

## Sleep Assessment in Parkinson's Disease — An Assessment Tool

### Ocena snu w chorobie Parkinsona — narzędzie oceny

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#### Abstract

Parkinson's disease (PD) is primarily characterised by movement disorders, but extra-motor symptoms are also an integral part of the disease. The most common of these include: sleep and mood disorders, sensory symptoms, autonomic dysfunction and cognitive impairment. Non-motor symptoms accompanying PD, particularly with the progression of the disease, include sleep disturbances of varying severity. Unfortunately, these symptoms are often overlooked, even though they can cause as many problems as motor symptoms and significantly impair functioning and quality of life. Regrettably, only a few studies on this topic can be found in Polish research to date, with slightly higher number in the foreign literature. Drawing on the available literature, the article presents Parkinson's Disease Sleep Scale 2 (PDSS-2), and proposes its use in clinical practice as a sleep assessment tool. (JNNN 2024;13(3):124–127)

**Key Words:** Parkinson's disease, Parkinson's Disease Sleep Scale 2 (PDSS-2), sleep disorder

#### Streszczenie

W chorobie Parkinsona (PD) występują przede wszystkim zaburzenia ruchowe, jednak jej integralną część stanowią także objawy pozaruchowe. Najczęstsze z nich to: zaburzenia snu i nastroju, objawy czuciowe, zaburzenia autonomiczne i upośledzenie funkcji poznawczych. Do objawów pozaruchowych towarzyszących PD szczególnie wraz z postępem choroby należą zaburzenia snu osiągające różny poziom nasilenia. Niestety do objawów tych przywiązuje się zbyt małą wagę, chociaż mogą one przysparzać pacjentom wiele problemów jak objawy ruchowe i znacząco upośledzać funkcjonowanie i jakość życia. Niestety jak dotąd w badaniach polskich można znaleźć pojedyncze prace badawcze na ten temat, nieco więcej w piśmiennictwie zagranicznym. W oparciu o dostępną literaturę przedstawione zostało narzędzie oceny snu — skala Parkinson's Disease Sleep Scale 2 (PDSS-2), jako propozycja zastosowania jej w praktyce klinicznej. (PNN 2024;13(3):124–127)

**Słowa kluczowe:** choroba Parkinsona, skala oceny snu w chorobie Parkinsona (PDSS-2), zaburzenia snu

#### Introduction

Sleep has an extremely important impact on the proper functioning of the brain. It significantly promotes memory processes, learning ability, logical decision-making, as well as mental health. Numerous studies have shown that a large proportion of the processes that affect the functioning of our body are dependent on the quality of sleep. Shorter sleep duration and other disturbances contribute to the development of neurodegenerative, cancerous and metabolic diseases, as well as mental disorders [1].

Sleep disorders are a very common marginalised health problem that often hinders daily functioning. Difficulty falling asleep, interrupted sleep, early awakening and other insomnia symptoms affect up to 30–50% of the adult population. Some studies indicate that the prevalence of insomnia symptoms increases with age and is associated with a negative impact on cognitive function. In addition, sleep disorders are associated with an increased risk of cardiovascular disease, depression, falls, and increased mortality. The main causes of sleep problems are loneliness, poor sleep hygiene, mental and somatic illnesses, stress, and an unhealthy lifestyle. Elderly

people find it more difficult to adapt to the ongoing changes, as they often suffer from polyopathy and, closely related to this, polypharmacy. Consequently, the support of the immediate family is very important and, in the absence of such support, a nurse often takes over this role. The treatment of a sleep disorder depends on its type, course and also the intensity of the onset of the disease [2,3].

The most commonly reported sleep problem is insomnia. According to the ICD-10 — International Classification of Diseases and Related Health Problems, insomnia is defined as insufficient quality and/or quantity of sleep, occurring no less than three times per week, for one month. A condition for the diagnosis of sleep disorders is a deterioration in the patient's functional status and quality of life during the day, which is a secondary symptom of sleep problems [4]. Insomnia, according to the International Classification of Sleep Disorders-2 (ICSD-2), is characterised by the appearance of one or more of the following symptoms: early awakening; poor sleep quality, which prevents the body from regenerating; problems falling asleep; difficulty staying asleep; frequent awakenings during the night, and daytime sleepiness, making it difficult to sleep at night.

Parkinson's disease (PD) is primarily characterised by movement disorders, but extra-motor symptoms are also an integral part of the disease. These include sleep disorders, depression and cognitive impairment, among others, and it is not uncommon for these symptoms to contribute more to a patient's functional impairment than the movement disorders [5].

Circadian rhythm disorders are common in patients with Parkinson's disease and other forms of parkinsonism [6]. The most common are night waking and disturbances related to falling asleep. It is estimated that these may affect between 40–90% of all patients. They can occur at any stage of the disease, although typically sleep pathology intensifies with the progression of motor symptoms [7,8]. Polysomnographic studies have demonstrated a number of pathologies in this group of patients, such as shallow and fragmented sleep (awakening), reduced REM sleep or increased REM sleep latency. Nocturnal awakenings are undoubtedly the most common pathology, which can affect up to 100% of patients in more advanced stages of PD. Disturbances related to falling asleep are less frequent and occur at a similar rate as in age-matched control groups; this indicates a possible lack of aetiological association with PD. Unpleasant or very realistic, vivid dreams may precede the onset of psychotic disorders and therefore provide an opportunity for early intervention (e.g. avoidance of drugs that may provoke them, such as anticholinergics or excessive doses of dopaminergic drugs) [9]. Studies have also drawn attention to daytime sleepiness in patients with Parkinson's disease, especially after the advent of new

dopamine agonists and reports of “sleep attacks” among patients taking these drugs. When initiating treatment with dopamine agonists, patients with Parkinson's disease should be warned about the possibility of excessive daytime sleepiness. It may be accompanied by increased REM sleep behaviour disorder, nocturia, nocturnal pain associated with immobilisation of the body, bradykinesia, apnoeic episodes during sleep and restless legs syndrome — all of these disorders have been described as associated with Parkinson's disease [6,10].

Sleep disorders that occur early and severely may be associated with the early development of cognitive impairment. In every patient with Parkinson's disease, a detailed sleep history should be collected and the occurrence of sleep disturbances should be monitored. Currently, there are several scales to choose from for this purpose such as [11,12]: Parkinson's Disease Sleep Scale (PDSS) [13], Pittsburgh Sleep Quality Index (PSQI) [14,15], Scales for Outcomes in Parkinson's Disease (SCOPA) [16], Epworth Sleepiness Scale (ESS) [17], Inappropriate Sleep Composite Score (ISCS) [18], Stanford Sleepiness Scale (SSS) [19] and Parkinson's Disease Sleep Scale 2 (PDSS-2).

### Parkinson's Disease Sleep Scale 2 (PDSS-2) — Assessment Tool Proposal

The Parkinson's Disease Sleep Scale 2 (PDSS-2) is a revised version of the Parkinson's Disease Sleep Scale (PDSS) developed in 2010 by Chaudhuri Ray and Trenkwalder Claudia [11,20]. It is a typical quantitative scale designed to characterise and quantify various aspects of sleep problems in Parkinson's disease, utilised in the Clinical Outcome Assessment (COA). Copyright PDSS-2 © Ray Chaudhuri, Claudia Trenkwalder 2010. All Rights Reserved.

The PDSS-2 scale consists of 15 questions concerning the description of various sleep disturbances, which patients rate with one of five response categories, ranging from zero (never) to four (very often). The total PDSS-2 score ranges from 0 (no disturbance) to 60 (maximum nocturnal disturbance).

The scale can be divided into three different domains that reflect the complexity of sleep problems in Parkinson's disease [20]: factor 1 is “Motor symptoms at night” (such as: Urge to move legs and arms, Restlessness of legs and arms at night, Distressing dreams at night, Painful posturing in the morning, Tremor on waking — questions 4, 5, 6, 12, 13); factor 2 is “PD symptoms at night” (such as: Distressing hallucinations at night, Muscle cramps in arms and legs, Pain in arms and legs, Snoring or difficulties in breathing, Uncomfortable and immobility at night — questions 7, 9, 10, 11, 15) and factor 3 is “Disturbed sleep” (such as: Difficulties staying asleep,

Difficulties falling asleep, Bad sleep quality, Tired and sleepy after waking in the morning, Get up at night to pass urine — questions 1, 2, 3, 8, 14).

Studies using the PDSS-2 scale have demonstrated its good psychometric properties and clinical utility. The optimal cut-off point for the Japanese version of the scale has been set at  $\geq 15$  points [21], and for the European version at  $\geq 18$  points [11].

The scale has also undergone several cultural validations and has been used in research in Spain, Italy, and Japan, among other countries [22–26]. Given the specificity of the PDSS-2 tool with regard to sleep disorders in Parkinson's disease, it is worth mentioning some of the latest scientific reports. This tool was used in a 2019–2020 study by Chinese researchers of 1,500 people with PD in 18 Chinese PD treatment centres [27]. The PDSS-2 scale, together with the Pittsburgh Sleep Quality Index (PSQI) and the Athens Insomnia Scale, was also used in a Japanese cross-sectional study (N=1048 people with PD) examining, among other things, the association between constipation and sleep disorders [28]. On the other hand, in an Italian study, the PDSS-2 scale together with the Epworth Sleepiness Scale (ESS) was used to examine 181 people with advanced PD (without dementia) in the context of the link between sleep disorders and cognitive dysfunction [29]. Likewise, a German study addressing the effect of levodopa on sleep quality in PD patients (N=1124) used this specific scale [30]. The problem of sleep disorders studied using the PDSS-2 is addressed in many scientific papers, and the reports cited above represent only a small sample of these.

## Conclusions

The Parkinson's Disease Sleep Scale (PDSS-2) plays an important role in the diagnosis of sleep disorders in patients with Parkinson's disease. It enables health and social care professionals and people with Parkinson's disease to self-assess and quantify the level of sleep disturbance experienced in order to introduce targeted therapy. It is also worth noting at this point that sleep disorders are a significant problem for people with Parkinson's disease, which is worth paying attention to as they can be an early, non-specific symptom of PD development and have early diagnostic value.

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