

Relationship of The Forman Parkinson's Disease (PD) Symptom Checklist Across Demographic Variables

Bushra Akram

Forman Christian College (A Chartered University)

Ivan Suneel

Forman Christian College (A Chartered University)

Parkinson's disease (PD) is characterized by hallmark symptoms, such as resting tremors, bradykinesia (slowness of movement), rigidity, postural instability, and various motor and non-motor impairments (DeMaagd & Philip, 2015; Golbe et al., 2012). This study aimed to explore risk factors associated with PD within a Lahore-based population. A purposive sample of 100 participants (87% male, 13% female), aged 20 to 80 years ($M = 20.0$, $SD = 14.04$), diagnosed by medical professionals, was assessed using the Forman Parkinson's Disease Symptom Checklist (FPDSC) (Akram & Suneel, 2022). Contrary to prior findings in Pakistan (e.g., Tufail, 2020), non-significant differences were observed in symptom checklist results across demographic variables. The two factors were named motor symptoms and non-motor symptoms respectively and had adequate psychometric properties.

Keywords. Parkinson's disease (PD), cardinal features, purposive sampling, forman parkinson disease symptom checklist (FPDSC)

Mansoor (2017) estimated that approximately 600,000 individuals are affected by PD, with many cases remaining undiagnosed due to limited awareness and the absence of culturally validated diagnostic tools in remote areas. Parkinson's disease (PD) is the second most common neurodegenerative disorder globally and affects an estimated 450,000 individuals in Pakistan (Hussain et al., 2017; Mansoor, 2017). Neurological disorders, currently the fifth leading cause of death, are expected to double by 2030 (Mukhtar et al., 2018). Pakistan faces a significant healthcare gap, with just one

Bushra Akram and Ivan Suneel, Department of Psychology, Forman Christian College, (A Chartered University), Pakistan.

Correspondence concerning this article should be addressed to Bushra Akram, Department of Psychology, Forman Christian College, (A Chartered University), Pakistan. Email: bushrach95@gmail.com

neurologist per 100,000 people and inadequate healthcare facilities (Ghulam et al., 2017; Tribune, 2018). A study in Karachi revealed a PD prevalence of 1.08% among surveyed individuals (Awan et al., 2019).

PD, caused by the progressive degeneration of neurons, primarily affects individuals aged 55 and older, though around 10% of cases occur in those under 50 (Rizek et al., 2016). Symptoms, often mistaken for signs of aging, include motor issues such as tremors, rigidity, and bradykinesia, alongside non-motor symptoms like mood disorders, sleep disturbances, and dementia (Obeso et al., 2017; Oliveira & Cardoso, 2021). Despite its growing prevalence, Pakistan lacks standardized, culturally validated diagnostic tools (Mahmood & Bashir, 2018; Wasay & Ali, 2010). Given the rising PD rates in Asia, which are projected to exceed six million cases by 2030, this study seeks to develop a culturally relevant screening tool for PD, addressing a critical healthcare gap in Pakistan (Hussain et al., 2017). Data will be collected from government healthcare facilities in Lahore to support this effort.

Parkinson's disease (PD) presents a wide array of symptoms that vary in their presentation and severity across patients. Some patients experience earlier symptom onset, while others manage symptoms more effectively with medication (Sanders-Dewey et al., 2001). Symptoms impact critical daily activities such as walking, dressing, eating, and writing, highlighting the disease's pervasive effect on quality of life.

Research suggests that non-motor symptoms often precede motor symptoms and tend to be more disabling (Müller et al., 2013; Massano & Bhatia, 2012). Symptoms such as fatigue, depression, and pain are particularly detrimental to health-related quality of life (HRQoL) (Mylius et al., 2015; Valkovic et al., 2015). However, some studies did not find a significant difference in HRQoL related to either motor or non-motor symptoms.

Additionally, research indicates that traumatic head injuries, particularly in middle or late adulthood, may precede the diagnosis of PD. However, no significant causal relationship has been established (Heyn & Davis, 2020; Kenborg et al., 2015). On the other hand, outdoor activities and exposure to sunlight have been linked to a reduced risk of developing PD, as sunlight increases vitamin D production, which may lower PD risk (Kwon et al., 2013).

In certain cultural contexts, such as Pakistan, the stigma surrounding sexual health problems and psychosis has led to underreporting of these issues among PD patients (Ahmad & Zubair,

2016; Mukhtar et al., 2018). Studies in Korea indicate that PD patients often remain at home due to the cultural value of filial piety, and the caregiver burden increases as the disease progresses, affecting both the caregiver's and the patient's health (Kim et al., 2016).

Research has also highlighted the psychological distress experienced by caregivers, particularly in male patients, who often face additional financial burdens due to cultural norms (Sabzwari et al., 2016; Hussain et al., 2017; Kumar et al., 2019). In general, caregivers of patients with neurological diseases report moderate to severe stress, regardless of whether they come from joint or nuclear families. The distress experienced by caregivers is influenced by factors such as the uncertainty of the illness, financial constraints, and the mental health of the caregiver (Sanders-Dewey et al., 2001). Additionally, problem-focused coping strategies have been shown to reduce caregiver distress more effectively than emotion-focused strategies (Sanders-Dewey et al., 2001). This suggests that caregivers and patients may benefit from strategies that focus on solving problems rather than solely managing emotional responses. The present research aims to examine whether there are significant differences in Parkinson's disease (PD) patients based on demographic variables, and to identify which of these variables may serve as a potential predictor for the development of PD in the general population. Previous studies have consistently shown that certain demographic factors—including advanced age, male gender, lower socioeconomic status, and limited access to healthcare—are associated with increased risk for PD (Tysnes & Storstein, 2017; Pringsheim et al., 2014). Furthermore, geographic and ethnic differences have also been linked to variations in PD prevalence and progression (Van Den Eeden et al., 2003). By integrating these findings, the current study seeks to investigate the relative impact of these demographic variables within a specific population sample. Understanding such associations is essential for identifying at-risk groups and informing early intervention and public health strategies.

Objective of the Study

1. To check the association and differences of demographic variables with the newly developed Forman Parkinson's Disease Symptom Checklist (FPDS).

Method

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Demographic variables, including age, gender, marital status, education, and occupation, were analyzed for their relationship with the Forman Parkinson's Disease Symptom Checklist (FPDSC) using independent samples t-tests and One-Way ANOVA.

Sample

Purposive and snowball sampling techniques were employed to gather data due to the constraints of the COVID-19 pandemic. Participants were recruited from government and mental health facilities and contacted via telephonic interviews or in-person meetings. This approach ensured access to a clinical population. Based on recommendations by [Costello and Osborne \(2005\)](#) and prior studies, a sample size of 100 was targeted, acknowledging pandemic-related limitations.

Inclusion and Exclusion Criteria

Participants of any age and gender diagnosed with Parkinson's disease (PD) were included. Patients with other neurological conditions were excluded. Participants were required to communicate in comprehensible Urdu.

Instruments

Demographic Information Sheet

A detailed demographic sheet was developed to collect data on age, gender, education, marital status, medical history, and other relevant variables of Parkinson's patients.

Forman Parkinson's Disease Symptoms Checklist (FPDSC)

[Akram and Suneel \(2022\)](#) developed the Forman Parkinson Disease Symptoms Checklist (FPDSC). The checklist comprised of 22 items with the two subscales i.e., 6 items in Motor symptoms and 16 items in Non-motor symptoms, consisting of five Likert scales ranging from 1–5 (*Not at all*), three (*Moderate*), and five (*Severe*). For the individual factors and for their total, the value of internal consistency is in the acceptable range i.e. .79, .84 and .88 respectively. The symptom checklist was administered to 100 PD patients.

Procedure

Data collection commenced after approval from the Board of Studies and the International Review Board (IRB). Neurologists from government and mental health facilities were approached with an official permission letter. Participants were informed of the study's objectives, the potential benefits of participation, and their right to decline without repercussions. Verbal consent was obtained before eliciting information. Participants or their primary caregivers described the symptoms' onset, intensity, frequency, and duration. Sampling continued until data saturation was reached, ensuring comprehensive symptom documentation. Participants were briefed on the study's purpose and ensured their participation was voluntary. Confidentiality and anonymity were maintained throughout the study, with data securely stored by the researcher.

Results

This section highlighted the relationship of demographic variables with the newly constructed scale; named as Forman Parkinson's disease Symptom Checklist. The key demographic variables that were asked of the participants included age, number of children, gender, educational and marital status, place of living, occupation, monthly income, caretaker of the patient, and post-injury onset. Therefore, the relationship of key variables with the scale was determined through either an Independent-samples t-test or a One-way analysis of variance (ANOVA).

Table 1: *Cronbach Alpha, Mean Scores, and Standard Deviation of the Total Score and Two Factors of Forman Parkinson's Disease Symptom Checklist (FPDSC)*

Scale	<i>k</i>	α	<i>M</i>	<i>SD</i>
Motor symptoms	6	.79	16.64	5.51
Non-motor symptoms	16	.84	24.82	12.87
FPDSC	22	.88	41.46	16.74

Note. FPDSC = Forman Parkinson's Disease Symptom Checklist.

Table 1 reveals the internal consistency of the Forman Parkinson's Disease Symptom Checklist (FPDSC), which includes 22 items, assessed using Cronbach's alpha, yielding an excellent reliability score of $\alpha = .880$. The checklist consists of two factors: Motor Symptoms (6 items, $\alpha = .797$) and Non-Motor Symptoms (16 items, $\alpha = .843$). These reliability scores fall within the acceptable

range of .70 to .80, as [Field \(2013\)](#) suggested, confirming the checklist's internal consistency.

Demographics Related Differences on FPDSC

Although exploratory analyses were initially conducted to examine potential differences in FPDSC total and factor scores across various demographic variables (such as gender, marital status, educational level, occupation, monthly income, medical history, type of caretaker, post-injury onset, age, and number of children), most subgroup sizes were highly unequal or underpowered for valid statistical testing. For instance, females ($n = 13$) were substantially fewer than males ($n = 87$), and certain categories, such as unmarried participants ($n = 3$), or those with higher income brackets or rare medical conditions, had group sizes below 10. As such, inferential statistics like t-tests and ANOVA results were omitted to maintain methodological rigor. Descriptively, no substantial differences were observed across groups, and trends did not suggest consistent or meaningful patterns. The results indicate that demographic characteristics may not have a pronounced effect on FPDSC scores in this sample; however, these findings should be interpreted with caution due to sample size limitations and the exploratory nature of the comparisons.

Place of living Related Differences on FPDSC

The relationship between place of living (rural vs. urban) and the FPDSC scores was analyzed using an independent-sample *t*-test.

Table 2: Means, Standard Deviations, *t*, and *p* Values of Rural ($n = 50$) and Urban Area ($n = 50$) on the Scores of Total and Two Factors of FPDSC

FPDSC	Place of living	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
FPDSC Total	Rural	42.98	17.42	.90	.36
	Urban	39.94	16.06		
Factor 1	Rural	17.14	5.02	.90	.36
	Urban	16.14	5.97		
Factor 2	Rural	25.84	13.99	.79	.43
	Urban	23.80	11.69		

Note. ** $p < 0.05$, *M* = Arithmetic Mean, *SD* = Standard Deviation.

These results indicate non-significant differences based on the participants' place of living.

Discussion

The present study examined the relationship between demographic variables and symptom severity scores obtained through the Forman Parkinson's Disease Symptom Checklist (FPDSC), a standardized assessment tool developed to capture both motor and non-motor symptoms in individuals diagnosed with Parkinson's disease. The study sample comprised 100 clinically diagnosed Parkinson's patients, with a notable gender disparity—87% male and 13% female—reflecting broader gender trends in Parkinson's epidemiology. Participants ranged in age from 20 to 80 years ($M = 20$, $SD = 14.04$), though a majority (74%) were 50 years or older, aligning with the typical onset age of the disease. Sociodemographic profiling showed that 96% of the participants were married, 46% had children, and 41% were employed in the private sector. A significant number of participants reported comorbid health issues: 33% had high blood pressure, and 9% had sustained a head injury prior to their Parkinson's diagnosis. Caregiving responsibilities were predominantly managed by close family members, with spouses (62%) and children (24%) serving as primary caregivers, reflecting the familial caregiving culture prevalent in the region.

Exploratory factor analysis conducted on the FPDSC revealed a two-factor structure, separating symptoms into motor (9 items) and non-motor (13 items) clusters. This factorial division aligns with established symptomatology in Parkinson's research. The two-factor solution demonstrated robust psychometric properties: internal consistency was strong, as evidenced by a Cronbach's alpha of 0.88, and the instrument showed high split-half reliability. Additionally, discriminant validity was established through a comparative analysis with a healthy control group, supporting the FPDSC's specificity in detecting symptom profiles unique to Parkinson's disease.

To investigate whether FPDSC scores varied significantly across demographic subgroups, inferential statistical analyses were conducted using independent-samples *t*-tests and one-way ANOVA. Demographic variables examined included age, gender, marital status, educational attainment, employment status, and income bracket, history of comorbid conditions, prior head injury, caregiving arrangements, and time since diagnosis or injury. However, these analyses revealed no statistically significant differences in FPDSC total or subscale scores across any of the demographic variables. It is important to note, however, that these null findings may be influenced by limitations in sample distribution. Several groups had highly uneven sample sizes—for instance, males ($n = 87$) versus females

($n = 13$), and married individuals ($n = 96$) versus unmarried individuals ($n = 4$)—thereby reducing statistical power and potentially obscuring true group differences. Additionally, many demographic subgroups contained fewer than 30 participants, falling below the threshold typically required to meet assumptions of normality and homogeneity of variance for t-tests and ANOVA, as recommended by standard parametric test guidelines.

Given these limitations, tables originally intended to report comparative analyses across demographic variables (Tables 2–13) were omitted from the final manuscript, as the statistical outputs could not be considered reliable or interpretable. Nevertheless, these findings suggest a high degree of generalizability of the FPDSC across diverse demographic groups, indicating that symptom reporting remains relatively consistent regardless of background factors in this sample. Interestingly, this observation contrasts with previous research conducted in Pakistan (e.g., [Tufail, 2020](#)), which reported statistically significant differences in symptom presentation and severity across gender, occupation, and educational levels. These discrepancies may point to regional, cultural, or methodological variations and warrant further exploration using larger, more demographically balanced samples in future research.

Limitations and Suggestions

Future research could focus on collecting data from various cities in Pakistan, with larger sample sizes, to improve the generalizability of findings. Data could also be gathered from different private healthcare facilities all over Pakistan. Confirmatory factor analysis (CFA) should be conducted to validate the results of the exploratory factor analysis. Additionally, future studies could explore the relationship between caregivers' mental health or daily functioning and the disease stage. Examining the coping mechanisms employed by caregivers of patients with neurodegenerative diseases would also be valuable.

Implications

Multiple reasons and causes can contribute to the development of PD among people. The study also helps in identifying areas where individuals need attention, enabling timely interventions. Additionally, given the psychosocial burden reported by caregivers, counseling services should be made available to them. There is a recognized need for increased awareness about counseling and a

shortage of trained neuropsychologists in Pakistan, suggesting an opportunity for psychologists to specialize in this field.

Conclusion

Parkinson's disease is a neurodegenerative disorder that significantly impacts daily functioning and reduces life expectancy, although it is not fatal. Factor analysis revealed two symptom categories—motor and non-motor symptoms—consistent with findings in Western populations. The FPDSC, developed in Urdu, has been validated as a culturally appropriate tool for assessing Parkinson's disease symptoms in the local population.

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