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Analysis of The Relationship between Psychological Status of Caregivers of Parkinson's Patients and Gender

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Abstract: *Objective*: Understand the level of anxiety and depression of PD caregivers, and pay attention to the relationship between mental health and different genders. *Methods*: 200 PD patients and their caregivers were recruited. The Hamilton Anxiety Scale (HAMA) and the 17-item Hamilton Depression Scale (HAMD) were used to assess the anxiety and depression of the patients; The Mental Component Summary scale (MCS) of the SF-36 was used to test the mental health status of PD caregivers. *Results*: The PD caregivers HAMA detection of anxiety was 59 cases (29.5%), including 44 female caregivers and 15 males anxious; the PD caregivers HAMD detection of depression was 96 cases (48.0%), including 66 female caregivers and 30 male caregivers; the MCS score of PD male caregivers was 47 (42.75–52.25), and the MCS score of PD female caregivers was 41 (39–48). There were statistically significant differences in anxiety, depression and mental health scores among caregivers of different genders ($p < 0.05$). *Conclusion*: The anxiety, depression and mental health of PD female caregivers were worse than male caregivers. Clinical and social work need to pay more attention to the caregivers with mental health.

Keywords: Parkinson; Caregivers; Gender; Mental health

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1. Introduction

Parkinson's disease (PD), a prevalent neurodegenerative disorder, predominantly affects middle-aged and elderly populations. Characterized by progressive motor impairments for example muscle rigidity and bradykinesia; non-motor symptoms including cognitive decline and psychiatric disturbances, this condition increasingly necessitates caregiving support as patients' mobility deteriorates [1]. Insomnia, restless legs syndrome, excessive daytime sleepiness, and rapid eye movement sleep behavior disorder are significant burdens for people with Parkinson's disease [2]. Motor and non-motor symptoms are significantly correlated with poor sleep quality in people with Parkinson's disease [3,4]. Normal sleep duration is crucial for maintaining brain homeostasis, and is

optimal for middle-aged and older adults at about 7 hours per day [5]. The caregiving burden remains globally prevalent and challenging, with particular attention required for caregivers' anxiety, depression, and mental health. The significance of a comprehensive forecast of future prevalence of Parkinson's disease is underscored by the substantial increasing trends in the disease burden of Parkinson's disease, as it plays a crucial role in gaining insights into future epidemic patterns, facilitating proactive management, enabling informed policy decisions, and guiding public health interventions. To date, only one study has projected the future global number of patients with Parkinson's disease to 2040 on the basis of Global Burden of Disease 2015 and a 2014 meta-analysis, without projections for the global prevalence of Parkinson's disease. The prediction of future prevalence should be based on comprehensive, accurate, and updated historical data. Global Burden of Disease 2021 systematically quantifies the health loss caused by Parkinson's disease in terms of age, sex, year, and geographical location from 1990 to 2021. This provides a more recent and appropriate foundation for forecasting the future prevalence of Parkinson's disease than previous forecasts. The prevalence of Parkinson's disease is influenced by various factors, which in turn shape its future trajectory. Large scale epidemiological studies and meta-analyses have consistently shown that ageing is the primary risk factor for Parkinson's disease.

In addition to motor symptoms, PD patients may also experience non-motor symptoms such as cognitive decline, anxiety and depression, and sleep disorders, affecting the quality of life of both patients and caregivers. The original lifestyle of the caregivers is disrupted due to the care of patients, and personal interests and social activities are affected, which inevitably affect the physical and mental health of the caregivers over time, leading to a decrease in their quality of life, and in severe cases, leading to the emergence of another patient. and foreign studies have shown that due to the burden of care, caregivers experience a decline in quality of life to varying degrees. The health status of PD patients, the intensity of care patients, the help and support received by caregivers from families and society, and other factors affect the burden of care and quality of life of caregivers. PD is a chronic disease, and daily life care needs to be highly concerned, especially in China where medical insurance and care institutions are not perfect and caregivers are mostly family members and relatives and friends. Paying attention to physical and mental health of caregivers helps to improve the quality of life of patients and caregivers and reduce the emergence of another patient. In our clinical practice, all Parkinson's patients visiting our hospital were identified as family caregivers, a pattern likely influenced by local cultural traditions. This study analyzed 200 Parkinson's patients and their unpaid caregivers including all family caregivers treated at our hospital between August 2022 and September 2024, conducting standardized assessments of depressive and anxiety symptoms to evaluate the mental health status of these caregivers.

2. Data and research methods

2.1. Study subjects

A total of 200 PD patients were included in the study, comprising 112 males and 88 females. All information obtained was acquired with signed consent from all participating PD patients and interviewed caregivers. All PD patients met the diagnostic criteria for primary PD outlined in the "Diagnostic Criteria for Parkinson's Disease in China (2016 Edition)". The caregiver group consisted of 200 individuals (120 females, 80 males), all being family caregivers living with the aforementioned PD patients. Exclusion criteria for caregivers included those suffering from malignant tumors, severe cardiovascular/cerebrovascular diseases, mental disorders, or other conditions.

2.2. Method

The caregivers of patients under investigation underwent mental health assessments. First, the Hamilton Anxiety Rating Scale (HAMA) was used to evaluate caregivers 'anxiety levels: scores < 7 indicate no anxiety, 7–14 suggest possible anxiety disorder, and ≥ 14 indicate severe anxiety disorder with higher scores indicating more severe symptoms. The Hamilton Depression Rating Scale (HAMD-17 items) assessed depressive levels: scores < 7 indicate no depression; 7–17 suggest possible depression; 17–24 indicate confirmed depression; ≥ 24 indicates severe depression. The Health Survey Brief SF-36 evaluated caregivers' health status, including physical and mental health components. The Mental Component Summary (MCS) evaluates four aspects: vitality, social functioning, emotional functioning, and mental health. Higher MCS scores indicate better mental health. In this study, the Mental Component Summary was selected to assess caregivers' mental health and analyze gender differences in psychological well-being.

2.3. Statistical methods

The analysis was conducted using SPSS 25.0 software. Data underwent Shapiro-Wilk normality tests, with non-normal distributions represented by mean (P25, P75). Between-group comparisons employed rank sum tests, while categorical data were presented as percentages. Two-sample *t*-tests were used for qualitative data comparisons. Statistical significance was defined as $p < 0.05$.

3. Results

3.1. General information

There were 200 PD caregivers, 80 males (40%) and 120 females (60%), with an age of (51.24 ± 11.25) years old. Their relationship with patients was spouse (187), son (13) or daughter. Their educational background was junior high school or below (111), high school or technical secondary school (65), college or above (24).

3.2. Analysis of HAMA, HAMD, and MCS scores between genders

According to the Student's *t*-test ($p < 0.05$), the data did not meet the normality assumption. The Wilcoxon rank sum test was conducted, revealing statistically significant differences in HAMA ($z = -5.42$, $p < 0.001$), HAMD ($z = -4.392$, $p < 0.001$), and MCS ($z = -4.748$, $p < 0.001$) scores between groups. Female caregivers exhibited higher HAMA and HAMD scores than male caregivers, with higher scores indicating more pronounced anxiety and depressive symptoms. Conversely, female caregivers scored lower on the MCS scale compared to males, suggesting poorer mental health status among female caregivers. See **Table 1** for details.

Table 1. Comparison of HAMA, HAMD and MCS scores between different genders of carers

Nature leave	Example count	Caregiver HAMA score		Caregiver HAMD score		Caregiver MCS score	
		Median	(P25 P75)	Median	(P25 P75)	Median	(P25 P75)
Male group	80	5	(3.25 14.75)	7.5	(5.5 18.5)	47	(42.75 52.25)
Women group	120	8.75	(6 19)	9	(5 22.5)	41	(39 48)
z		-5.420		-4.392		-4.748	
p		< 0.001		< 0.001		< 0.001	

3.3. Comparison of anxiety and depression prevalence among caregivers

The HAMA scale (≥ 14 points) indicates anxiety, while the HMAD scale (≥ 17 points) reflects depression. Among Parkinson's disease (PD) caregivers: 59 (29.5%) were identified with anxiety through HAMA assessment (44 female vs. 15 male), and 96 (48.0%) showed depressive symptoms through HMAD evaluation (66 female vs. 30 male). Chi-square test results demonstrate higher prevalence rates of anxiety and depression in female caregivers compared to their male counterparts. See **Table 2**.

Table 2. Differences in psychological status of female carers compared with the control group (n%)

Nature leave	Caregiver anxiety disorder		Caregiver depression	
	Exist	Not have	Exist	Not have
Male Group	15 (18.75)	65 (81.25)	30 (37.5)	50 (62.5)
Women Group	44 (36.67)	76 (63.33)	66 (55.0)	54 (45.0)
χ^2	5.697		10.443	
p	0.017		0.001	

3.4. Summary

This study investigated the level of anxiety, depression and mental health among caregivers of patients with PD in Jiangyin City. Although our sample size was not, it was also meaningful in reflecting data on a potential correlation. The results showed that female caregivers had a higher incidence of anxiety and depression and a worse mental health status than male caregivers. See **Tables 1** and **2** for details.

There are still some shortcomings in this study. There may be some bias in the single-center study. In the future study, more factors will be included, and the medical team will be strengthened to cooperate with the community and Parkinson's disease patient alliance association to carry out effective medical measures and reasonable community cooperation mode.

4. Discussion

Rapid eye movements, sleep behavior disorder, insomnia, restless legs syndrome, obstructive sleep apnea and excessive daytime sleepiness are the most common non-motor symptoms of Parkinson's disease [6]. The association between sleep duration and quality of life in Parkinson's patients is complicated, so better care is very important for patients to provide appropriate and improve the quality life of Parkinson's patients. A caregiver for a patient with a chronic illness is defined as someone who lives with the patient and is directly involved in some aspect of care or is affected the patient's health problems. Caregivers for patients with chronic illness play a significant role in ensuring safety at home, adherence to treatment, and activities of daily living; the patient's response to medications and treatment also depends on the direct observation of the caregiver who can provide reliable information about the patient's condition and is essential in the treatment. Parkinson's disease is the second most common neurodegenerative disease in the world. The World Health Organization has estimated that neurodegenerative diseases including Parkinson's disease and Alzheimer's disease will become the second leading cause of death worldwide by 2040, surpassing cancer related deaths.

A longitudinal study by Lyons et al. noted that female caregivers exhibited a faster increase in depression prevalence; Murat Gultekin et al. proposed that depression and anxiety are the most significant factors affecting

the quality of life of Parkinson's disease (PD) caregivers, with female caregivers facing particularly greater risks of anxiety and depression [7,8]. A meta-analysis integrating results from 229 studies revealed that female caregivers experienced poorer burden, depression levels, subjective well-being, and physical health compared to their male counterparts [9]. These findings align with our assessment results. The reasons for this may include: during the caregiving process, individuals undergo behavioral changes and role identity shifts; in the case of family caregivers, the role transitions from an equal relationship within intimate family ties to a more nursing-oriented one, leading to increased responsibilities for those being cared for. Given that men have higher prevalence of Parkinson's disease than women, female caregivers tend to be more prevalent within family units. Caregivers experiencing role and task transitions are prone to isolation, anxiety, and tension [10]. Moreover, these caregivers often neglect self-care while assisting vulnerable individuals, resulting in adverse health consequences such as sleep deprivation, anxiety, and depression [11,12]. Women's emotional fluctuations correlate with hormonal changes, which are linked to neurotransmitter balance, potentially increasing risks of anxiety and depression. In traditional Chinese culture, women typically shoulder more household responsibilities and caregiving duties, demonstrating greater competence than men, which may exacerbate their mental stress.

In fact, the effect of treatment, the observation of the condition, and the quality of life of patients and caregivers cannot be separated from the psychological state of the caregiver. Therefore, PD caregivers should be supported by society and professional medical institutions. It is very important to provide psychological therapy, or even drug therapy, for with psychological problems, such as anxiety or depression. Caregivers can also gain relevant professional knowledge from doctors during the process of accompanying patients in the treatment of PD. Therefore, doctors also consider the influence of the psychological state of caregivers on the effect of PD treatment, and discover problems early to give help and support. In our country, there is a lack of investigation on the mental and psychological state of PD caregivers, and there is also a lack of attention to this issue.

5. Conclusion

This study aims to draw attention to the risk of depressive anxious symptoms in caregivers and to provide more comprehensive support for the treatment of PD through the judgment and analysis of relevant psychological problems in PD caregivers. Since there is currently no known cure for Parkinson's disease, caregivers continue to experience stress and negative emotions while caring for patients with worsening symptoms [13]. Clinicians must conduct regular screenings and collaborate with multidisciplinary teams to provide coping strategies and resources for those in need, with particular attention given to caregivers experiencing mental health issues.

Disclosure statement

The authors declare no conflict of interest.

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