Subjective Assessment of Sleep

Cristina Frange, Maria Júlia Figueiró Reis, Eliana Lottenberg Vago, and Fernando Morgadinho Santos Coelho

The intention of sleep assessment is to provide sufficient and accurate data to determine treatment. Accurate sleep assessment is the first step in effective sleep management by the physiotherapist. Information on the nature of sleep disturbance, physiologic, behavioral, and emotional aspects, as previous experiences with sleep, are crucial for the beginning of the treatment and also for managing treatment. Valid and reliable measurements of sleep are needed to identify patients who require intervention and to evaluate the effectiveness of an intervention.

A detailed anamnesis includes an assessment of numerous variables that may interfere with sleep and may play crucial roles in sleep management. Patient characteristics such as age, gender, ethnicity, profession, and marital status should never be missed in the assessment. It is interesting to have height, weight (to calculate body

C. Frange (✉)
Department of Neurology and Neurosurgery, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil

Certified in Sleep Physiotherapy by the Brazilian Sleep Society (ABS), and The Brazilian Association of Cardiorespiratory Physiotherapy and Physiotherapy in Intensive Care (ASSOBRAFIR), São Paulo, SP, Brazil

World Physiotherapy Network for Health Promotion in Life and Work, São Paulo, SP, Brazil

M. J. F. Reis
Psychobiology Department, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil

E. L. Vago
Neurology and Neurosurgery Department, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil

F. M. S. Coelho
Neurology and Neurosurgery Department; Department of Psychobiology, Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil

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mass index, BMI), and measures of the neck and abdominal circumference. Listed below are samples of key questions regarding sleep-related issues and disorders:

- Sleep routine: time of going to bed and waking up
- Quality of sleep: nonrestorative or unrefreshing?
- Difficulties falling asleep, staying awake during the night
- Number of hours that sleep refreshes vs. number of hours that really sleeps
- Adequate opportunity to sleep
- Somnolence during the day: tendency to nap easily during the day?
- How and when sleep disturbance/complaint started?
- Fragmented seep? How many awakenings?
- Tendency to snort or choke during sleep
- Tendency to stop breathing during sleep
- Witnessed apnea, lack of breathing or choking
- Grind teeth during sleep?
- Wake up during the night due to which reason?
- In which position do you sleep?
- Tendency to go to the bathroom/toilette during the night? How many times? Nocturia?
- Do you move a lot during the night?
- Environmental questions: How is your bedroom? Cozy? Warm? Blackout curtains? Loud disruptive snoring?
- Medications (that can interfere within sleep)
- History of appearing to "act out one's dreams" such as punching or flailing arms in the air, shouting, or screaming
- Tendency to experience unpleasant, nervous, creepy-crawly sensations in the legs/feet, primarily at night or when sitting at rest, an urge to move the legs, and the tendency for the unpleasant sensations to temporarily be relieved by moving the legs or walking
- A propensity for the legs to periodically jerk during sleep
- Propensity to experience cramps prior to or during sleep
- Tendency to struggle falling asleep before 1 h and 3 h (AM), and then tendency to awaken after 8 h in the morning
- Propensity to struggle to maintain wakefulness prior to 8 h in the evening, and then tendency to awaken earlier than 6 h in the morning

If in the anamnesis the physiotherapist suspects of any symptom or disease, questionnaires to evaluate them should be included, aiming to help within the clinical picture, as the diagnosis is performed by the sleep specialized physician and to monitor treatment.

Some scales are helpful for tracking a patient's progress. Some sleep diseases might need objective examinations prescribed by the physician or need the video recording of the sleep (e.g., REM sleep behavior disorder or sleep bruxism) to get to a defined diagnosis. Depending on the questionnaire, it is translated, validated, and adapted into many languages, including Brazilian Portuguese, English, Portuguese, French, German, Italian, Japanese, Korean, Spanish, Thai, and Turkish. Please do check the status of available translations within the preferred language.

Table 1 Questionnaires used to assess sleep quality, sleepiness, insomnia, risk for apnea, narcolepsy, restless leg syndrome, pain, and circadian preference

Condition	Questionnaire	Characteristics	Purpose + Score + Cut off values
Quality of sleep	Pittsburgh Sleep Quality Index Buysse et al. 1989 [1] www.sleep.pitt.edu/instruments	Evaluates last 1-month 7 subscales: subjective quality of sleep, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction 19 questions, grouped into 10 questions to answer from 0 (easy) to 3 (severe difficulty) on Likert scale	Assessment of overall sleep quality discrimination between good and poor sleepers assessment of multiple sleep disturbance Overall score: from 0 to 21 points Scores >5 indicate poor sleep, <5 good sleep
	Jenkins Sleep Evaluation Jenkins et al., 1988 [2]	Evaluates last 1-month 4 items: difficulty to fall asleep, wake up at night, difficult to stay asleep and wake up exhausted in the morning instead of sleeping as usual Likert scale from 0 to 5, where 0 is never, 1 is 1–3 days, 2 is 4–7 days, 3 is 8–14 days, 4 is 15–21 days, and 5 is 22–28 days 3–4 question	Sleep disturbance scores Overall score: 0–20 points Score from 1–11 defines a little of sleep deprivation Score ≥ 12 identifies a high frequency of sleep deprivation
	Sleep Scale from Medical Outcomes Study https://www.rand.org/health-care/surveys_tools/mos/sleep-scale.html [3]	Evaluates last 1-month 6 subscales: initiation (time to fall asleep), quantity (hours of sleep each night), maintenance, respiratory problems, perceived adequacy, somnolence (the last 4 items reported using a 6-item Likert scale ranging from "All of the time" to "None of the time") 12 items	Overall score: 12–71 points No formal cutoff scores are provided
Sleepiness	Epworth Sleepiness Scale Johns, 1991 [4] https://epworthsleepinessscale.com	Evaluates last 1-month respondents are asked to rate, on a 4-point scale (0–3), their usual chances of dozing off or falling asleep while engaged in 8 different activities: sitting and reading, watching TV, sitting inactive in a public place, as a passenger in a car for an hour of travel, sitting and talking with somebody, lying down and relaxing in the evening, sitting after having lunch without alcohol or in a car during a traffic jam item-scores are intended to be integers (0–3)	Excessive daytime sleepiness Overall score: 0–24 points scores 0–5 lower normal daytime sleepiness 6–10 higher normal daytime sleepiness 11–12 mild excessive daytime sleepiness 13–15 moderate excessive daytime sleepiness 16–24 severe excessive daytime sleepiness
	Stanford Sleepiness Scale Hoddes et al. 1972 [5]	7-point Likert-type scale has descriptors ranging from "feeling active, vital alert, or wide awake" (score = 1) to "no longer fighting sleep, sleep onset soon and having dream-like thoughts" 1. Single question	Quantify progressive steps in sleepiness at a certain point in timeOverall score: 7
	Karolinska Sleepiness Scale Åkerstedt & Gillberg 1990 [6]	The particular time during the day, a measure of situational sleepiness 9-point scale1 = extremely alert, 3 = alert, 5 = neither alert nor sleepy, 7 = sleepy – but no difficulty remaining awake, and 9 = extremely sleepy – fighting sleep	

(continued)

Table 1 (continued)

Condition	Questionnaire	Characteristics	Purpose + Score + Cut off values
Insomnia	Insomnia Severity Index Bastien et al., 2001 [7]	Evaluates last 1-month measures: severity of sleep-onset, sleep maintenance, early morning awakening problems, satisfaction with current sleep, interference with daily functioning, impairment attributed to the sleep problem, level of distress caused by a sleep problem 7 questions Likert scale of 5 points: 0–4 Recently, it has been described in three sub-domains: nocturnal sleep difficulties, the sum of questions 1 + 2 + 3, the impact of insomnia during the day, the sum of questions 5 + 6 + 7, and dissatisfaction sleep with the sum of questions 1 + 4 + 7	Cognitive-behavioral (b) Insomnia screening (c) Assessment of treatment response Overall score: 0–28 Scores 0–7: no clinically significant insomnia; 8–14: sub-threshold insomnia; 15–21: moderate insomnia; and 22–28: severe insomnia
	Athens Insomnia Scale Soldatos et al., 1999 [8]	Evaluates last 1-month The 8-item questionnaire evaluates sleep onset, night and early-morning waking, sleep time, sleep quality, frequency and duration of complaints, distress caused by the experience of insomnia, and interference with daily functioning Each question could be rated from 0 (no problem) to 3 (very serious problem), leaving two intermediate scores	The severity of insomnia using diagnostic criteria set forth by the International Classification of Diseases (ICD-10) Overall score: 0–24 Cutoff >6 define the presence of insomnia
	Insomnia Symptom Questionnaire Okun et al., 2009 [9]	Weeks, months, or years 13 questions Questions 1–5 are multiple choices on an ordinal scale to assess the presence, frequency, and/or severity of the complaint For example, the "During the past month have you had difficulty falling asleep?" item includes choices ranging from 0 = never to 5 = always (5–7 days per week), and a follow-up contingency question asks about the problem's duration Questions 6–13 assess the extent to which the individual's endorsed sleep complaints affect daytime activities, with response choices ranging from 0 = not at all to 4 = extremely	Designed to identify insomnia

Obstructive sleep apnea	STOP-Bang Chung et al. 2012 [10] http://www.stopbang.ca/osa/screening.php	Easy-to-use 8 yes" or "no" questions + anthropometric measures such as BMI, age, neck circumference, and male sex	Screen for symptoms of obstructive sleep apnea Cutoff ≥3 define having a risk for OSA
	Berlin Netzer et al. 1999 [11] www.sleepapnea.org/wp-content/uploads/2017/02/berlin-questionn	Focuses on 3 categories of apnea signs and symptoms: snoring, daytime sleepiness, and obesity/high blood pressure 11 questions	To identify individuals at high risk for sleep apnea 3 categories related to the risk of having sleep apnea Classification: High risk (≥2 positive answers) or low risk (<2 positive answers)
	NoSAS Score Marti-Soler et al., 2016 [12]	5 items: neck circumference, BMI, snoring, age >55 years, and male sex	Prescreening for sleep-disordered breathing Maximum score = 19 a score of ≥8 indicates an increased probability of sleep-disordered breathing
Narcolepsy	Narcolepsy Severity Scale Dauvilliers et al., 2017 [13]	15 questions to evaluate the frequency and severity of sleepiness, cataplexy, hypnagogic hallucinations, paralysis of sleep, and fragmentation of sleep	Maximum total score = 57 Higher total scores indicate greater severity of narcolepsy at the time of the evaluation
Restless legs syndrome	IRLSSG Restless Legs Syndrome Rating Scale for Severity The International Restless Legs Syndrome Study Group, 2002 [14] http://irlssg.org/RLS-Ratings	Evaluates last week 10 item scale: 5 addressing symptom frequency and intensity +5 addressing the impact of them Likert scale from 0–4, 1 is	Classifies the intensity of the symptoms Overall score: 0–40 points Scores: 0–10 mild; 11–20, moderate; 21–30, severe; and 31–40 very severe
	Johns Hopkins Restless Legs Severity Scale Allen et al., 2001 [15]	Based on the time of day at which symptoms begin to appear 1. Single question	RLS severity

(continued)

Table 1 (continued)

Condition	Questionnaire	Characteristics	Purpose + Score + Cut off values
Pain	Pain and Sleep Questionnaire Three-Item Index (PSQ-3) Ayearst et al., 2012 [16]	Direct measure of the impact of chronic pain on sleep 8 questions: 6 are scored on a 100 mm VAS (ranging from 0 [“never”] to 100 [“always”]) and asks respondents to rate how often they have trouble falling asleep; how often they need pain medication to fall asleep; how often they need sleeping medication to fall asleep; how often they are awakened by pain during the night and in the morning; and how often their partner is awakened. The seventh item is also scored using a VAS; however, it uses different anchor points (0 [“very poor”], 100 [“excellent”]) and asks individuals to rate the overall quality of their sleep. The final item asks individuals to indicate, using a number that can range from 1 to 24, the average number of hours of sleep they get each night	Impact of pain on sleep in chronic pain patients
	Chronic Pain Sleep Inventory (CPSI) https://cpsi-sleep.com [17]	5-item tool measured on a 100 mm VAS assessing: Trouble falling asleep because of pain, needed sleep medication to help you fall asleep, awakened by pain during the night, awakened by pain in the morning, rate overall quality of your sleep	Impact of pain on sleep quality
	Sleep assessment instrument for older adults with pain (SAIOAP) Santana et al., 2021 [18]	Simple and practical tool Sleep dimensions, namely, sleep onset and maintenance, physical discomfort, diurnal repercussions of sleep such as excessive daytime sleepiness, self-perception of health status and medication used for sleep 7 questions: yes and no +4 questions on time to go to bed and wake up, sleep latency, and sleep duration	Score: 1 point for each “yes” answer to produce the total score
Circadian preference	Morningness-Eveningness Questionnaire Horn & Osteberg, 1976 [19] www.cet.org	19 multiple-choice questions, each having 4 or 5 response options	Overall score: 16–86 points Scores: ≤41 indicate “evening types,” ≥59 indicate “morning types,” between 42 and 58 indicate “intermediate types”
	Munich Chronotype Questionnaire Roenneberg et al., 2015 [20] www.thewep.org/documentations/mctq	Evaluates past 4 weeks 4 subscales: work schedule, workday sleep schedule, free day sleep schedule, self-assessment of chronotype 17 questions	Assess individual phase of entrainment on work and work-free days Scored electronically by the website
Sleep Diary	www.thensf.org/nsf-sleep-diary www.sleepfoundation.org/sleep-diary	A simple and practical tool evaluates how many days desired (suggested to evaluate weekdays and weekends) routine	Detailed information on morning and evening pre-sleep and post-sleep collects data overtime on self-reported sleep

There are several questionnaires for sleep assessment, which are easy, costless, and very manageable at the physiotherapist clinic. Here we present questionnaires that have reliability and validity against objective measures and can be incorporated into physical therapists' (PTs) anamnesis and treatment outcomes evaluation (Table 1). These are subjective measures that assess self-perception of quality and quantity of sleep and can assist in the diagnosis of sleep disorders. Just a reminder that the questionnaires are not designed to provide clinical diagnoses by themselves.

For the evaluation of general sleep, the Pittsburgh Sleep Quality Index (PSQI) [1] is one of the most used in research and clinical practice, assessing sleep quality

THE EPWORTH SLEEPINESS SCALE

Name: _____

Today's date: _____ Your age (years): _____

Your sex (male = M; female = F): _____

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even if you have not done some of these things recently try to work out how they would have affected you. Use the following scale to choose the *most appropriate number* for each situation:

0 = would *never* doze
1 = *slight* chance of dozing
2 = *moderate* change of dozing
3 = *high* chance of dozing

Situation	Chance of dozing
Sitting and reading	_____
Watching TV	_____
Sitting, inactive in a public place (e.g. a theater or a meeting)	_____
As a passenger in a car for an hour without a break	_____
Lying down to rest in the afternoon when circumstances permit	_____
Sitting and talking to someone	_____
Sitting quietly after a lunch without alcohol	_____
In a car, while stopped for a few minutes in the traffic	_____

Thank you for your cooperation

Fig. 1 Epworth sleepiness scale. (Reprinted with permission from Johns. Publisher: Oxford University Press [4])

Name: _____ **Date:** _____

1. Please rate the current (i.e., last 2 weeks) **SEVERITY** of your insomnia problems(s).

	None	Mild	Moderate	Severe	Very
Difficulty falling asleep:	0	1	2	3	4
Difficulty staying asleep:	0	1	2	3	4
Problem waking up too early:	0	1	2	3	4

2. How **SATISFIED**/dissatisfied are you with your current sleep pattern?

Very Satisfied				Very Dissatisfied
0	1	2	3	4

3. To what extent do you consider your sleep problem to **INTERFERE** with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc.).

Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering
0	1	2	3	4

4. How **NOTICEABLE** to others do you think your sleeping problem is in terms of impairing the quality of your life?

Not at all Noticeable	Barely	Somewhat	Much	Very Much Noticeable
0	1	2	3	4

5. How **WORRIED**/distressed are you about your current sleep problem?

Not at all	A Little	Somewhat	Much	Very Much
0	1	2	3	4

Fig. 2 Insomnia severity index. (Reprinted with permission from Bastien et al. Elsevier Science [7])

in a 1-month interval. PSQI is an extensive questionnaire on the behavior of sleeping times and problems. In addition, there are the Jenkins Sleep Evaluation Questionnaire (JSEQ) [2] and the Sleep Scale from the Medical Outcomes Study (MOS-Sleep) [3], which are also well used.

In respect of disease-specific instruments, there are many designed to assess specific conditions of the disease itself. For the sleepiness evaluation, there are some assessment tools such as the Epworth Sleepiness Scale (ESS) [4] (Fig. 1), the Stanford Sleepiness Scale (SSS) [5], and the Karolinska Sleepiness Scale (KSS) [6], which help to assess the impact of sleepiness on the ability to conduct daily activities.

For insomnia, the Insomnia Severity Index (ISI) [7](Fig. 2), the Athens Insomnia Scale [8], and the Insomnia Symptom Questionnaire (ISQ) [9] are among the most used questionnaires, designed to establish a clinically relevant case definition of insomnia consistent with widely used insomnia classification criteria.

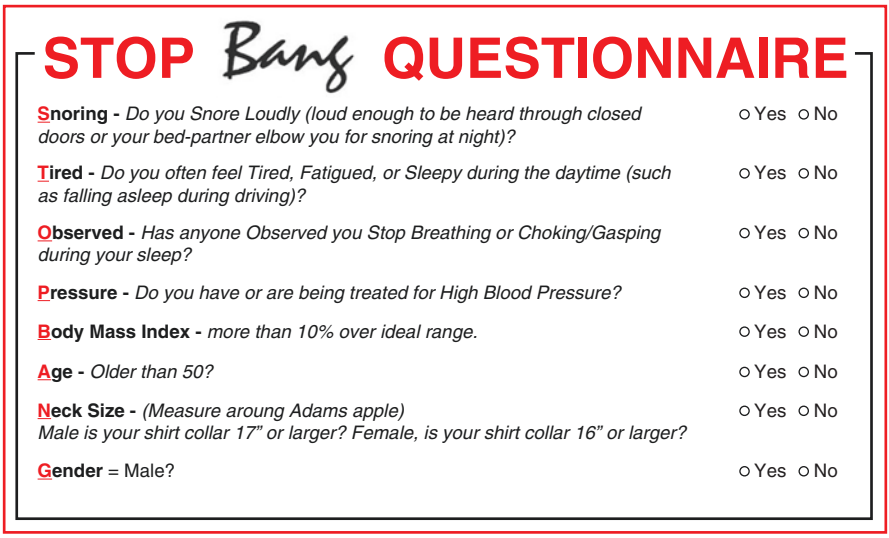


Fig. 3 STOP-Bang questionnaire. (Reprinted with permission from Chung et al. [10])

Population-based studies evaluating the accuracy of screening questionnaires for OSA against PSG were Berlin questionnaire [11], STOP-Bang Questionnaire [10] (Fig. 3), and NoSAS Score [12]. Regarding OSA, mouth and jaw can also be analyzed by a visual inspection, using the modified Mallampati Classification, which visually classifies the amount of mouth opening to the size of the tongue, and provides an estimate of space available for oral intubation by direct laryngoscopy (Fig. 4). A high Mallampati score (class 3 or 4) is associated with a higher incidence of sleep apnea [21, 22]. It is important at this moment to evaluate the patency of the oropharynx, and to measure neck circumference, and also the development of the maxilla (hypoplasia) and mandible (mandibular retro position) because retrognathia is a risk factor and, when added to other elements, can worsen obstructive sleep apnea [23, 24].

The Narcolepsy Severity Scale is a measurement tool for quantitative evaluation of narcolepsy symptoms, useful for monitoring and optimizing the management of narcolepsy [13]. As a new assessment tool, it is only available in French [13, 25], Brazilian Portuguese [26], and Chinese [27].

The International Restless Legs Syndrome Rating Scale (IRLSRS) was developed by the International Restless Legs Syndrome Study Group to assess the severity of a patient's RLS symptoms [14] (Fig. 5).

As we have presented in a separate chapter (chapter "Sleep and Chronic Pain Interlaced Influences: Guidance to Physiotherapy Practice"), there is a relationship between sleep and pain. Both can be evaluated together, by the Pain and Sleep Questionnaire Three-Item Index (PSQ-3), a direct measure of the impact of chronic pain on sleep [16]; and by the Chronic Pain Sleep Inventory (CPSI), a 5-item tool using a 100 mm visual analog scale [17]. A new measurement tool specifically

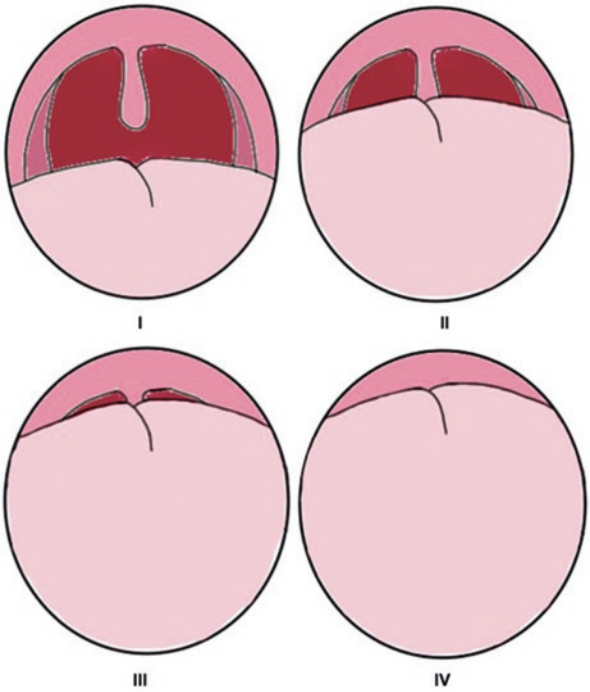


Fig. 4 Modified Mallampati Classification, classes I to IV. Mallampati classes: Class I corresponds to all structures visible (soft palate, uvula, fauces, and pillars); Class II, pillars are no more visible (soft palate, major part of uvula, and fauces visible); Class III, fauces are no more visible (soft palate and base of the uvula visible); finally, class IV, only the hard palate is visible. (Image courtesy from Dr. Maria Júlia Figueiró Reis. Original figure)

designed and validated for the older ones is the Sleep Assessment Instrument for Older Person with Pain (SAIOAP) [18](Fig. 6).

To assess circadian preferences (i.e., whether a person's circadian rhythm or biological clock produces peak alertness in the morning, in the evening, or in between) the Morningness Eveningness Questionnaire (MEQ) [19], which helps to determine individual differences in sleep-wake patterns, and the time-of-day people feel and perform best can be used (Fig. 7). Munich Chronotype Questionnaire (MCTQ) can assess individuals' chronotypes – diurnal preferences that manifest in personal sleep-wake rhythms [20].

The sleep diary is a record of an individual's routine of sleeping and waking times. It can be fulfilled by the proper patient, by a caregiver, or by the parents. The sleep diary records the subjective perception of the sleep period (Fig. 8) and can be recorded for at least 10 days, in order to include weekdays and weekends, or more, depending on the case. Often patients record information such as the time the patient

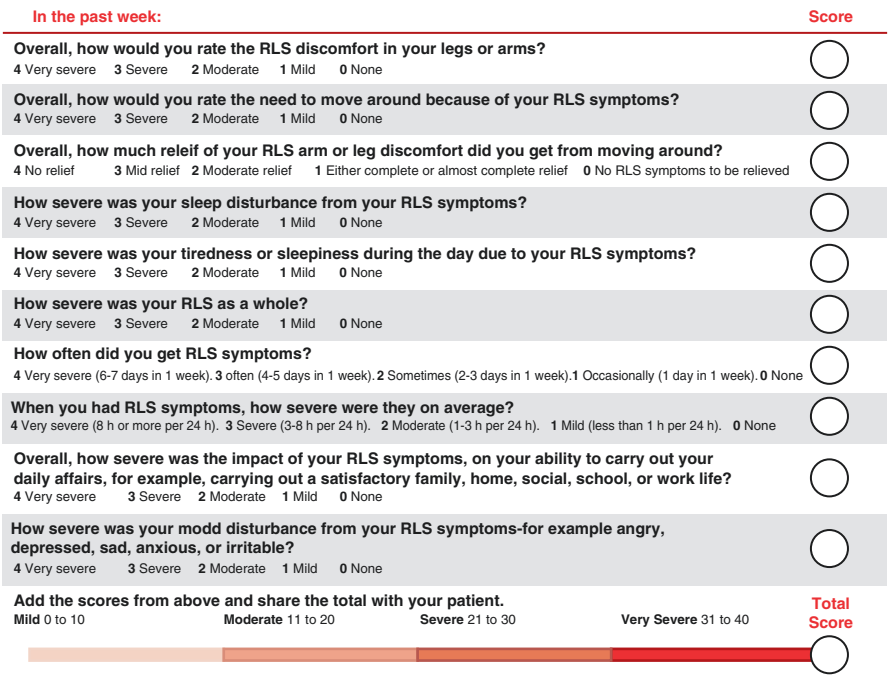


Fig. 5 Restless legs syndrome rating scale for severity. (Reprinted with permission from Walters et al. [14])

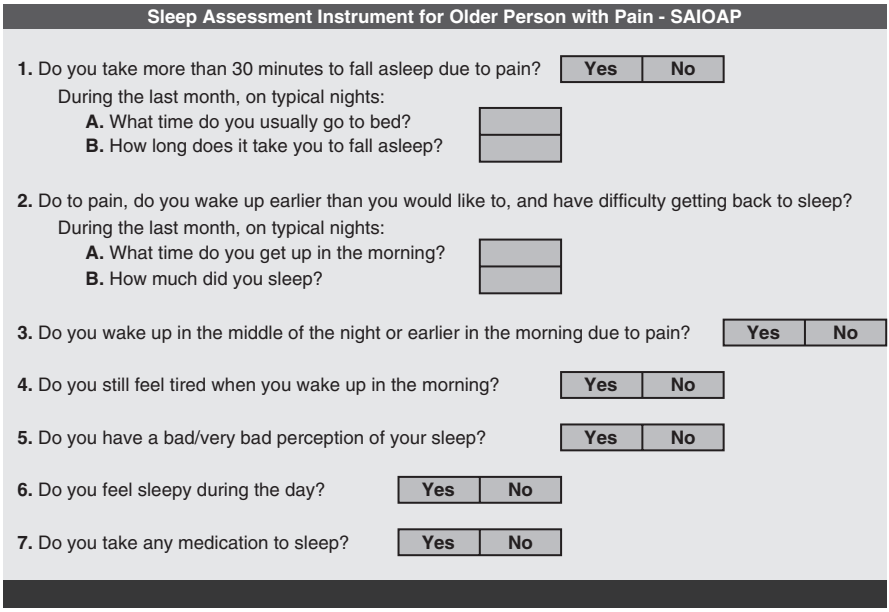


Fig. 6 Sleep assessment instrument for older person with pain. (Reprinted with permission from Santana et al. [18])

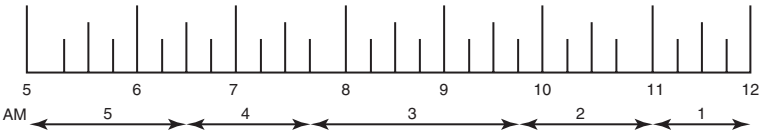
Morningness-Eveningness Questionnaire

Instructions:

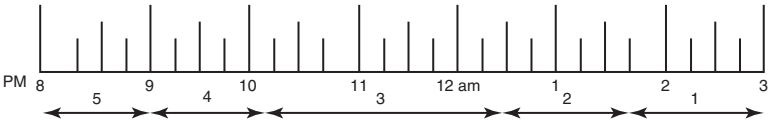
1. Please read each question very carefully before answering.
2. Answer ALL questions
3. Answer questions in numerical oeder.
4. Each question should be answered independently of others. Do NOT go back and cheek your answers.
5. All questions have a selection of answers. For each question place a cross alongside ONE answer only. Some questions have a scale instead of a selection of answers. Place a cross at the appropriate point along the scale.
6. Please answer each question as honestly as possible. Both your answers and the results will be kept, in strict confidence.
7. Please feel free to make any comments in the section provided below each question.

The Questionnaire with scores for each choice

1. Considering only your own "feeling best" rhythm, at what time would you get up if you were entirely free to plan your day?



2. Considering only your own "feeling best" rhythm, at what time would you get to bed if you were entirely free to plan your evening?



3. If there is a specific time at which you have to get up in the morning, to what extent are you dependent on bring woken up by an alarm clock?

Not at all dependent ☐ 4
Slightly dependent ☐ 3
Fairly dependent ☐ 2
Very dependent ☐ 1

4. Assuming adequate environmental conditions, how easy do you find getting up in the mornings?

Not at all easy ☐ 1
Not very easy ☐ 2
Fairly easy ☐ 3
Very easy ☐ 4

5. How alert do you feel during the first half hour after having woken in the mornings?

Not at all alert ☐ 1
Slightly alert ☐ 2
Fairly alert ☐ 3
Very alert ☐ 4

6. How is your appetite during the first half-hour after having woken in the mornings?

Very poor ☐ 1
Fairly poor ☐ 2
Fairly good ☐ 3
Very good ☐ 4

Fig. 7 Morningness eveningness questionnaire. (Reprinted with permission from Terman et al. [28])

7. During the first half-hour after having woken in the morning, how tired do you feel?

Very tired	☐ 1
Fairly tired	☐ 2
Fairly refreshed	☐ 3
Very refreshed	☐ 4

8. When you have no commitments the next day, at what time do you go to bed compared to you usual bedtime?

Seldom or never later	☐ 4
Less than one hour later	☐ 3
1-2 hours later	☐ 2
More than two hours later	☐ 1

9. You have decided to engage in some physical exercise. A friend suggests that you do this one hour twice a week and the best time for him is between 7:00-8:00 a.m. Bearing in mind nothing else but your own "feeling best" rhythm, how do you think you would perform?

Would be on good form	☐ 4
Would be on reasonable form	☐ 3
Would find it difficult	☐ 2
Would find it very difficult	☐ 1

10. At what time in the evening do you feel tired and as a result in need of sleep?

11. You wish to be at your peak performance for a test which you know is going to be mentally exhausting and lasting for two hours. You are entirely free to plan your day and considering only your own "feeling best" rhythm which ONE of the four testing times would you choose?

8:00-10:00 a.m.	☐ 6
11:00 a.m.-1:00 p.m.	☐ 4
3:00-5:00 p.m.	☐ 2
7:00-9:00 p.m.	☐ 0

12. If you went to bed at 11 p.m. at what level of tiredness would you be?

Not at all tired	☐ 0
A little tired	☐ 2
Fairly tired	☐ 3
Very tired	☐ 5

13. For some reason you have gone to bed several hours later than usual, but there is no need to get up at any particular time the next morning. Which ONE of the following events are you most likely to experience?

Will wake up at usual time and will NOT fall asleep	☐ 4
Will wake up at usual time and will doze thereafter	☐ 3
Will wake up at usual time but will fall asleep again	☐ 2
Will NOT wake up until later than usual	☐ 1

14. One night you have to remain awake between 4-6 a.m. in order to carry out a night watch. You have no commitments the next day, Which ONE of the following alternatives will suit you best?

Would NOT go to bed until watch was over	☐ 1
Would take a nap before and sleep after	☐ 2
Would take a good sleep before and nap after	☐ 3
Would take ALL sleep before watch	☐ 4

Fig. 7 (continued)

15. You have to do two hours of hard physical work. You are entirely free to plan your day and considering only your own "feeling best" rhythm which ONE of the following times would you choose?

8:00-10:00 a.m. ☐ 4
11:00 a.m.-1:00 p.m. ☐ 3
3:00-5:00 p.m. ☐ 2
7:00-9:00 p.m. ☐ 1

16. You have decide to engage in hand physical exercise. A friend suggests that you do this for one hour twice a week and the best time for him is between 10-11 p.m. Bearing in mind nothing else but your own "feeling best" rhythm how well do you think you would perform?

Would be on good form ☐ 1
Would be on reasonable form ☐ 2
Would find it difficult ☐ 3
Would find it very difficult ☐ 4

17. Suppose that you can choose your work hours. Assume that you worked a FIVE hour day (including breaks) and that your job was interesting and paid by results. Which FIVE CONSECUTIVE HOURS would you select?

12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
Midnight Noon Midnight
1 5 4 3 2 1

18. At what time of the day do you think that you reach your "feeling best" peak?

12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
Midnight Noon Midnight
1 5 4 3 2 1

19. One hears about "morning" and evening" types of people. Which ONE of these types do you consider yourself to be?

Definitely a "morning" type ☐ 6
Rather more a "morning" than an evening type ☐ 4
Rather more an "evening" than a morning type ☐ 2
Definitely an "evening" type ☐ 0

Fig. 7 (continued)

Consensus Sleep Diary - E (Please Complete Upon Awakening) **ID/NAME:** ____________
Sample

Today's Date	4/5/11							
1. What time did you get into bed?	10:15 p.m.							
2. What time did you try to go to sleep?	11:30 p.m.							
3. How long did it take you to fail asleep?	55 min.							
4. How many times did you wake up, not counting your final awakening?	6 times							
5. In total, how long did these awakenings last?	2 hours 5 min.							
6a. What time was your final awakening?	6:35 a.m.							
6b. After your final awakening. how long did you spend in bed trying to sleep?	45 min.							
6c. Did you wake up earlier than you planned?	☒Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐ No
6d. If yes, how much earlier?	1 hour							
7. What time did you get out of bed for the day?	7:20 a.m.							
8. In total, how long did you sleep?	4 hours 10 min.							
9. How would you rate the quality of your sleep?	☐Very poor ☒Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☒Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☐Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☐Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☐Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☐Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☐Poor ☐Fair ☐Good ☐Very Good	☐Very poor ☐Poor ☐Fair ☐Good ☐Very Good
10. How rested or refreshed did you feel when you woke-up for the day?	☐Not at all rested ☒Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested	☐Not at all rested ☐Slightly rested ☐Somewhat rested ☐Well-rested ☐Very well-rested

Fig. 8 Consensus sleep diary with instructions. (Reprinted with permission from Carney et al. [30])

Consensus Sleep Diary - E (Please Complete Before Bed) **ID/NAME:** _____

	Sample							
Today's Date	4/4/11							
11a. How many times did you nap or doze? 11b. In total, how long did you nap or doze?	2 times 1 hour 10 min.							
12a. How many drinks containing have? 12b. What time was your last drink?	3 drinks 9 :20 p.m.							
13a. How many Caffeinated drinks (coffee, tea, soda, you have? 13b. What time was your last drink?	2 drinks 3 :00 p.m.							
14a. Did you take any over-the-counter or prescription medication(s) to help you sleep? If so, list medication(s), dose, and time taken	☑Yes ☐No Medication(s): Relaxo-Herb Dose: 50 mg Time(s) taken: 11 pm	☐Yes ☐No Medication(s): Dose: Time(s) taken:	☐Yes ☐No Medication(s): Dose: Time(s) taken:	☐Yes ☐No Medication(s): Dose: Time(s) taken:	☐Yes ☐No Medication(s): Dose: Time(s) taken:	☐Yes ☐No Medication(s): Dose: Time(s) taken:	☐Yes ☐No Medication(s): Dose: Time(s) taken:	☐Yes ☐No Medication(s): Dose: Time(s) taken:
15. Comments (if applicable)	I have a cold							

Fig. 8 (continued)

went to bed, the amount of time it took to fall asleep, time the patient left the bed in the morning, number of times patient awoke during the night, how refreshing overall sleep was, what may have disturbed patient's sleep (breathing troubles, leg movements, insomnia, etc.), number and time of caffeinated and alcoholic beverages consumed throughout the day, medications taken during the day, time spent exercising and period of the day, activities performed prior to bed [29, 30]. The National Sleep Foundation has a good example of a sleep diary (www.sleepfoundation.org). Sleep diaries are typically used in addition to or in place of objective measures (i.e., polysomnography or actigraphy) and can be completed over multiple time points. It is a self-report measure in which patients and participants record their sleep patterns and answer other questions related to their sleep on a daily basis (e.g., sleep quality, daytime sleepiness, medication use). Sleep diaries capture night-to-night variability in sleep. It is a particularly important tool for assessing sleep routine for the physiotherapist and the patient, as they can have a better idea of the patient's sleep patterns and habits, can help the physician with a diagnosis, and also can monitor the effectiveness of treatment. In addition, the sleep diary may help the patient to get more proactive about their sleep, knowing it better. Henceforth, we conclude best practice is to include both subjective and objective measures when examining sleep.

General Instructions

What is a Sleep Diary? A sleep diary is designed to gather information about your daily sleep pattern.

How often and when do I fill out the sleep diary? It is necessary for you to complete your sleep diary every day. If possible, the sleep diary should be completed within one hour of getting out of bed in the morning. The Nighttime Sleep Diary questions can be completed before you go to bed at night.

What should I do if I miss a day? If you forget to fill in the diary or are unable to finish it, leave the diary blank for that day.

What if something unusual affects my sleep or how I feel in the daytime? If your sleep or daytime functioning is affected by some unusual event (such as an illness, or an emergency), you may make brief notes on your diary.

What do the words "bed" and "day" mean in the diary? This diary can be used for people who are awake or asleep at unusual times. In the sleep diary, the word "day" is the time when you choose or are required to be awake. The term "bed" means the place where you usually sleep.

Will answering these questions about my sleep keep me awake? This is not usually a problem. You should not worry about giving exact times, and you should not watch the clock. Just give your best estimate.

Morning Sleep Diary Item Instructions

Use the guide below to clarify what is being asked for each item of the Sleep Diary. Date: Write the date of the morning you are filling out the diary.

1. What time did you get into bed? Write the time that you got into bed. This may not be the time you began "trying" to fall asleep.

2. What time did you try to go to sleep? Record the time that you began "trying" to fall asleep.

3. How long did it take you to fall asleep? Beginning at the time you wrote in question 2, how long did it take you to fall asleep?

4. How many times did you wake up, not counting your final awakening? How many times did you wake up between the time you first fell asleep and your final awakening?

5. In total, how long did these awakenings last? What was the total time you were awake between the time you first fell asleep and your final awakening? For example, if you woke 3 times for 20 minutes, 35 minutes, and 15 minutes, add them all up (20 + 35 + 15 = 70 min or 1 hr. and 10 min).

6a. What time was your final awakening? Record the last time you woke up in the morning.

6b. After your final awakening, how long did you spend in bed trying to sleep? After the last time, you woke up

(Item #6a), how many minutes did you spend in bed trying to sleep? For example, if you woke up at 8 am but continued to try and sleep until 9 am, record 1 hour.

6c. Did you wake up earlier than you planned? If you woke up or were awakened earlier than you planned, check yes. If you woke up at your planned time, check no.

6d. If yes, how much earlier? If you answered "yes" to question 6c, write the number of minutes you woke up earlier than you had planned on waking up. For

example, if you woke up 15 minutes before the alarm went off, record 15 minutes here.

7. **What time did you get out of bed for the day?** What time did you get out of bed with no further attempt at sleeping? This may be different from your final awakening time (e.g., you may have woken up at 6:35 a.m. but did not get out of bed to start your day until 7:20 a.m.)
8. **In total, how long did you sleep?** This should just be your best estimate, based on when you went to bed and woke up, how long it took you to fall asleep, and how long you were awake. You do not need to calculate this by adding and subtracting; just give your best estimate.
9. **How would you rate the quality of your sleep?** "Sleep Quality" is your sense of whether your sleep was good or poor.
10. **How restful or refreshed did you feel when you woke up for the day?** This refers to how you felt after you were done sleeping for the night, during the first few minutes that you were awake.

Nighttime Sleep Diary Item Instructions

Please complete the following items before you go to bed.

Date: Write the date of the evening you are filling out the diary.

11a. **How many times did you nap or doze?** A nap is a time you decided to sleep during the day, whether in bed or not in bed. "Dozing" is a time you may have nodded off for a few minutes, without meaning to, such as while watching TV. Count all the times you napped or dozed at any time from when you first got out of bed in the morning until you got into bed again at night.

11b. **In total, how long did you nap or doze?** Estimate the total amount of time you spent napping or dozing, in hours and minutes. For instance, if you napped twice, once for 30 minutes and once for 60 minutes, and dozed for 10 minutes, you would answer "1 hour 40 minutes." If you did not nap or doze, write "N/A" (not applicable).

12a. **How many drinks containing alcohol did you have?** Enter the number of alcoholic drinks you had where 1 drink is defined as one 12 oz. beer (can), 5 oz. wine, or 1.5 oz. liquor (one shot).

12b. **What time was your last drink?** If you had an alcoholic drink yesterday, enter the time of day in hours and minutes of your last drink. If you did not have a drink, write "N/A" (not applicable).

13a. **How many caffeinated drinks (coffee, tea, soda, energy drinks) did you have?** Enter the number of caffeinated drinks (coffee, tea, soda, energy drinks) you had where for coffee and tea, one drink = 6–8 oz.; while for caffeinated soda one drink = 12 oz.

13b. **What time was your last drink?** If you had a caffeinated drink, enter the time of day in hours and minutes of your last drink. If you did not have a caffeinated drink, write "N/A" (not applicable).

14. **Did you take any over-the-counter or prescription medication(s) to help you sleep?** If so, list medication(s), dose, and time taken: List the medication name,

how much and when you took EACH different medication you took tonight to help you sleep. Include medication available over the counter, prescription medications, and herbals (e.g., "Sleepwell 50 mg 11 pm"). If every night is the same, write "same" after the first day.

15. Comments: If you have anything that you would like to say that is relevant to your sleep, feel free to write it here.

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