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Frequency and Gender Differences of Non Motor Symptoms in Patients with Parkinson's Disease; A Cross Sectional Study

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ABSTRACT

Background: Parkinson's disease is one of the most common neurodegenerative disorder, presenting with a variety of symptoms. **Objective:** To determine Frequencies and gender differences of Non Motor symptoms among patients presenting with Parkinson's disease to Tertiary Care Hospital of Lahore. **Methodology:** This cross sectional study was conducted at the department of Neurology, National Hospital and Medical Center, Lahore, from, December 2024 to May 2025. A total of 185 patients presenting with Parkinson's disease in the neurology department were included through non-probability consecutive sampling. Individuals of both genders aged 30 to 90 years were enrolled after obtaining informed consent. **Results:** Out of 185 patients, 137(74.1%) were male and 48(25.9%) were female .The mean age was 63.6±7.3 years. The majority of patients (59.5%) were within the 61-70 year age group. Across both genders, the most common symptoms were fatigue and urinary problems(65.9%).Among females, the most common symptom was depression (85.4%), while males predominantly experienced fatigue (62.8%). **Conclusion:** It is concluded that Parkinson's disease was more prevalent in men, and majority of patients suffered from non motor symptoms, with fatigue and urinary problems as the most commonly reported symptoms overall. However, females experienced a higher burden of mood disorders and pain.

INTRODUCTION

Parkinson's disease (PD) is the second most common neurodegenerative disorder among the elderly population, manifesting clinically as a variety of motor and non-motor symptoms[1]. It is associated with profound disability and negative effect on the quality of life. Whereas, the exact cause of Parkinson's disease is not known, the pathologic manifestations include the loss or abnormal functioning of dopaminergic neurons in the substantia nigra pars compacta[2]. Studies have shown that PD is more frequent in men than in women[3].

Patients present with motor and non motor symptoms. Motor symptoms are primarily caused by a lack of dopamine, these include bradykinesia, tremor and rigidity. In contrast, non-motor symptoms, such as depression, sleep disorders, and constipation, start many years before the onset of motor symptoms and persist throughout the course of the disease[4].

The global burden of Parkinson's disease is increasing rapidly, with 2019 estimates identifying over 8.5 million individuals living with the condition, according to the World Health Organization. As per 2023 data of WHO, there has been a significant 81% increase in disability-adjusted life years (DALYs) and a doubling of mortality rates since 2000[5].

While the exact etiology of the disease remains undetermined, it is increasingly attributed to a combination of genetic predisposition and environmental triggers, such as exposure to pesticides and industrial chemicals[6].

This study investigated the frequency and gender differences in non motor symptoms of PD patients at a tertiary care center in Lahore, Pakistan, to better categorize disease manifestations and hence optimize patient care.

Objective

To determine Frequencies and Gender differences of Non Motor symptoms among patients presenting with Parkinson's disease to Tertiary Care Hospital of Lahore.

METHODOLOGY

This cross-sectional study was conducted at the Department of Neurology, National Hospital and Medical Center, Lahore from December 2024 to May 2025. The sample size was determined utilizing OpenEpi software [7], expecting frequency of cognitive impairment in men

86% [8] at a 95% confidence interval. A margin of error of 5% was applied, resulting in a calculated sample size of 185. Data were collected through a nonprobability consecutive sampling technique.

Inclusion Criteria

- Idiopathic Parkinson's disease diagnosed according to the Movement Disorder Society criteria [9]
- Patients of both genders, male and female
- Age range 30 to 90 years

Exclusion Criteria

- Secondary or Atypical parkinsonism such as multiple system atrophy, corticobasal degeneration, and progressive supranuclear palsy
- Serious medical conditions, for example, severe infection, malignancy, anemia, or hepatic disease

Data Collection Procedure

After obtaining approval from the Ethical Review Committee of the hospital, a total of 185 patients who presented with Parkinson's disease in department of Neurology at National Hospital and Medical Centre, Lahore, were enrolled. Patients who fulfilled the inclusion and exclusion criteria, as defined by the operational definitions, were included after proper counseling. Confidentiality of all participants was maintained throughout the research process. Written informed consent was obtained from each participant before inclusion in the study. A detailed medical history was recorded, and a comprehensive neurological examination was performed by trained clinicians. Data were systematically collected on variables such as age, gender, onset of disease, duration of disease, and non motor symptoms. Each patient was interviewed using a structured Performa.

Data Analysis

All collected data were entered and analyzed using SPSS version 27.0. Numerical variables such as age, onset of disease, and duration of disease were summarized using mean and standard deviation. Categorical variables, including gender and non motor symptoms, were expressed as frequencies and percentages. The data were stratified for age, gender, onset of disease, and duration of disease. Poststratification, the Chi-square test was applied, and a p value of less than 0.05 was considered statistically significant.

RESULTS

Data were collected from 185 patients, with a mean age of 63.6±7.3 years. The majority of patients were male (74.1%), and the rest were female (25.9%). The average age at onset of disease was 59.4±5.7 years, and average duration of disease was 4.27±2.7 years.

Table 1

Baseline Characteristics of the Study Population (n=185)

Variable	Mean ± SD / n (%)
Age(years)	63.6±7.3
Gender	Male: 137 (74.1%) Female: 48 (25.9%)
Age at onset of disease(years)	59.4±5.7
Duration of disease(years)	4.27±2.7

Out of the total 185 participants, 177 (95.7%) reported non-motor symptoms, while only 8 (4.3%) reported their absence.

Among the 137 males, a significant majority, 130 (94.9%), presented with non-motor symptoms, while 7 (5.1%) did not.

Similarly, among the 48 females, almost all, 47 (97.9%), exhibited non-motor symptoms, and only 1 (2.1%) reported their absence.

Table 2

Distribution of Parkinson's disease by Gender

Non Motor Symptoms	Male(n=137)	Female(n=48)	Total
Present	130(94.9%)	47(97.9%)	177(95.7%)
Absent	7(5.1%)	1(2.1%)	8(4.3%)
Total	137(74.1%)	48(25.9%)	185(100%)

The age wise distribution of Parkinson's disease showed that the highest prevalence of Parkinson's disease was within the 61-70 years age group,for both male and female gender, accounting for 59.5% of the total. The second most common age group was 51-60 years, comprising 24.9% of the total. Individuals aged 71-80 years made up 9.7% , all of whom were male. Similar trends were observed in the oldest age group, 81-90 years, accounting for 2.2% , exclusively consisting of males.The youngest age groups (31-40 and 41-50 years) collectively represented a small portion of the study population, totaling 3.7% , with the 31-40 age group showing one female participant (2.1%) and the 41-50 age group having 5 males(3.6%) and 1 female (2.1%).

Table 3

Age Group (years)	Male	Female	Total
31-40	0(0.0%)	1(2.1%)	1(0.5%)
41-50	5(3.6%)	1(2.1%)	6(3.2%)
51-60	38(27.7%)	8(16.7%)	46(24.9%)
61-70	72(52.6%)	38(79.2%)	110(59.5%)
71-80	18(13.1%)	0(0.0%)	18(9.7%)
81-90	4(2.9%)	(0.0%)	4(2.2%)
Total	137(100%)	48(100 %)	185(100%)

The most commonly reported symptoms overall were fatigue and urinary problems, each affecting 65.9% of the total participants. Sleep disturbance and depression also demonstrated high overall prevalence, both at 57.3%. Many non motor symptoms were significantly more prevalent in females. Depression was reported by 85.4% of females compared to 47.4% of males, and urinary problems affected 79.2% of females versus 61.3% of males. Similarly, fatigue (75.0% in females vs. 62.8% in males), anxiety (56.2% in females vs. 39.4% in males), and pain/cramps (52.1% in females vs. 29.9% in males) were more frequently observed in females. Conversely, sexual dysfunction was notably more common in males, reported by 30.7% of males but only 12.5% of females. Other symptoms such as cognitive impairment, psychosis, falls, and gastrointestinal problems showed relatively similar prevalence rates between genders, while hyposmia/anosmia was the least prevalent overall(7%).

Table 4

Non motor symptoms	Male	Female	Total
Depression	65(47.4%)	41(85.4%)	106(57.3%)
Anxiety	54(39.4%)	27(56.2%)	81(43.8%)
Cognitive impairment	35(25.5%)	15(31.2%)	50(27.0%)

Hyposmia/anosmia	10(7.3%)	3(6.2%)	13(7.0%)
Pyschosis	19(13.9%)	8(16.7%)	27(14.6%)
Falls	42(30.7%)	15(31.2%)	57(30.8%)
Fatigue	86(62.8%)	36(75.0%)	122(65.9%)
Urinary problems	84(61.3%)	38(79.2%)	122(65.9%)
GIT problems	42(30.7%)	17(35.4%)	59(31.9%)
Sleep disturbance	77(56.2%)	29(60.4%)	106(57.3%)
Pain/cramps	41(29.9%)	25(52.1%)	66(35.7%)
Sexual dysfunction	42(30.7%)	6(12.5%)	48(25.9%)

DISCUSSION

This study was conducted to determine the frequency and gender differences among patients presenting with Parkinson's disease in the neurology department of a tertiary care hospital in Lahore, Pakistan. Out of 185 patients included, 137(74.1%) were male and 48 (25.9%) were female. The findings indicate that PD was more prevalent in males in this study population.The overall male predominance observed in this study aligns with prior research as well. A meta analysis published in 2023 (Zirra et al) concluded that PD is more prevalent in men[10]. The findings of the present study are strongly supported by regional data as well. Specifically, Hussain et al. (2025) observed a similar gender disparity in their population-based approach in Pakistan, reporting that 77.8% of their Parkinson's cohort were male[11].Studies from neighboring countries such as China have reported similar gender patterns as well[12].

The pathophysiology resulting in the gender difference has not been well understood but studies suggest that estrogen may provide a neuroprotective effect in women, potentially delaying the onset of symptoms and resulting in lower prevalence rates compared to men[13].

Among the total 185 participants, a vast majority of 177 individuals (95.7%) reported experiencing non-motor symptoms. With respect to gender, 94.9% males and 97.9 % females exhibited non-motor symptoms. These findings highlight a consistently high occurrence of non-motor symptoms across both genders. A large multicentre study(PRIAMO Study, 2009) estimated that about 98.6% patients had non motor symptoms[14]. Fernandes et al(2021) demonstrated that non motor symptoms were present in 88.5% of the patients[15].

The age-wise distribution in the study population revealed that there's a predominant distribution in the older age brackets, consistent with the typical onset of PD.Nearly 60% of the total individuals were concentrated in the 61-70 years age group. This predominance suggests that the onset of PD is most common within this age range, aligning with the known epidemiology of the disease where incidence significantly increases with advancing age. Females were notably concentrated in the 61-70 age bracket, while males were more broadly distributed across various age groups from 41 to 90 years.Participants aged 71-90 years accounted for 11.9% of the population and were exclusively male, highlighting another demographic aspect that may relate to gender-related longevity, survival bias or gender differences in late-life disease prevalence.The younger age groups, spanning 31-40 and 41-50 years, constituted only a small fraction of the total, collectively under 4%, which is consistent with the rarity of early-onset PD but also highlights its presence in younger populations that should not be overlooked. Overall, this age and gender distribution suggest that PD predominantly affects older adults, with notable gender disparities across different age groups that merit additional research to understand underlying biological, environmental, and social factors influencing these patterns. Such knowledge could improve targeted screening, diagnosis, and management strategies tailored to specific demographic groups.

The most common nonmotor symtoms overall were fatigue and urinary problems, affecting 65.9% of participants. Sleep disturbances and depression were also highly prevalent (57.3%). These findings align with large-scale population studies, such as the PRIAMO study, which identified fatigue and urinary dysfunction as among the most common non-motor symptoms in PD [14].

Specific non-motor symptoms revealed different prevalence rates, with notable differences observed between genders. Females experienced a higher prevalence of affective and somatic symptoms compared to males. Specifically, depression was reported by 85.4% of females versus 47.4% of males, and anxiety by 56.2% of females versus 39.4% of males. This is consistent with the findings of Martinez-Martin et al. (2012) and Nicoletti et al. (2017), who reported that female gender is a strong predictor for mood disturbances and fatigue in PD populations [16,17]. Furthermore, the higher incidence of pain/cramps in females (52.1% vs. 29.9%) supports previous research suggesting that women experience a higher pain burden and lower pain thresholds [16].

In contrast, sexual dysfunction was the only symptom significantly more prevalent in males (30.7%) compared to females (12.5%). This specific gender disparity is well-documented in the literature, where male gender is consistently associated with higher scores in sexual dysfunction domains, whereas females tend to score higher in mood and pain domains [16, 18].

The relatively similar prevalence rates for cognitive impairment, psychosis, falls, and gastrointestinal issues suggest that these features may present independently of biological sex.

However, the distinct gender-specific profiles observed for mood, pain, and sexual function underscore the necessity for tailored clinical management. Clinicians should maintain a lower threshold for screening depression and pain in female patients, while actively inquiring about sexual health in male patients, as these symptoms significantly impact quality of life but may be underreported.

Limitations of this study include its single-center design and non-probability sampling. Also, the reliance on self-reported data for symptoms such as depression, anxiety, and sexual dysfunction introduces the potential for recall bias or social desirability bias, particularly regarding sensitive topics where underreporting may differ by gender. A cross-sectional design allows for the assessment of prevalence but precludes the establishment of causal relationships between biological sex and symptom development.Despite these limitations, the study provides valuable local data on the frequency and gender differences in Parkinson's disease in a tertiary hospital setting in Pakistan.

CONCLUSION

It is concluded that Parkinson's disease was more prevalent in males, and majority of patients suffered from non motor symptoms, with fatigue and urinary problems as the most commonly reported symptoms overall. As compared to males, females experienced a higher burden of mood disorders(depression and anxiety) and pain. In contrast, males were more susceptible to sexual dysfunction. Cognitive impairment, psychosis, falls, and gastrointestinal problems showed relatively similar prevalence rates between genders.

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