

# Sleep Quality in Patients with Fibromyalgia Using the Pittsburgh Sleep Quality Index

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**ABSTRACT.** **Objective.** To characterize and quantify the sleep complaints of patients with fibromyalgia (FM) using the Pittsburgh Sleep Quality Index (PSQI).

**Methods.** The PSQI was applied to 30 patients with FM according to American College of Rheumatology classification criteria and to 30 healthy controls in individual sessions under similar conditions.

**Results.** The median global PSQI scores were [median (25–75%)] 12.0 (10–16) and 3.0 (2.0–5.0) in patients with FM and controls, respectively ( $p < 0.001$ ). All PSQI component scores except sleep medications were significantly higher in patients than controls. Sleep latency, sleep disturbances, and daytime dysfunction were the most frequent sleep difficulties experienced by patients with FM.

**Conclusion.** Our results indicate that the PSQI is a useful instrument for characterizing and quantifying sleep disturbances in patients with FM. (First Release Aug 15 2006; J Rheumatol 2006;33:1863–5)

**Key Indexing Terms:**

FIBROMYALGIA

SLEEP QUALITY

PITTSBURGH SLEEP QUALITY INDEX

Fibromyalgia (FM) is a chronic pain syndrome presenting muscle tenderness and often accompanied by fatigue, sleep disturbance, and depressed mood. Sleep disturbances are described by patients as a subjective impression of having experienced nonrestorative sleep. Polysomnographic features of FM are controversial, but several features, including reduced sleep efficiency, increased number of awakenings, reduced amount of slow-wave sleep, and abnormal alpha wave intrusion in non-rapid eye movement (NREM) sleep, have been described<sup>1</sup>. Patients with FM report insomnia, early morning awakenings, and awakening feeling tired or unrefreshed, as well as mood and cognitive disturbances<sup>2</sup>. A direct correlation has been shown between poor sleep quality and pain intensity<sup>3</sup>.

Although sleep quality is a readily accepted clinical complaint in patients with FM, it is difficult to define and measure objectively. There is frequently a discrepancy between subjective complaints and objective sleep measurements. Sleep laboratory investigations provide a suitable rationale for management of diseases in which a specific primary sleep disorder is present. However, polysomnographic measurements are complex and expensive. In addition, overall sleep quality is a

largely subjective concept, and therefore cannot be defined through sleep laboratory measurements<sup>4</sup>.

Our objective was to describe and quantify sleep disturbances in patients with FM using the Pittsburgh Sleep Quality Index (PSQI)<sup>4</sup>, a standardized, widely used tool for subjectively assessing sleep quality.

## MATERIALS AND METHODS

**Study participants.** Our study comprised 30 consecutive patients with FM, diagnosed according to American College of Rheumatology classification criteria<sup>5</sup>, from the outpatient rheumatology clinic of our university hospital and 30 healthy individuals accompanying patients with knee osteoarthritis receiving treatment in the Department of General Rehabilitation. All patients with FM enrolled in this study had been seen by a rheumatologist, and any presenting associated inflammatory, metabolic disorders or any painful condition other than FM were excluded. All participants were women and were given the PSQI in individual sessions, under the same conditions, and by the same investigator.

**Sleep disturbance measurement and analysis.** The PSQI is a self-administered questionnaire that assesses sleep quality and disturbances over a one-month interval. It is a standardized questionnaire<sup>4</sup> and has been translated for use in Portuguese<sup>6</sup>. Nineteen individual items generate 7 component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each of the 7 component scores is weighted equally on a scale of 0 to 3, 0 indicating no difficulty and 3 indicating severe difficulty. The 7 component scores are then summed to yield a global PSQI score, ranging from 0 to 21. Higher scores indicate worse sleep quality, and a global PSQI score  $\geq 5$  is consistent with poor sleep quality. Differences between patients and controls were compared using the Mann-Whitney statistical test and presented as median (25–75%).

## RESULTS

The mean ages were  $50.4 \pm 10.1$  (patients with FM) and  $51.1 \pm 11.4$  (controls;  $p = \text{NS}$ ). The mean global PSQI score was 12.0 (10–16) for patients and 3.0 (2.0–5.0) for controls ( $p < 0.001$ ). More than 90% (28/30) of the patients presented a global PSQI score  $\geq 10$  compared to only 3/30 controls.

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Scores for each component of the PSQI by patients and controls are shown in Table 1. Scores for all components except sleep medications were significantly higher in patients than controls. FM patients reported the greatest sleep difficulties, with mean scores  $\geq 2$  for sleep latency, sleep disturbances, and daytime dysfunction. The PSQI also indicated that patients with FM had more pronounced problems related to sleep quality and sleep duration.

## DISCUSSION

Despite the high prevalence of sleep complaints among patients with FM and confirmed polysomnographic features showing clear abnormalities in the continuity of sleep as well as in sleep architecture<sup>1,7-9</sup> few studies have assessed sleep quality in patients with FM. We found the global PSQI score was 3 times higher in patients with FM compared to controls. More than 90% of our patients (28/30) had a global PSQI score  $\geq 10$ , whereas only 3/30 controls had such high scores. In addition, patients with FM had significantly higher scores than controls on all evaluated questionnaire components, except sleep medications.

The most significant sleep difficulties in patients with FM were sleep latency, sleep disturbances, and daytime dysfunction. Interestingly, our data suggest that the pattern of impaired sleep in FM differs somewhat from that seen in major depression<sup>10</sup>. Specifically, reduced total sleep time and decreased sleep efficiency, characteristics of depression, although also high in FM, were not the major components characterizing our FM patients. The high sleep latency component score in FM patients corresponds to the polysomnographic finding of increased stage 1 sleep. Sleep disturbances, which in FM patients are primarily related to pain, probably reflect the intensity of alpha intrusions during slow-wave sleep.

A few studies have specifically assessed sleep quality in FM. One study, similar to ours, used the PSQI to examine the relationship between subjective sleep quality and pain threshold in 16 patients with FM<sup>11</sup>. The authors found a negative correlation between pain and sleep disturbance, showing that increased pain sensitivity is associated with greater sleep disturbance. We did not specifically assess pain threshold and

sleep quality. However, our findings regarding sleep quality in FM patients and controls reinforce the idea that high global PSQI scores, together with high daytime dysfunction scores, profoundly affect quality of life and are related to many of the physical complaints reported by these patients. Sleep quality has been directly implicated in reduced quality of life and lower pain thresholds<sup>12-14</sup>. Indeed, poor sleep or sleep deprivation has been correlated with greater psychopathology<sup>15</sup>, whereas satisfactory sleep quality, more than sleep quantity, has been correlated with improved health and life satisfaction<sup>16</sup>.

Our study suggests that the PSQI is a useful tool for evaluating and quantifying sleep in patients with FM.

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*Table 1.* Scores obtained for each component of the PSQI in patients with FM and controls. Results are expressed as median (25-75%).

PSQI	Patients (n = 30)	Controls (n = 30)	p
Global score	12 (10-16)	3.0 (2.0-5.0)	< 0.001
Sleep quality	2.0 (1.0-3.0)	1.0 (0.0-1.0)	< 0.001
Sleep latency	3.0 (2.0-3.0)	0.0 (0.0-1.0)	< 0.001
Sleep duration	3.0 (2.0-3.0)	0.0 (0.0-1.0)	< 0.001
Sleep efficiency	2.0 (0.0-3.0)	0.0 (0.0-1.0)	< 0.003
Sleep disturbances	2.0 (2.0-2.0)	1.0 (0.0-2.0)	< 0.001
Sleeping medications	0.0 (0.0-2.0)	0.0 (0.0-0.0)	0.08
Daytime dysfunction	2.0 (1.0-3.0)	0.5 (0.0-1.0)	< 0.001

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