

Brief Communication

Correlation of sleep disorder and Parkinson's disease severity in Turkish patients

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Between 60 and 98% of patients with Parkinson's disease (PD) have sleep-related symptoms.¹ The motor disturbances of this disease may cause an inability to achieve restful sleep. Sleep difficulties in patients with PD are independent of specific sleep disorders, and may be part of the disease process itself. The dopaminergic drugs and the pathophysiology of PD might contribute to a higher frequency of sleep fragmentation and disruption of sleep among these patients. Although PD usually presents with a disorder of movement, non-motor symptoms may occur particularly as the disease progresses. Non-motor aspects of PD can also interfere with sleep. Despite the high prevalence of sleep disorders and the problems they cause, there are few reports evaluating sleep problems in PD. To assess the type of sleep disorders and the correlation between disease severity and sleep disorders, we prospectively evaluated patients in our movement disorders clinic.

Fifty-four patients with PD participated in the study after giving written informed consent. This was a prospective study of patients with PD consecutively seen at the movement disorder outpatient clinic of Mustafa Kemal University Hospital, Antioch, Turkey between March and August 2007. The Institutional Review Board of Mustafa Kemal University, School of Medicine, approved the study. A diagnosis of PD was made by virtue of patients having at least 2 of the following features: resting tremor, bradykinesia, and rigidity, without any

other explanation for Parkinsonism. Those with clinical features suggestive of parkinsonian syndromes due to multiple system atrophy, progressive supranuclear palsy, or Lewy body dementia were excluded. The 54 patients with PD underwent a standardized assessment battery including Unified Parkinson Disease Rating Scale (UPDRS),² Hoehn-Yahr Scale (HYS),³ Schwab and England activities of daily living scale (ADLS), and Parkinson's Disease Sleep Scale (PDSS).⁴ The severity of the PD was classified according to UPDRS, ADLS, and HYS. Patients were categorized as mild, moderate, and severe according to UPDRS (0-11 score-mild, 12-22 score-moderate, and <22 score-severe). Patients were categorized as independent and dependent according to ADLS (independent; 80-100%, dependent; <80%). Patients were categorized into 3 stages (stage <2, stage 2, stage >2) according to HYS. The same physician performed all clinical ratings.

Statistical analyses were performed using the statistical package SPSS v 15.0. Normality of the data was checked by Shapiro-Wilk test and by normal Q-Q plots. Since the data were not distributed normally, appropriate non-parametric test was chosen such as Kruskal-Wallis test, Mann-Whitney U test, and Spearman rank correlation test. One-way ANOVA, student t test, and Pearson correlation test was used for the normally distributed data. Results were presented as mean±SD and median (min-max). A *p*-value of <0.05 was considered significant.

There were 21 women (38.9%) and 33 men (61.1%). Their mean age (SD) was 73 years (range 46-87). The UPDRS score was 27.8±16.2, range 3-59, the Hoehn and Yahr score was 1.83±1.02, range 0-5, and the Schwab and England ADLS score was 66.30±22.51, range 0-90. Table 1 shows the distribution of patients according to PD severity with scales. According to

Table 1 - Distribution of total PDSS according to disease severity classification with different scales.

PD scales	No. of patients (%)	PDSS		P-value
		Mean± SD	Median	
<i>Schwab and England ADLS</i>				
Independent (80-100%)	36 (67)	90.1±26.2	94.5	0.0001
Dependent (<80 %)	18 (33)	58.6±22.8	64.5	
<i>Hoehn and Yahr scale</i>				
Early (stage <2)	25 (46)	89.8±23.5	94.0	0.001
Moderate (stage 2)	14 (26)	86.3±23.5	82.5	
Severe (stage >2)	15 (28)	56.4±30.6	45.0	
<i>UPDRS</i>				
Mild (0-11)	11 (20)	109.9±13.6	108.0	0.0001
Moderate (12-22)	9 (17)	98.1±20.5	94.0	
Severe (>22)	34 (63)	64.9±24.1	66.5	
Total	54	79.6±29.1	78.5	

PDSS - Parkinson's disease sleep scale, UPDRS - Unified Parkinson's Disease Rating Scale, ADLS - activities of daily living scale

PDSS, the highest score was found for item 9 (having incontinence of urine because of symptoms, 7.4 ± 3.3), item 7 (hallucination at night, 7.1 ± 3.4), and 6 (distressing dreams, 6.1 ± 3.6). As expected, most items on the PDSS (except items 5; fidgeting in bed, 6; distressing dreams at night, and 8; getting up at night to pass urine) were significantly related with the severity of PD according to UPDRS classification. No relation was found between fidgeting in bed ($p=0.854$), suffering from distressing dreams at night ($p=0.341$), and getting up at night to pass urine ($p=0.418$) with the severity of PD. Items 4 (restlessness of legs), 6 (distressing dreams at night), and 7 (hallucination at night) could be indicators of parasomnia. We did not find any correlation between distressing dreams and severity of PD ($p=0.341$), however, item 4 (restlessness of legs) ($p=0.07$) and item 7 (hallucination at night) ($p=0.022$) were found to correlate with disease severity. The total PDSS score was found to decrease while the severity of the PD increased. The distribution of total PDSS scores according to disease severity classification with different scales is shown in Table 1. Significant relations were found between PDSS and severity of disease according to Schwab and England ADLS, Hoehn-Yahr Score, and UPDRS score classifications.

Sleep disorders are believed to occur in over 90% patients with PD at some stage.² In this study, the strongest predictor of quality of life in PD was the presence of a sleep disorder, as measured by the PDSS. By using a visual analogue scale (PDSS), we provided a quantitative measure of symptoms causing sleep disturbance in a group of patients with PD. The PDSS is a bedside instrument designed to assess the multifactorial nature of sleep disturbances in PD.⁴ This study shows that the PDSS scores were significantly lower in patients with high scores on the UPDRS, HYS, Schwab and England ADLS. The patients with advanced PD had significantly lower scores on the PDSS compared with patients with early/moderate disease, suggesting that advancing disease is more likely to predispose to sleep disruption. While Chaudhuri et al⁴ found no significant differences between the patients and the controls on item 2 (sleep onset insomnia), we found a significant difference on items 2 and 3, suggesting both sleep onset insomnia and sleep maintenance insomnia are PD related. Although worsening of scores was seen across all 15 items of the PDSS, item 5 (do you fidget in bed), item 6 (do you suffer from distressing dreams at night), and item 8 (do you get up at night to pass urine) was not correlated with the worsening of PD. In our study, we found a significant correlation with item

4, suggesting nocturnal restlessness, but no significant correlation on item 5. These findings suggest that our patients with advanced disease either have nocturnal restlessness, except for fidgeting in bed or inability to turn over in bed. Patients with PD experience a wide range of parasomnias. We found no significant correlation between worsening of PD and parasomnias according to item 5, and a significant correlation between them according to items 4 and 7. This may be a contradiction. The frequency of urinary symptoms in PD patients varies from 37-70%. The urinary symptoms of PD patients include frequency, urgency, and urge incontinence. Because of these symptoms, patients often suffer from nocturia. In our study, we could not find an association between PD severity and the frequency of nocturia. A limitation of this study was the unvalidation of PDSS against polysomnography, however, our aim was to evaluate sleep problems using a simple bedside test, such as PDSS.

In conclusion, there is a strong correlation between PDSS scores and the other scales used for PD severity. Patients with PD who had high scores on the UPDRS, HYS, and low scores on the PDSS had more sleep disability. The diagnosis of these sleep disorders can only be made after interviewing patients and their relatives. Therefore, the PDSS is a simple and brief bedside screening tool to evaluate sleep problems in PD for diagnosis and follow up.

Received 25th February 2008. Accepted 23rd December 2008.

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