

ORIGINAL ARTICLE

Frequency of Depression Among Caregivers of Patients with Parkinson's Disease at a Tertiary Care Hospital in Hyderabad, Pakistan



Soonh Durani¹, Adeeqa Aman¹, Muslim Ali Lakhair¹, Abdul Hafeez Bughio¹, Waseem Asif¹, Neeta Maheshwary²

Affiliation:

¹Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.

²Ziauddin University, Karachi, Pakistan.

Correspondence:

Waseem Asif, Clinical Pharmacist, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan

E-mail: drwaseem.asif@hotmail.com

Received: Oct 10, 2025, Accepted: June 22, 2026, Published: June 30, 2026.

DOI: <https://doi.org/10.47489/szmc.v40i2.842>

Data Availability: The corresponding author can provide access upon request.

Funding: No funding received

Competing Interests: No competing interest to declare.

Author Contributions:

SD, AA, MAL, AHB, WA, NM

- Each author made substantial contributions to the conception and design of the study, or acquisition, analysis, and interpretation of data.
- All authors were involved in drafting the manuscript or critically revising it for important intellectual content.
- All authors approved the final version of the manuscript to be published and agree to be accountable for all aspects of the work.

ABSTRACT

Background: Parkinson's disease (PD) is the second most common neurodegenerative disease after Alzheimer's disease and is the most common movement disorder worldwide. According to 2019 data, more than 8.5 million people are affected by PD, and its prevalence has doubled in the last 25 years. In Pakistan, the number of PD patients is currently estimated at one million and is expected to reach 1.2 million by 2030.

Objective: The objective is to assess the frequency of depression and association with demographic characteristics among caregivers of patients suffering from Parkinson's disease in a tertiary health care center.

Method: A descriptive cross-sectional study was conducted from 20th May 2024 to 20th November 2024. A total of 67 caregivers aged 20–60 years, of both genders, were recruited. Data were collected on age, gender, marital status, and caregiver relationship to the patient. Depression was assessed using validated Patient Health Questionnaire-9 (PHQ-9). Categorical variables were presented as frequencies and percentages. Cross-tabulations were performed to describe the distribution of depression status across selected demographic variables, including age, gender, education, and caregiver relationship to the patient.

Results: The mean age of caregivers was 36.83 ± 9.84 years. Male caregivers comprised 53.7%, and 70.1% were married. Depression was identified in 41.8% of caregivers of patients with Parkinson's disease. Education status and relationship to patients was significantly associated with depression status ($p < 0.001$).

Conclusion: Depression was common among caregivers of patients with Parkinson's disease, affecting more than two-fifths of participants. Education status and relationship to the patient showed significant associations with depression, highlighting the need for early screening, psychosocial support, and targeted caregiver-focused interventions.

Keywords: Parkinson Disease, Caregivers, Depression, Psychological Stress, Mental Health

INTRODUCTION: Parkinson's disease (PD) is the second most common neurodegenerative disorder globally, following Alzheimer's disease, and remains the most prevalent movement disorder [1]. As of 2019, more than 8.5 million people were living with PD, with the global frequency doubling over the past 25 years [2]. Idiopathic PD affects individuals across all ethnic and socioeconomic groups, though incidence rates vary significantly; for example, African Americans have an incidence rate nearly one-quarter that of White populations [3,4]. In Asia, the burden of PD is projected to rise from 2.57 million in 2005 to over 6.17 million by 2030 [3]. In Pakistan alone, an estimated one million individuals are currently living with PD, and this number is expected to increase to 1.2 million by 2030 [5].

Although the exact etiology of PD remains unclear, both genetic and environmental factors are believed to play a role. Sporadic cases account for over 90% of PD diagnoses. Increasing age, head trauma, pesticide exposure, and anxiety have been associated with a higher risk of PD, whereas smoking, caffeine, and moderate alcohol intake appear to have protective effects [6]. PD is now recognized as a systemic disorder with widespread motor

and non-motor manifestations. The hallmark motor symptoms include resting tremor, bradykinesia, rigidity, and postural instability, which significantly contribute to disability [7].

Non-motor symptoms are common, but often go undiagnosed and untreated. Several studies have estimated that between 40% and 50% of patients with Parkinson's disease experience clinical depression. These symptoms not only affect the lives of patients, but also place a significant burden on their caregivers [8,9].

Caregivers of patients with Parkinson's disease experience very high levels of stress, which have negative psychological repercussions, such as depression. The frequency of depression in caregivers has been observed to range from 14% to 44% [10,11], depending on the patients' demographic characteristics.

A recent study by Khan et al. found a 44.7% frequency of depression among caregivers of PD patients [12]. However, localized data remains limited, underscoring the need for further investigation. Therefore, this study aims to determine the frequency of depression among caregivers of patients with Parkinson's disease in a tertiary care hospital setting.

METHOD: This descriptive cross-sectional study was conducted at the outpatient and inpatient departments of Neurology, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro/Hyderabad. The LUMHS Research Ethics Committee granted ethical approval (no. LUMHS/REC/-190) on May 3, 2024. The study was carried out over a six-month period, from 20th May 2024 to 20th November 2024. A non-probability consecutive sampling technique was employed for participant selection. The sample comprised 67 caregivers of patients with a confirmed diagnosis of Parkinson's disease. The sample size was calculated using the WHO OpenEpi sample size calculator, based on a previously reported frequency of depression among caregivers (44.67%) [12].

Caregivers aged 20–60 years, of either gender, who were family members and primary caregivers of patients diagnosed with Parkinson's disease for more than one year were included after obtaining written informed consent. Eligible caregivers included spouses, parents, children, or siblings. Caregivers were excluded if they had a previous physician-diagnosed depression or other significant psychiatric illness, were using antidepressant or antipsychotic medication, or refused to provide informed consent. These factors were assessed through a brief interview conducted at the time of recruitment, based on information provided by the caregivers themselves about their history of psychiatric illness, their current treatment and their medication.

Once informed consent was obtained, participants were informed about the purpose and nature of the study. Data were collected using a pre-formulated questionnaire that gathered demographic information on age, sex, marital status, educational level, and caregiver-patient relationship. The diagnosis of depression was made using the Urdu translation of the Patient Health Questionnaire-9 (PHQ-9), an internationally recognized tool for detecting depression (Cronbach's alpha 0.91) [13]. Scores were interpreted as: 0–4 minimal/no depression, 5–9 mild, 10–14 moderate, 15–19 moderately severe, and 20–27 severe depression.

Data analysis was performed using SPSS (Statistical Package for the Social Sciences) version 22.0. The mean and standard deviation were used to describe the continuous variable (age). Frequencies and percentages were used to describe categorical variables, such as sex, marital status, educational level, and the presence or absence of depression. Chi square/Fisher exact test was used to describe the distribution of depression according to selected variables, such as age, sex, educational level, and type of caregiver relationship.

This study was conducted in accordance with the ethical principles set forth in the Declaration of Helsinki.

RESULTS: In this study, 67 caregivers of patients with Parkinson's disease were selected according to the inclusion criteria. The mean age of the participants was 36.83 ± 9.84 years. Regarding gender distribution, the majority (53.7%) were men (36 participants), while the remainder (46.3%) were women, totaling 31 participants. As for marital status, the majority (70.1%) were married (47 individuals). Data relating to educational background and relationship with the patients are presented in Table 1.

Depression was found in 28 caregivers (41.8%) using the PHQ-9 scoring method. Of the total number of patients with depression, 13 cases (46.4%) presented with mild depression, 10 (35.7%) with moderate depression, while the remaining 5 cases (17.9%) presented with severe depression (Figure 1). The classification of depression according to sociodemographic variables such as age, sex, educational level, and type of caregiver is shown in Table 2.

Table 1. Demographic Characteristics of Caregivers (n = 67)

Variable	Frequency (n)	Percentage (%)
Age Group		
20–40 years	43	64.17%
41–60 years	24	35.83%
Gender		
Male	36	53.7%
Female	31	46.3%
Marital Status		
Married	47	70.1%
Unmarried	20	29.9%
Education Status		
No formal / primary	31	46.3%
High school	34	50.7%
University	2	3.0%
Relationship with the Patient		
Spouse	21	31.3%
Son	13	19.4%
Daughter	13	19.4%
Brother	9	13.4%
Sister	3	4.5%
Mother	3	4.5%
Other	5	7.5%

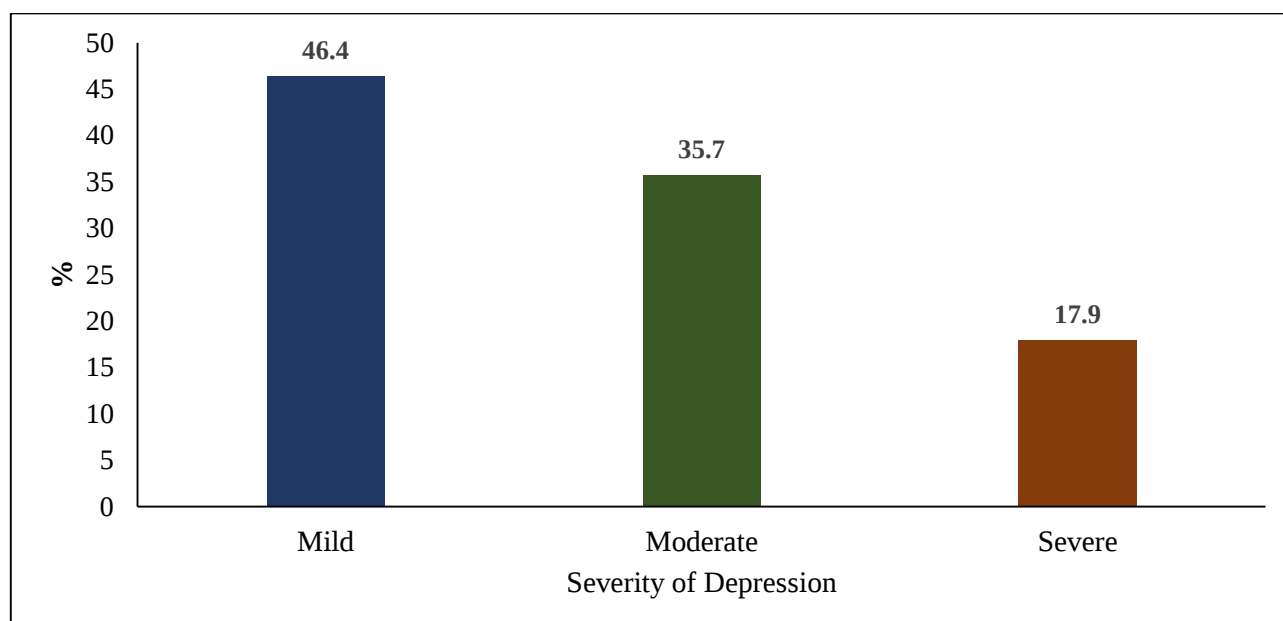


Figure 1: Severity of depression among caregivers (n=67)

Table 2: Cross-tabulation of Depression Status among Caregivers by Demographic Variables (n = 67)

Variable	Depression Yes n (%)	Depression No n (%)	p-value
Age group			
20–40 years	9 (33.3)	18 (66.7)	0.249*
41–60 years	19 (47.5)	21 (52.5)	
Education status			
No formal/primary	22 (71.0)	9 (29.0)	<0.001**
High school	6 (17.6)	28 (82.4)	
University	0 (0.0)	2 (100.0)	
Gender			
Male	15 (41.7)	21 (58.3)	0.982*
Female	13 (41.9)	18 (58.1)	
Relationship to patient			
Spouse	11 (52.4)	10 (47.6)	<0.001**
Son	9 (69.2)	4 (30.8)	
Daughter	8 (61.5)	5 (38.5)	
Brother	0 (0.0)	9 (100.0)	
Sister	0 (0.0)	3 (100.0)	
Mother	0 (0.0)	3 (100.0)	
Other	0 (0.0)	5 (100.0)	

*Chi-square test, ** Fisher Exact Test

DISCUSSION: Depression among caregivers of patients with Parkinson's disease was the primary focus of this study, along with identifying factors associated with their sociodemographic characteristics. The results show that 41.8% of caregivers experienced depression, ranging in severity from mild to severe. This figure is alarming, as it highlights an important aspect of Parkinson's disease that requires special attention, particularly in Pakistan.

The incidence of depression among caregivers in our sample correlates with regional and international studies. Literature from South Asia and neighboring regions shows depression in caregivers in 35% to 45% of cases [14-17]. For example, a longitudinal study conducted in Taiwan showed a high incidence of depressive disorders among caregivers of PD patients, influenced by the patient's disability and the caregiver's age [14]. A nationwide Italian study also found that nearly half of all caregivers of PD patients experience a significant psychological burden [15]. Another example of the connection between caregiver depression and patient cognition is found in Egypt [16]. The same problem has also been observed in Turkey [17].

In a more local context, a community-based study among Indians reported a high burden on caregivers (40%), with a strong correlation between the incidence of depression and the non-motor symptoms experienced by patients [18]. Significantly high rates of major depressive disorder have also been reported among caregivers of patients with Parkinson's disease in studies conducted in Sri Lanka [19]. Taken together, these findings indicate that the frequency of 41.8% falls within normal limits.

Our study also investigated demographic variables that might be associated with depression. Caregivers in the younger age group (20–40 years) had a comparatively low prevalence of depression compared to those in the older age group (41–60 years). These findings were supported by previous studies conducted in Taiwan [14] and India [20], which indicated that older caregivers may be exposed to greater physical, social, and emotional

stress. Educational level was found to be another key factor. Turkish and Indian studies also found that caregivers with no formal education had a very high prevalence of depression [17,20].

Gender disparity was not significantly associated with depression, with a slight male predominance in our study population, unlike other global publications that emphasize that caregivers are more likely to develop depressive disorders [15,21]. The marital status and education status of the caregiver was another important factor that significantly associated with depression. Asian and Western studies reported higher emotional burden among spousal caregivers [20,21]. Our observations are consistent with studies that have found that the patient's neuropsychiatric problems are predictors of caregiver depression. An Indian study found that patient depression, anxiety, and psychosis significantly increased the caregiver burden [20]. Similarly, contributing variables such as the patient's functional disability, neuropsychiatric problems, and caregiver demographics have been found to increase the burden on caregivers of patients with Parkinson's disease [21]. A study in Egypt has shown that the patient's cognitive problems significantly contribute to the caregiver's depressive problems [16]. These results support the interrelationship of the factors that influence the mental health of the patient and the caregiver.

The implications of depression in caregivers extend beyond their own health. A recent study published in JAMA Network Open indicated that depression in caregivers has negative consequences for patient well-being, including quality of care, disease progression, and hospital admissions [22]. Therefore, it is important to incorporate a holistic approach to the treatment of Parkinson's disease, considering both patients and their caregivers. A key strength of this research lies in its study of a minority group in Pakistan, which helps fill a significant gap in the local literature. The use of recognized instruments such as the PHQ-9 allowed us to effectively measure depression among caregivers. Limitations of this research include the small number of participants, the single-center study design, and the lack of longitudinal follow-up, which may limit the generalizability of the results. Another limitation is that we did not consider other sources of psychological stress, such as financial problems or physical health.

The results highlight the crucial importance of including mental health assessments of caregivers in the treatment of Parkinson's disease in Pakistan. It is essential that healthcare professionals screen caregivers for mental health and refer them for psychological care when necessary. Caregiver intervention programs, through support groups, counseling sessions, and psychoeducational training programs, can be very helpful in alleviating the psychological burden. The literature from Taiwan, Italy, and the United States indicates the effectiveness of such programs for caregivers [14,15,22]. Furthermore, additional studies with larger, multicenter samples are recommended.

CONCLUSION: In conclusion, this study has demonstrated a high frequency of depression among caregivers of patients with Parkinson's disease. It is clear that depression was associated with certain sociodemographic variables such as age, education level, gender, and spousal care. This underscores the need for regular mental health assessments of caregivers and the establishment of support services for them in Pakistan.

REFERENCES

1. Kouli A, Torsney KM, Kuan WL. Parkinson's Disease: Etiology, Neuropathology, and Pathogenesis. In: Stoker TB, Greenland JC, editors. Parkinson's Disease: Pathogenesis and Clinical Aspects [Internet]. Brisbane (AU): Codon Publications; 2018 Dec 21. Chapter 1. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK536722/> DOI: <https://doi.org/10.15586/codonpublications.parkinsonsdisease.2018.ch1>
2. Gadhave DG, Sugandhi VV, Jha SK, Nangare SN, Gupta G, Singh SK, et al. Neurodegenerative disorders: Mechanisms of degeneration and therapeutic approaches with their clinical relevance. Ageing Res Rev. 2024 Aug; 99:102357 DOI: <https://doi.org/10.1016/j.arr.2024.102357>
3. Bailey M, Anderson S, Hall DA. Parkinson's Disease in African Americans: A Review of the Current Literature. J Parkinsons Dis. 2020;10(3):831-841. DOI: <https://doi.org/10.3233/JPD-191823>
4. Hall DA, Shulman JM, Singleton A, Bandres Ciga S, S Tosin MH, Ouyang B, et al. Racial Disparities in Parkinson Disease Clinical Phenotype, Management, and Genetics: Protocol for a Prospective Observational Study. JMIR Res Protoc. 2025 Apr 7;14:e60587. DOI: <https://doi.org/10.2196/60587>

5. Jamali YA, Rahu HN, Kumar A, Khuhro AB, Shaikh AS, Soomro S. Frequency of Parkinson's disease in Pakistan – A Systematic Review : Frequency of Parkinson's Disease in Pakistan. *Pakistan BioMedical Journal*. 2024;7(01). DOI: <https://doi.org/10.54393/pbmj.v7i01.1027>
6. Pang SY, Ho PW, Liu HF, Leung CT, Li L, Chang EES, et al. The interplay of aging, genetics and environmental factors in the pathogenesis of Parkinson's disease. *Transl Neurodegener*. 2019 Aug 16;8:23. DOI: <https://doi.org/10.1186/s40035-019-0165-9>
7. Jankovic J, Tan EK. Parkinson's disease: etiopathogenesis and treatment. *J Neurol Neurosurg Psychiatry*. 2020 Aug;91(8):795-808. doi: 10.1136/jnnp-2019-322338. DOI: <https://doi.org/10.1136/jnnp-2019-322338>
8. Jellinger KA. The pathobiological basis of depression in Parkinson disease: challenges and outlooks. *J Neural Transm (Vienna)*. 2022 Dec;129(12):1397-1418. DOI: <https://doi.org/10.1007/s00702-022-02559-5>
9. Prange S, Klinger H, Laurencin C, Danaila T, Thobois S. Depression in Patients with Parkinson's Disease: Current Understanding of its Neurobiology and Implications for Treatment. *Drugs Aging*. 2022 Jun;39(6):417-439. DOI: <https://doi.org/10.1007/s40266-022-00942-1>
10. Lee Y, Chiou YJ, Hung CF, Chang YY, Chen YF, Lin TK, et al. A dyadic study of psychological well-being of individuals with Parkinson's disease and their caregivers. *Sci Rep*. 2021 Jan 13;11(1):957. DOI: <https://doi.org/10.1038/s41598-020-79609-z>
11. Aamodt WW, Kluger BM, Mirham M, Job A, Lettenberger SE, Mosley PE, et al. Caregiver Burden in Parkinson Disease: A Scoping Review of the Literature from 2017-2022. *J Geriatr Psychiatry Neurol*. 2024 Mar;37(2):96-113. DOI: <https://doi.org/10.1177/08919887231195219>
12. Khan MK, Mufti AA, Khan G, Afridi KA, Nizamudin. Frequency of depression among caregivers of patients with parkinson's disease, *PJMHS*. 2020;14(4):1356-57
No DOI assigned. Journal article URL: <https://pjmhsjournal.com>
13. Ahmad S, Hussain S, Akhtar F, Shah FS. Urdu translation and validation of PHQ-9, a reliable identification, severity and treatment outcome tool for depression. *J Pak Med Assoc*. 2018 Aug;68(8):1166-1170. No DOI assigned. PubMed: <https://pubmed.ncbi.nlm.nih.gov/30108497/>
14. Lee Y, Chiou YJ, Hung CF, Chang YY. Frequency and associated factors of depressive disorder in caregivers of individuals with Parkinson's disease. *Int Psychogeriatr*. 2021;33(7):681–90. DOI: <https://doi.org/10.1017/S1041610220001787>
15. Donzuso G, Brunelli P, Milesi G, Mancini S, Martillotti F, Cicero CE, et al. Caregiver burden in Parkinson's disease: a nationwide observational survey. *Neurol Sci*. 2025;46(2):305–12. DOI: <https://doi.org/10.1007/s10072-025-08306-4>
16. Gaballa AA, Elagouz NH, Sarhan AE, El-adawy A. Cognitive impairment and depressive symptoms in Parkinson's disease: clinical and caregiver correlates. *Explor Med*. 2025;6:39–47. DOI: <https://doi.org/10.37349/emed.2025.001332>
17. Inaltekin A, Kocatürk I. Psychological distress among caregivers of patients with Parkinson's disease assessed with SCL-90-R questionnaire. *Turk J Neurol*. 2021;27(1):17–22. DOI: <https://doi.org/10.4274/tnd.2021.58544>
18. Sanyal J, Das S, Ghosh E, Banerjee TK. Burden among Parkinson's disease caregivers: a community-based study from India. *J Neurol Sci*. 2015;358(1–2):172–7. DOI: <https://doi.org/10.1016/j.jns.2015.09.345>
19. Ketharanathan T, Hanwella R, Weerasundera R, de Silva VA. Major depressive disorder in Parkinson's disease: a cross-sectional study from Sri Lanka. *BMC Psychiatry*. 2014;14:278. DOI: <https://doi.org/10.1186/s12888-014-0278-8>
20. Juneja A, Anand K, Chandra M, Deshpande S, Dhamija R, Kathuria P, et al. Neuropsychiatric Symptoms and Caregiver Burden in Parkinson's Disease. *Ann Indian Acad Neurol*. 2020 Sep-Oct;23(5):656-660. DOI: https://doi.org/10.4103/aian.AIAN_91_20
21. Soares GM, Bouça-Machado R, Abreu D, Ferreira JJ. Contributory Factors to Caregiver Burden in Parkinson's Disease. *Mov Disord Clin Pract*. 2023 Aug 30;10(10):1507-1518. DOI: <https://doi.org/10.1002/mdc3.13868>
22. Rashid R, Aamodt WW, Horn S, Dahodwala N. Association of caregiver depression risk with patient outcomes in Parkinson disease. *JAMA Netw Open*. 2023;6(8):e2325091. DOI: <https://doi.org/10.1001/jamanetworkopen.2023.25091>

The Authors:

- Dr. Soonh Durani, Consultant Neurologist, Department of Neurology, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.
- Dr. Adeeqa Aman, Consultant Neurologist, Department of Neurology, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.
- Dr. Muslim Ali Lakhair, Associate Professor, Department of Neurology, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.
- Dr. Abdul Hafeez Bughio, Associate Professor, Department of Neurology, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.
- Waseem Asif, Clinical Pharmacist, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.
- Dr. Neeta Maheshwary, Physician, Department of Internal Medicine, Ziauddin University Karachi, Pakistan