

Sleep Quality in Patients with Parkinson's Disease in Western Maharashtra: A Cross-Sectional Study

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Abstract

Background: Sleep disturbances are common non-motor manifestations of Parkinson's disease. Region-specific evidence from Western Maharashtra is limited.

Objectives: To assess sleep quality among patients with Parkinson's disease, identify sleep-related problems, and determine associations between sleep quality and demographic and clinical variables.

Methods: A quantitative, cross-sectional descriptive analytical study was conducted among 100 patients with Parkinson's disease attending four neurology clinics in the Sangli, Miraj, and Kupwad Corporation area, Maharashtra, India. Participants were recruited using non-probability purposive sampling. Data were collected using a demographic and clinical questionnaire, the Pittsburgh Sleep Quality Index (PSQI), and the Parkinson's Disease Sleep Scale-2 (PDSS-2). Descriptive statistics summarized sleep-related scores. Associations between PSQI-defined sleep quality and selected variables were examined using the chi-square test, with $P < 0.05$ considered statistically significant.

Results: Poor sleep quality was identified in 96% of participants. The highest mean PDSS-2 item scores were observed for excessive daytime sleepiness (3.44 ± 1.02), overall sleep quality (3.20 ± 1.09), insomnia (3.15 ± 1.21), and frequent nocturnal awakenings (3.14 ± 1.25). Sleep quality was significantly associated with age ($\chi^2 = 41.05$; $P < 0.001$), Parkinson's disease duration ($\chi^2 = 40.15$; $P < 0.001$), comorbid medical conditions ($\chi^2 = 36.12$; $P < 0.001$), and average sleep duration ($\chi^2 = 38.88$; $P < 0.001$). No significant associations were observed with sex, marital status, smoking, or alcohol consumption.

Conclusions: Poor sleep quality was prevalent in this sample. Assessment using validated sleep instruments may support early recognition of sleep problems and individualized multidisciplinary care.

Key-words: Parkinson's disease; sleep quality; Pittsburgh Sleep Quality Index; Parkinson's Disease Sleep Scale-2; non-motor symptoms; sleep disturbances; neurological disorders; insomnia.

Introduction

Parkinson's disease (PD) is a progressive neurodegenerative disorder with substantial motor and non-motor manifestations. Sleep disturbances, including insomnia, nocturnal awakenings, excessive daytime sleepiness, nocturia, and nocturnal motor symptoms, are common and can impair functioning and quality of life.¹⁻⁴ Although sleep problems are well documented internationally, region-specific evidence from western Maharashtra is limited. This study therefore assessed sleep quality and Parkinson's disease-specific sleep problems among patients attending selected neurological healthcare settings in the Sangli, Miraj, and Kupwad Corporation area and examined associations between sleep quality and selected demographic and clinical variables.

Material and Methods

Study design and setting

A quantitative, cross-sectional descriptive analytical study was conducted in four selected neurology clinics/hospitals in the Sangli, Miraj, and Kupwad Corporation area of Maharashtra, India. Data collection was conducted in December 2025.

Participants and sampling

The study included 100 patients with a clinical diagnosis of Parkinson's disease who were willing to participate and could understand English, Hindi, or Marathi. Patients with other neurological or mental health conditions likely to affect sleep, severe cognitive impairment, or use of medications known to influence sleep patterns were excluded. Participants were recruited using non-probability purposive sampling. The sample size was calculated using a prevalence-based formula and yielded 94; this was increased to 100 participants.

Measures

A researcher-developed demographic and clinical questionnaire collected information on age, sex, marital status, disease duration, medications, comorbidities, sleep duration, sleep aids, smoking, alcohol consumption, and physical activity. Its content validity index was 0.98 after expert review. Overall sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), with a global score >5 indicating poor sleep quality.⁵ Parkinson's disease-specific sleep problems were assessed using the 15-item Parkinson's Disease Sleep Scale-2 (PDSS-2), in which higher scores indicate greater sleep disturbance; the instrument has also been evaluated in an Indian population.⁶⁻⁷

Data collection and ethics

Ethical approval was obtained from the institutional ethics committee before data collection (approval dated June 25, 2025). The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants. Data were collected individually in a quiet setting, and confidentiality was maintained through coded records. A pilot study involving 10 patients was conducted to assess feasibility and clarity; pilot participants were not included in the main study. Test-retest reliability was assessed in the pilot, with reported coefficients of $r=0.90$ for the PSQI and $r=0.87$ for the PDSS-2.

Statistical analysis

Data were coded and analyzed using IBM SPSS Statistics version 21.0. Frequencies and percentages summarized categorical variables, while means and standard deviations summarized PDSS-2 item scores. Associations between PSQI-defined sleep quality and selected categorical variables were assessed using the chi-square test. Statistical significance was set at $P<0.05$.

AI-assisted manuscript preparation

During preparation of this manuscript, the authors used ChatGPT (GPT-5.6 Luna) for language editing, structural refinement, and review of manuscript formatting against the journal's author instructions. The authors independently reviewed, edited, and verified the final manuscript, including all scientific content, data, analyses, and references, and accept full responsibility for its accuracy and integrity.

Results

One hundred participants were included. The largest age groups were 71–75 years (34%) and ≥ 76 years (32%); 58% were male and 84% were married. Parkinson's disease duration was 6–10 years in 44% and ≥ 11 years in 37%. Hypertension and diabetes were present together in 68% of participants. Most participants (91%) reported sleeping <4 hours per night. Sixty-nine percent had never smoked and 63% reported no alcohol consumption.

According to the PSQI, 96 participants (96%) had poor sleep quality (global score >5), while four (4%) had good sleep quality (global score ≤ 5).

PDSS-2 item scores were highest for excessive daytime sleepiness (mean $\pm$ SD, 3.44 ± 1.02), overall sleep quality (3.20 ± 1.09), insomnia (3.15 ± 1.21), and frequent awakenings (3.14 ± 1.25). Morning tremor (2.88 ± 1.13) and nocturia (2.80 ± 1.29) were also prominent. Lower mean scores were observed for nocturnal hallucinations (0.20 ± 0.47), urge to move the limbs at night (0.52 ± 0.73), distressing dreams (0.53 ± 0.74), and nocturnal immobility (0.60 ± 0.68).

Sleep quality was significantly associated with age ($\chi^2=41.05$, $df=3$, $P<0.001$), Parkinson's disease duration ($\chi^2=40.15$, $df=2$, $P<0.001$), comorbid medical conditions ($\chi^2=36.12$, $df=3$, $P<0.001$), and average sleep duration ($\chi^2=38.88$, $df=2$, $P<0.001$). No significant association was observed with sex ($\chi^2=1.47$, $df=1$, $P=0.225$), marital status ($\chi^2=4.69$, $df=2$, $P=0.096$), smoking status ($\chi^2=1.16$, $df=1$, $P=0.281$), or alcohol consumption ($\chi^2=0.043$, $df=1$, $P=0.836$).

Discussion

The present study found that 96% of participants had poor sleep quality according to the PSQI. This high prevalence is consistent with the recognized burden of sleep disturbances among people with Parkinson's disease. Sleep

impairment in PD is multifactorial and may reflect interactions among nocturnal motor symptoms, autonomic dysfunction, medication effects, circadian abnormalities, and other non-motor symptoms.¹⁻⁴ Excessive daytime sleepiness had the highest PDSS-2 item mean, followed by overall poor sleep quality, insomnia, and frequent nocturnal awakenings. Morning tremor and nocturia were also prominent. These findings are clinically relevant because sleep disruption in PD is not limited to difficulty initiating or maintaining sleep; motor symptoms, autonomic symptoms, pain, and daytime somnolence may coexist and contribute to fragmented nighttime sleep and impaired daytime functioning.^{3,4,8,9} The use of both the PSQI and PDSS-2 provides complementary information: the PSQI characterizes overall subjective sleep quality, whereas the PDSS-2 captures PD-specific nocturnal symptoms.^{5,6} Sleep quality was significantly associated with age, duration of Parkinson's disease, comorbid medical conditions, and average sleep duration. Advancing age and longer disease duration may be associated with greater accumulation of motor and non-motor symptoms and altered sleep-wake regulation. Comorbid conditions may further increase symptom burden and contribute to nocturnal discomfort or sleep fragmentation. The association with average sleep duration is also consistent with the close relationship between sleep quantity and perceived sleep quality. However, because the present study is cross-sectional, these associations should not be interpreted as causal. No significant associations were observed for sex, marital status, smoking, or alcohol consumption. These findings suggest that, within this selected sample, disease-related and clinical characteristics may be more closely related to sleep quality than the demographic and lifestyle variables examined. The findings should nevertheless be interpreted cautiously because the sample was obtained through purposive sampling from selected neurological healthcare settings. The study has several limitations. The cross-sectional design prevents assessment of temporal changes and causal relationships. Purposive sampling and recruitment from four selected facilities may limit generalizability. The sample size was 100, and the study excluded individuals with certain neurological, psychiatric, or cognitive conditions and those taking medications that could influence sleep. Sleep was assessed using self-report instruments rather than objective methods such as polysomnography or actigraphy. In addition, the study was limited to participants able to understand English, Hindi, or Marathi. Finally, the small number of participants classified as having good sleep quality may affect the stability of chi-square analyses and should be considered when interpreting associations. These findings have implications for neurological nursing practice. Routine screening with validated instruments such as the PSQI and PDSS-2 may help identify sleep problems that are not spontaneously reported during consultations. Patients with prominent daytime sleepiness, insomnia, nocturnal awakenings, nocturia, or nocturnal motor symptoms may benefit from further clinical evaluation and individualized multidisciplinary management.^{9,10}

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Table 1. Demographic and clinical characteristics of participants (n=100)

Variable	N	%
Personal characteristics		
Age (years)	N	%
Below 65	11	11
66–70	23	23
71–75	34	34
76 and above	32	32
Sex	N	%
Male	58	58
Female	42	42
Marital status	N	%
Single	1	1
Married	84	84
Widowed	15	15
Clinical characteristics		
Duration of Parkinson's disease (years)	N	%
Up to 5	19	19
6–10	44	44
≥11	37	37
Comorbid medical conditions	N	%
Hypertension	27	27
Diabetes	1	1
Hypertension and diabetes	68	68
None	4	4
Average sleep duration (hours)	N	%
<4	91	91
5–6	3	3
7–8	6	6
Smoking status	N	%
Never	69	69
Former	31	31
Alcohol consumption	N	%
Never	63	63
Occasionally	37	37

Table 2. Overall sleep quality according to the Pittsburgh Sleep Quality Index (n=100)

Sleep quality	N	%
Good sleep quality (≤5)	4	4
Poor sleep quality (>5)	96	96

Table 3. Parkinson's Disease Sleep Scale-2 item scores (n=100)

PDSS-2 item	Mean ± SD
Excessive daytime sleepiness	3.44 ± 1.02
Overall sleep quality	3.20 ± 1.09
Insomnia	3.15 ± 1.21
Frequent awakenings	3.14 ± 1.25
Morning tremor	2.88 ± 1.13
Nocturia	2.80 ± 1.29

Nocturnal muscle cramps	2.19 ± 1.12
Night pain (limb pain)	2.07 ± 1.16
Early morning painful dystonia	1.57 ± 1.20
Snoring/breathing difficulty	1.02 ± 0.59
Nocturnal limb restlessness	0.70 ± 0.80
Nocturnal immobility	0.60 ± 0.68
Distressing dreams	0.53 ± 0.74
Urge to move limbs at night	0.52 ± 0.73
Nocturnal hallucinations	0.20 ± 0.47

Higher scores indicate greater sleep disturbance.

Table 4. Association between PSQI-defined sleep quality and selected variables (n=100)

Variable	χ^2	df	P value	Interpretation
Age	41.05	3	<0.001	Significant
Sex	1.47	1	0.225	Not significant
Marital status	4.69	2	0.096	Not significant
Duration of Parkinson's disease	40.15	2	<0.001	Significant
Comorbid medical conditions	36.12	3	<0.001	Significant
Average sleep duration	38.88	2	<0.001	Significant
Smoking status	1.16	1	0.281	Not significant
Alcohol consumption	0.043	1	0.836	Not significant