Clinical Methods

Screening and evaluation tools for sleep disorders in older adults ☆

Faith S. Luyster, Ph.D. *, JiYeon Choi, Ph.D., Chao-Hsing Yeh, Ph.D., Christopher C. Imes, Ph.D., Ann E.E. Johansson, BSN, Eileen R. Chasens, Ph.D., RN

School of Nursing, University of Pittsburgh, Pittsburgh, PA, USA

A R T I C L E   I N F O

A B S T R A C T

The negative effects of impaired sleep on physical and mental well-being in older adults have recently been recognized by health care professionals. However, researchers and clinicians may be unaware of reliable and valid screening and evaluation tools for evaluating sleep disorders in older adults. The purpose of this article is to present subjective and objective instruments that measure sleep quality, excessive daytime sleepiness, obstructive sleep apnea, insomnia and restless leg syndrome that are appropriate for use in adult and older adult patients.

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Sleep is a complex physiological and behavioral process that is composed of two distinct states, non-rapid eye movement (NREM stages 1–3) and rapid eye movement (REM), each with unique characteristics. Older adults experience age-related changes in sleep architecture including less slow-wave sleep (NREM stage 3) and REM sleep that result in lighter, more fragmented sleep (Crowley, 2011). In addition to changes in sleep architecture, circadian rhythm-related changes are also present in older adults, with many having an advanced phase rhythm resulting in an early bedtime and rise time (Crowley, 2011). Age-related changes in sleep combined with medical and psychiatric conditions that accompany older age lead to many older adults having sleep complaints, with approximately 50% reporting difficulty sleeping (Foley, Ancoli-Israel, Britz, & Walsh, 2004). Sleep complaints in older adults are often symptoms of insomnia, including difficulties initiating and maintaining sleep and early morning awakenings. Insomnia can be a primary sleep disorder; however, in older adults, it is often comorbid with medical and psychiatric illnesses and medications and other sleep disorders such as obstructive sleep apnea (OSA) and restless legs syndrome (RLS) (Crowley, 2011). OSA and RLS are more common in older than younger adults (Ancoli-Israel et al., 1991; Hornyak & Trenkwalder, 2004). Sleep disorders can have significant consequences for the elderly, including increased risk for psychiatric disorders and serious medical conditions, reduced quality of life, cognitive impairment,

increased risk for falls, and increased risk for mortality (Hornyak & Trenkwalder, 2004; Gooneratne et al., 2011).

Poor sleep and excessive daytime sleepiness can occur in association with various sleep disorders, medical and psychiatric conditions, and sleep deprivation or due to medication effects. Excessive daytime sleepiness in older adults is associated with cognitive impairment, depressive symptoms, impairments in daily function, and an increased risk for cardiovascular mortality (Gooneratne et al., 2003). Impairments in cognitive function associated with excessive sleepiness can result in motor-vehicle accidents (Ellen et al., 2006).

The importance of sleep to optimal physical and mental health has been increasing recognized by clinical researchers. Unfortunately, identification of sleep problems by health care providers largely depends on patients' disclosure of these problems and older adults may assume that changes in their sleep are due to normal aging. Given the high prevalence of sleep disorders, an assessment of sleep is recommended as a routine component of geriatric care and as an important component of research involving older adults. Having knowledge of assessment tools for common sleep disorders is important for assessment of impaired sleep and development of subsequent interventions, which can have a significant impact on patient's quality of life.

1. Purpose

There are many questionnaires that can be used to assess sleep depending on what aspect one is interested in evaluating. This article presents some of the most widely used questionnaires and provides information about psychometric properties, patient burden, instrument accessibility and administration. Although subjective assessments are often faster and less expensive, objective measures of sleep (actigraphy,

in-laboratory and in-home polysomnography [PSG], and the Multiple Sleep Latency Test [MLST]) are used for diagnosis and evaluation of many sleep disorders. Nurse researchers and clinicians must carefully consider their objective when determining which method to use for assessment of sleep. Whereas the ease of administration and low cost associated with questionnaires and sleep diaries make these subjective sleep measures applicable for both individual evaluation of patients in clinical practice and population-based screening in clinical research, objective measures of sleep may have limited utility for clinical research given the cost and complexity. The purpose of this article is to present subjective and objective assessment tools for four common sleep disorders found among older adults, insomnia, excessive daytime sleepiness, OSA, and RLS, that can be used in clinical practice and potentially clinical research with older adults and adults of any age.

2. Subjective sleep measures and sleep diary

2.1. Sleep quality and daytime function

Table 1 lists subjective sleep measures for assessment of sleep quality, daytime sleepiness, and functional outcomes. A general assessment of sleep quality can be obtained using the Pittsburgh Sleep Quality Index (PSQI) or the Patient-Reported Outcomes Measurement Information System (PROMIS) sleep disturbance instrument, which will be discussed below. Excessive sleepiness is characterized by difficulty in maintaining a desired level of wakefulness (Crowley, 2011). Two commonly used questionnaires for assessment of daytime sleepiness and functional impairments associated with daytime sleepiness are also discussed, the Epworth Sleepiness Scale (ESS) and Functional Outcomes of Sleep Questionnaire (FOSQ).

2.1.1. Pittsburgh Sleep Quality Index

The PSQI assesses self-reported sleep quality and disturbances over the last 1 month time period (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI includes 19 items to measure seven domains of sleep quality: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, sleep disturbance and use of sleeping medications. Four items have free-entry responses to assess usual bed and wake times, number of minutes to fall asleep, and hours slept per night. The remaining items use 4-point Likert scale responses, with higher scores indicating worse sleep quality. Five additional items are included in the questionnaire that are completed by a bed partner but are not included in the calculation of the global sleep quality score. A global sleep quality score is obtained by summing the seven domain scores, with higher scores indicating worse sleep quality (range = 0–21). A PSQI score greater than 5 indicates a "poor" sleeper. An early evaluation of the PSQI by Buysse, Reynolds, Monk, and Hoch (1991) concluded that sleep quality frequently decreases among older adults; however, the majority of persons 80 + years old were found to have PSQI scores indicating "good" sleep quality. More recently, the PSQI was evaluated in samples of older men and women and was affirmed as being a reliable and a valid instrument to evaluate subjective sleep quality in older adults (Beaudreau et al., 2012).

2.1.2. PROMIS sleep

The PROMIS sleep disturbance item bank (e.g., 27 questions in total) assesses self-reported perceptions of sleep quality, sleep depth, and satisfaction with sleep over the past week (Buysse et al., 2010). More specifically, these items evaluate difficulties getting to sleep and staying asleep, refreshment upon waking, and worry over falling sleep. Not included in the PROMIS sleep disturbance items are symptoms of specific sleep disorders (sleep apnea, narcolepsy) or subjective estimates of time (time to fall asleep, total hours asleep). The instrument uses five-item Likert scales to assess sleep variables. The PROMIS sleep disturbance instrument and scoring instructions can be obtained on the PROMIS Web site through Assessment Center (www. assessmentcenter.net). Although the PROMIS sleep instrument was developed and pilot tested in samples that included older adults, the

Table 1
Subjective assessment measures for sleep quality, daytime sleepiness, and functional outcomes.

Measure	Purpose	Number of items	Score Interpretation and Psychometrics	Additional Information
Pittsburgh Sleep Quality Index Levenson et al., 2013	• Assess subjective sleep quality and sleep habits during the last month	• 19 items and 5 additional items that are completed by bed partner	• Global PSQI calculated by summing seven domain scores • PSQI > 5 has sensitivity (89%) and specific (86.5%) for differentiating "poor" from "good" sleepers • Internal consistency: Cronbach α = 0.73. • Test–retest reliability = 0.85	• Translated into 56 languages • Time to complete: 5–10 minutes • Detailed information at: http://www.sleep.pitt.edu/content.asp?id=1484&subid=2316
PROMIS Sleep Disturbance Bastien et al., 2001	• Evaluates self-reported sleep quality, sleep depth, and satisfaction with sleep	• Pool of 27 items. • Short form options: 4, 6, or 8 items • Computerized adaptive test option	• T-score ranges from approximately 29 to 78 (depending on the version used) • Average score is 50, with higher scores indicating more sleep disturbance • Internal consistency: Cronbach α = 0.91	• More information at: http://www.nihpromis.org/
Epworth Sleepiness Scale Punjabi, 2008	• Assesses subjective daytime sleepiness	• 8 items	• Total score >10 = excessive daytime sleepiness; ≥17 indicates pathological sleepiness • Internal consistency: Cronbach's α ranged from 0.73 to 0.86	• Time to complete: 5 minutes • Information at: http://epworthsleepinessscale.com/1997-version-ess/
Functional Outcomes of Sleep Questionnaire Young et al., 2004	• To assess the impact of excessive sleepiness on daily activities and quality of life	• 30-items self-rated Likert	• Total score calculated from five domain scores • Scores range from 0 to 24, with higher scores indicating less functional impact • Internal consistency: Cronbach α = 0.95 • Test–retest reliability = 0.90	• Written at a fifth grade reading level • Time to complete: 15 minutes • FOSQ-10 is a shortened 10-item version; total score only should be used (not domain scores) Bradley & Floras, 2009 • Use with permission T. Weaver, PhD teweaver@uic.edu

Note: PSQI, Pittsburgh Sleep Quality Index; FOSQ, Functional Outcomes of Sleep Questionnaire.

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