Information Analysis on Depression in Patients with Parkinson's Disease

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Abstract *Objective* To investigate the relationship between depression and clinical aspects of Parkinson's disease (PD). *Methods* 318 patients diagnosed by the London Brain Bank criteria took part in the investigation. 318 PD patients were evaluated using United Parkinson's Disease Rating Scale (UPDRS), Hoehn & Yahr staging (H&Y). Depression was evaluated with Zung's Self-Rating Depression Scale (SDS). The analysis of quantitative data was performed using descriptive statistics, ANOVA and χ^2 test. *Results* 208 (65.4 %) patients were depressed. There was a significant difference between men and women PD patients respect to the depression degree ($\chi^2 = 16.981$, $P < 0.05$); depression degree among duration groups were statistically significant different ($\chi^2 = 18.0$, $P < 0.05$); when compared to the non-depressed ones, presented the following results: H&Y: 2.34 ± 0.851 versus 1.83 ± 0.725; UPDRS total: 50.486 ± 23.787 versus 38.191 ± 16.081. *Conclusion* Depression is a frequently neuropsychiatric phenomenon in Parkinson's disease. Female and long duration PD patients has higher incidence of moderate and severe depression. PD patients with depressive disorder presented more advanced H&Y staging, greater UPDRS score than non-depressed ones.

Keywords Parkinson's disease • Depression • Incidence • Zung's self-rating depression scale

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33.1 Introduction

Parkinson's disease (PD) is a chronic, progressive neurodegenerative disorder, characterized by cardinal motor symptoms, such as bradykinesia, resting tremor, rigidity, and postural instability. Depression is one of the most common psychiatric symptoms in Parkinson's disease. Symptoms of depression are reported in 40–50 % of PD patients according to different study [1, 2]. Unfortunately, only 20 % of all depressed PD patients receive treatment for their psychological status [3, 4]. If depression is left untreated, there is an increased risk for greater disability and reduced quality of life [5]. However, the mechanisms of depression in PD are poorly understood. The present study was undertaken in the hope of exploring the association, such as the incidence of depressive symptoms occurring in male and female PD patients, the relationship between the depressive symptoms and certain variable factors, namely, the duration of the illness; UPDRS; Hoehn & Yahr stage; and SDS score compared to Chinese norm.

33.1.1 Patients

318 PD patients who went to extrapyramidal outpatient service of Tianjin Medical University General Hospital were investigated by the questionnaire from December 2010 to January 2012. Among these patients there were 162 men (50.9 %, 63.07 ± 9.47) and 156 women (49.1 %, 63.95 ± 9.647), total average age is 63.51 ± 9.55 years old.

33.1.2 Methods

These patients was diagnosed idiopathic PD according to the United Kingdom Parkinson's disease Society Brain Bank clinical criteria for idiopathic Parkinson's disease [6]. The questionnaire were designed by ourselves and the content includes general information such as age, sex, duration of disease, the time of appearing depression and so on, mini-mental state examination (MMSE), the Zung's Self-Rating Depression Scale (SDS), the Unified Parkinson's Disease Rating Scale (UPDRS). Unified Parkinson's Disease Rating Scale (UPDRS) sub-scale I, mental condition; sub-scale II, functional activity; sub-scale III, motor condition; and IV, Motor Complications [7]. The UPDRS is a tool used to evaluate all those aspects and higher scores indicate the severity of the symptoms. Hoehn & Yahr Clinical Staging Scale that ranges from 1 (mild) to 5 (severe, incapacitating) [8]. Because cognitive impairment makes it difficult to complete the questionnaire by himself, patients with a Mini-Mental State Examination Scale (MMSE)10 score < 21 were excluded.

33.1.3 Statistical Analysis

All analyses were performed using the Statistical Package for the Social Sciences (SPSS) with version 17.0. Chi square test was used to compare the sex, duration of disease, the time of appearing depression among different depression groups. One-way ANOVA was used to compare SDS score between PD patients and Chinese norm. $P < 0.05$ was considered statistically significant.

33.2 Results

33.2.1 General Information

According to the Hoehn and Yahr scale, forty-eight PD patients classified as stage 1–1.5, 120 as stage 2–2.5, 130 as stage 3, 17 as stage 4, and 3 as stage 5. PD patients with dementia who cannot complete the questionnaire by himself were excluded. Incidence of depression in this study is 65.4 %. The results from our Chi squared analyses produced significant differences between men and women PD patients respect to the depression degree ($\chi^2 = 16.981$, $P < 0.05$). Moderate and severe cases in female group were more than in male group. It implied that female PD patients were liable to depression (Table 33.1).

33.2.2 The Relationship Between Duration of Disease and Depression

A Chi square test showed that the difference of depression degree among duration groups in PD patients were statistically significant different ($\chi^2 = 18.0$, $P < 0.05$). Serious cases have a rising tendency along with the duration extend (Table 33.2).

Table 33.1 The relationship between sex and depression

Sex	Depression degree				χ^2	P
	No	Mild	Moderate	Severe		
Male	61	50	19	32	16.981	0.001
Female	49	25	34	48		

Table 33.2 The relationship between duration of disease and depression

Duration of disease (year)	Depression degree				χ^2	P
	No	Mild	Moderate	Severe		
<1	40	14	11	18	18.00	0.006
1–5	55	43	28	34		
>5	15	18	14	28		

33.2.3 The Relationship Between First-Onset Depressive PD Patients and Others

In Table 33.3, it is showed that depression incidence is 11.32 % as the first symptom before the motor symptom of PD. These patients were all moderate and severe cases, and the difference were statistically significant ($\chi^2 = 49.84$, $P < 0.05$).

33.2.4 The Relationship Between Different Depression Groups and Disease Severity

The outcome about comparing UPDRS score and Hoehn & Yahr stage between non-depression and depression is showed in Table 33.4. Depressive patients presented higher UPDRS and Hoehn & Yahr. UPDRS I mental condition ($F = 47.199$, $P < 0.05$); UPDRS II functional activity ($F = 15.876$, $P < 0.05$); UPDRS III, motor condition ($F = 14.987$, $P = 0.002$); and IV, Motor Complications ($F = 10.057$, $P < 0.05$). Hoehn & Yahr ($F = 28.464$, $P < 0.05$). The difference was statistically significant.

33.2.5 Mean Scores of Each SDS Item for PD Patients Compared to Norm

The scores of each SDS item for PD patients compared to norm were showed in Table 33.5. PD patients scored higher on all items compared to Chinese norm

Table 33.3 Depression before first-onset depressive PD patients and others

First-onset depressive PD patients	Depression degree				χ^2	P
	No	Mild	Moderate	Severe		
Yes	0	0	11	25	49.84	0.000
No	78	47	26	46		

Table 33.4 The relationship between different depression groups and disease severity

	Non-depression	Depression	F	P
	Mean ± SD	Mean ± SD		
UPDRS I	1.86 ± 1.511	3.47 ± 2.193	47.199	0.000
UPDRS II	11.12 ± 4.595	13.98 ± 6.751	15.876	0.000
UPDRS III	25.0 ± 12.603	32.38 ± 17.777	14.987	0.000
UPDRS IV	0.209 ± 0.526	0.649 ± 1.403	10.057	0.002
UPDRS total	38.191 ± 16.081	50.486 ± 23.787	23.651	0.000
Hoehn & Yahr	1.83 ± 0.725	2.34 ± 0.851	28.464	0.000

Table 33.5 Mean scores of each SDS item for PD patients compared to norm

Item	PD Mean ± SD	Norm Mean ± SD	T	P
Depressed affect	2.32 ± 1.270	1.5 ± 0.73	10.8008	0.0000
Diurnal variation	2.48 ± 1.269	2.31 ± 1.19	10.6139	0.0000
Crying spells	1.99 ± 1.23	1.16 ± 0.48	11.5121	0.0000
Sleep disturbance	2.36 ± 1.292	1.6 ± 0.85	9.2549	0.0000
Decreased appetite	2.19 ± 1.367	1.74 ± 1.07	5.3909	0.0000
Decreased libido	2.49 ± 1.352	2.33 ± 1.21	1.9166	0.0559
Weight loss	2.09 ± 1.331	1.26 ± 0.63	10.5438	0.0000
Constipation	3.08 ± 1.313	1.23 ± 0.56	23.8846	0.0000
Tachycardia	2.08 ± 1.177	1.24 ± 0.58	12.0421	0.0000
Fatigue	2.73 ± 1.347	1.48 ± 0.78	15.5166	0.0000
Confusion	2.20 ± 1.180	1.72 ± 1.03	6.6023	0.0000
Psychomotor retardation	3.04 ± 1.090	1.81 ± 1.09	18.0906	0.0000
Agitation	2.06 ± 1.178	1.50 ± 1.24	7.3085	0.0000
Hopelessness	2.29 ± 1.248	1.99 ± 1.05	3.9137	0.0000
Irritability	2.44 ± 1.365	1.56 ± 0.81	10.7635	0.0000
Indecisiveness	2.63 ± 1.241	2.24 ± 1.04	5.1182	0.0000
Personal devaluation	2.23 ± 1.194	2.0 ± 1.05	3.1245	0.0000
Emptiness	2.31 ± 1.258	1.96 ± 0.96	4.5652	0.0000
Suicidal ideation	1.92 ± 1.152	1.18 ± 0.58	10.8264	0.0000
Dissatisfaction	2.26 ± 1,198	1.69 ± 0.98	7.7644	0.0000

except decreased libido, and these differences were statistically significant (Table 33.5).

33.3 Discussion

33.3.1 Parkinson's Disease has a much Higher Incidence in Older People

Depressive illness among patients with PD has been estimated to range between 20 % and 70 %, the wide range mainly depending on criteria used for defining depression [9, 10]. Such as difficulty of recognizing depressive symptoms in PD, use of different diagnostic tools, diagnostic procedures adopted, methodological design choices, and particularities of each investigated sample. In this study incidence was 65.4 %, so there is higher incidence of depression in PD patients. Moderate and severe cases in female group were more than in male group. The result is quite like the previously study that showed PD patients, especially women, are more likely to develop depression. PD patients' quality of life will be reduced by depression. Therefore, physicians should pay attention to depression when treating PD patients, especially treating female PD patients.

33.3.2 Serious Cases have an Increase Tendency Along with the Duration Extend

It is reported that the high incidence of depression in patients with PD is a result of decreased activity in dopaminergic pathways. The fact that the antihypertensive drug methyldopa frequently causes depression as a side-effect supports this, as does the fact that reserpine which depletes dopamine in the brain is a powerful inducer of depression. However, levodopa therapy rarely alleviated the symptoms of depression. The explanation maybe that the central neutrotransmitters about PD patients is getting disorder along with the duration extend. It reminds us to keep our eyes open for the drug use in PD patients with long duration and the patients with hypertension.

33.3.3 Our Study Showed that Depressive Patients had Higher UPDRS and H&Y Score than the Non-depressive Ones

In the study, ANOVA elicit significant correlation between depression and PD scales (as measured by UPDRS, Hoehn & Yahr). It concurs with some of previous studies. However, in our study there was some cases occurrence of depression before early PD typical motor signs. Our data presented that PD patients scored higher on all items of SDS compared to Chinese norm. It is reported that though many PD patients were in a state of depression but only fewer of the patients themselves and their caregivers were aware of depression. It was a more important factor than the severity of motor disability. Therefore, depression could be a early manifestation of the neurodegenerative process of PD and that it is part of PD. These result implied that the mechanism of PD depression is complex, and this psychiatric condition could be considered not only a reactive manifestation, but a symptom of PD in itself. This could be related to the underlying pathology of PD itself.

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