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Brief communication

The prevalence of sleep disorders in patients with Parkinson's disease A self-reported, community-based survey

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Abstract

Objective: Sleep disruption is common in patients with Parkinson's disease (PD). The goal of our survey was to gain insight into the causes of sleep disruption and into the prevalence of specific sleep disorders in PD.

Method: A sleep questionnaire was mailed to 400 unselected PD patients. Analysis of the results was descriptive.

Results and Conclusion: The results of earlier performed surveys for sleep disruptive factors in PD were confirmed and a high prevalence of a possible rapid eye movement-sleep behavior disorder and restless legs syndrome in PD was found.

Keywords: Sleep disorders; Parkinson's disease; Rapid eye movement-sleep; Restless legs

1. Introduction

Complaints of sleep and wake are common (74–98%) in patients with Parkinson's disease (PD) and adversely affect the quality of life in these patients [1–3]. Sleep fragmentation is the earliest and most frequent complaint and gradually worsens with disease progression[1,2]. According to previous reports, sleep disruption probably results from impaired motor functions, nocturia, nocturnal pain and cramps, altered dream phenomena, vocalization, visual hallucination, dystonia and involuntary myoclonic jerks [1,2,4–7]. These disruptions often lead to excessive daytime sleepiness and fatigue [3,4,6–8]. Part of the complaints of sleep and wake might be due to concurrent depression and specific sleep disorders such as obstructive sleep apnea syndrome (OSAS), restless legs syndrome (RLS) or REM-sleep behavior disorder (RSBD) [4,9–12].

The prevalence and severity of specific sleep disorders in PD patients have not been investigated in the Netherlands before. We therefore performed a survey using a questionnaire that was mailed to an unselected population of patients suffering from PD.

2. Methods

We designed a sleep questionnaire containing 25 questions regarding the items shown in the first column of Table 1. Questions inquiring as to who helped the patient to fill out the questionnaire and the Epworth sleepiness scale (ESS) were also included [13]. This questionnaire was mailed to 400 PD patients known at the outpatient clinic of 'Medisch Centrum Haaglanden' in The Hague.

Two-hundred and thirty-four (59%) patients returned useable questionnaires. From the medical files of these patients, their most recent Hoehn and Yahr scores (H&Y), present medication and disease duration were noted.

A descriptive analysis of these data was performed.

3. Results

One-hundred and eighteen men and 116 women suffering from PD, with a mean age of 72 (±11) years, a median H&Y score of 2.5 (range, 0–5) and a mean disease duration of 8.4 (±2.3) years completed the questionnaire. One-hundred and sixty-seven (71%) patients completed the questionnaires by themselves, or with their bed partners. Forty-six (20%) questionnaires were filled out with the aid of spouses and 21 (9%) by professional health care workers. No sex-related significant differences in age, disease dura-

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Table 1
The prevalence of sleep disorders in patients with PD[a]

	Total (234)	Cut-off point
Median sleep quality	7 (0–10)	NR
Mean time in bed (h)	9.1 ± 1.7	NR
Sleep initiation problems	38 (16)	>30 min
Nocturnal awakenings	182 (77)	>2 times
Nocturia	138 (59)	>3 times
Inability to turn over in bed	169 (72)	>No
Frequent talking during sleep	56 (24)	>No/I don't know
Frequent movements	55 (24)	>No/I don't know
Vivid dreams and nightmares	71 (30)	>No/unchanged
Frequent napping	104 (44)	>No
Mean duration of naps (min)	35	NR
Suggestion of OSAS	27 (12)	All questions yes
Suggestion of RSBD	31 (13)	All questions yes
Suggestion of RLS	130 (56)	All questions yes

[a] Figures in parentheses represent percentage values, except for median sleep quality which has the range in parentheses.

tion, H&Y, time spent in bed or reporting of sleep complaints were found in this population.

Twenty-one patients (9%) were not treated with medication. The remaining patients used levodopa (78%), dopamine agonists (34%), selegiline (26%), amantadine (12%), anticholinergic medication (5%), and often combinations of anti-PD medication (63%). Current use of clozapine was reported by 14 patients (6%); 45 patients (19%) reported frequent use of hypnotics, such as benzodiazepines, zopiclon and zolpidem.

The actual reported sleep complaints are summarized in Table 1. The most prominent ones were sleep fragmentation due to nocturia and inability to turn over in bed. The prevalence of complaints suggestive of OSAS, RLS and RSBD were surprisingly high. These sleep disorders were equally distributed in men and women, except for RSBD which was three times more frequent in male patients (23 men, eight women).

Assessment of the ESS revealed no useful information due to the fact that many patients were not able to answer the questions properly.

4. Discussion

A community-based survey using a questionnaire has several limitations, such as possible selection bias, accuracy of self-reporting and the possibility that subjective complaints may not correlate with abnormalities found in electrophysiological studies. Despite these limitations, we have chosen this study design because it is likely to give an insight into the prevalence of sleeping problems in PD patients in the same way that a clinician would by asking his patients for sleep complaints.

In general, we found a prevalence of complaints of sleep and wake in 82% of our population. This percentage is quite similar to previous reported results [1,2,4–8].

As expected from earlier work, sleep initiation problems were only found in a limited number of patients (16%). The main complaints were sleep fragmentation, probably due to an inability to turn over in the bed and nocturia. Vivid dreams and nightmares, vocalization and myoclonus were also found to be frequent causes of sleep fragmentation in our group. Despite these problems, patients regarded the quality of their sleep as good.

Previous studies found overall sleep complaints to occur more often in PD patients than in an age-matched elderly population. In particular, sleep fragmentation, due to impaired motor function, nocturia, altered dreaming, nocturnal vocalization and daytime hallucinations occurred more frequently in the PD group, suggesting that these symptoms were disease-related [4,5,7]. It has also been suggested that pain and depression might be concurrent important factors resulting in sleep disruption in PD patients [4,7,12].

The incidence of fatigue was not assessed in our population. In a recently performed community-based questionnaire study using an age-matched control group, a higher incidence of fatigue in the PD group (44%) than in elderly controls (18%) was found. Fatigue was concluded to be an independent symptom of PD, which was overlapping, but not causally related to depressive symptoms [8].

Due to the nature and design of this study, we could not assess the relationships between sleep complaints and time or dosage of dopaminergic medication. It is possible that dopaminergic therapy in PD patients results in a better nocturnal motor function, thereby leading to less sleep fragmentation. On the contrary, dopaminergic therapy could also cause sleep attacks, more visual hallucinations and nightmares, or lead to more arousals as a result of the amphetamine-like effect of dopamine. Specially designed studies, using matched control groups have been performed, but are still necessary to clear up this controversy [2,4,9,14].

The main new finding in our study is the suggestion that PD is often associated with specific sleep disorders. Snoring and apneas, suggesting OSAS occurred in 12% of our population. This percentage is three times the percentage found in a previously performed demographical study [10]. Very interesting is the high prevalence of aggressive nocturnal behavior, often with injuries inflicted on themselves or on partners and spouses, suggesting RSBD (13%) and a high prevalence of symptoms that may suggest RLS (56%). This last percentage is in contrast to van Hilten et al., who found no significant differences in the complaints of RLS compared with their control group [4]. However, our questionnaire does not include pertinent questions fulfilling the international RLS study group criteria [15].

The fact that dopaminergic therapy is the most effective treatment for RLS endorses the idea of a relationship between RLS and dopamine deficiency [11]. RSBD has already been reported to be associated with PD and other neurodegenerative hypokinetic syndromes such as multiple system atrophy, also suggesting a connection between RSBD and basal ganglia disease [16,17].

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References

[1] Factor SA, McAlarney T, Sanchez-Ramos JR, Weiner WJ. Sleep disorders and sleep effect in Parkinson's disease. Mov Disord 1990;5:280–285.
[2] Lees AJ, Blackburn NA, Campbell VL. The nighttime problems of Parkinson's disease. Clin Neuropharmacol 1988;11:512–519.
[3] Partinen M. Sleep disorders related to Parkinson's disease. J Neurol 1997;244(Suppl 1):S3–S6.
[4] van Hilten B, Weggeman M, van der Velde EA, Kerkhof GA, et al. Sleep, excessive daytime sleepiness and fatigue in Parkinson's disease. J Neural Transm 1993;5:235–244.
[5] Horiguchi J, Inami Y, Nishimatsu O, Innami T, et al. Sleep–wake complaints in Parkinson's disease. Rinsho Shinkeigaku 1990;30:214.
[6] Nausieda PA, Glantz R, Weber S, Baum R, et al. Psychiatric complications of levodopa therapy of Parkinson's disease. Adv Neurol 1984;40:271–277.
[7] Tandberg E, Larsen JP, Karlsen K. A community-based study of sleep disorders in patients with Parkinson's disease. Mov Disord 1998;13:895–899.
[8] Karlsen K, Larsen JP, Tandberg E, Jørgensen K. Fatigue in patients with Parkinson's disease. Mov Disord 1999;14:237–241.
[9] van Hilten B, Hoff JI, Middelkoop HAM, van der Velde EA, et al. Sleep disruption in Parkinson's disease. Arch Neurol 1994;51:922–928.
[10] Knuistingh Neven A, Middelkoop HAM, Kemp B, Kamphuizen HAC, et al. The prevalence of sleep apnoea syndrome in the Netherlands. Thorax 1998;53:638–642.
[11] Rijsman RM, de Weerd AW. Secondary periodic limb movement disorder and restless legs syndrome. Sleep Med Rev 1999;3:147–158.
[12] Starkstein SE, Preziosi TJ, Robinson RG. Sleep disorders, pain, and depression in Parkinson's disease. Eur Neurol 1991;31:352–355.
[13] Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep 1991;14(6):540–545.
[14] Razmy A, Shapiro CM. Interactions of sleep and Parkinson's disease. Semin Clin Neuropsychiatry 2000;5(1):20–32.
[15] Walters AS. Toward a better definition of the restless legs syndrome. The International Restless Legs Study Group. Mov Disord 1995;10(5):634–642.
[16] Olson EJ, Boeve BF, Silber MH. Rapid eye movement disorder: demographic, clinical and laboratory findings in 93 cases. Brain 2000;123:331–339.
[17] Comella CL, Nardine TM, Diederich NJ, Stebbins GT. Sleep-related violence, injury and REM-sleep behaviour disorder in Parkinson's disease. Neurology 1998;51:426–429.