



**MEASURING ONCOLOGY NURSING-SENSITIVE PATIENT OUTCOMES:
MEASUREMENT SUMMARY**

SLEEP-WAKE DISTURBANCES

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Table(s) of Tools to Measure Oncology Nursing-Sensitive Outcome: Sleep-Wake Disturbances

Measurement of sleep-wake patterns can be divided into several categories: self-report (diary, questionnaire), behavioral (observation, actigraphy), and physiologic (polysomnography). This list includes reviews of self-report measurement approaches to sleep-wake disturbances in cancer and includes reviews published in books. The Structured Interview for Sleep Disorders also is included, but the use of this instrument has not been reported in patients with cancer or their caregivers.

Table A. Description of Self-Report Tools

Name of Tool	Author/Year	Domains or Factors	Number of Items	Scaling	Scoring	Language
Insomnia Severity Index (ISI)	(Bastien et al., 2001; Savard et al., 2004)	Focus is on daytime symptoms; insomnia severity, sleep worry, functional impairment, social concern and sleep satisfaction used to compare medication versus cognitive-behavioral treatments of insomnia	Seven	Five-point scale	Total score ranges from 7–35	English French
Pittsburgh Sleep Quality Index (PSQI)	(Beck et al., 2004; Buysse et al., 1989)	Global score of sleep quality, subscales: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, daytime functioning.	19 basic and five roommate-rated	Mixed-format	Complex; generates global score plus seven subscales; range of each = 0–3; total = 0–21	Widely translated
Morin’s Sleep Diary	(Berger et al., 2002; Berger et al., 2003; Morin, 1993; Morin & Espie, 2003)	Sleep parameters: reports napping, sleep, use of aids and alcohol, feelings of morning refreshment and sleep restedness; important component in	10	Mixed format	Calculations done on each parameter	English French

		the behavioral evaluation of sleep				
Epworth Sleepiness Scale	(Johns, 1991, 1992)	Tendency to doze in particular situations; daytime sleepiness	Eight	Four-point scale items	0–24	English German Italian Chinese
Structured Interview for Sleep Disorders (DSMIII-R) (SIS-D)	(Schramm et al., 1993)	Structured clinical interview; semi-structured section plus structured (sleep disorder symptoms)	Interview	Interview	Interview	English; widely translated

Table B: Psychometric Properties of Self-Report Tools

Name of Tool	Populations	Reliability and Validity	Sensitivity	Clinical Utility	Comment
Insomnia Severity Index (ISI)	1) 145 patients evaluated for insomnia in a sleep disorders clinic in study 1; 78 older patients with insomnia for study 2 (Bastien et al., 2001) 2) 1,670 patients with cancer (Savard et al., 2004)	<u>Reliability</u> 1) Internal consistency Chronbach’s alpha coefficient in insomnia patients = 0.74 (Bastien et al., 2001); coefficient in patients with cancer = 0.90 overall and item-total correlations ranging from 0.65–0.78. (Savard et al., 2004) 2) Test-retest reliability R = 0.83 at one month; 0.77 at two months, and 0.73 at three months (Savard et al., 2004) <u>Validity</u> 1) Convergent validity with different indices derived from self-reports of sleep (r = 0.32–0.91, all p= < 0.05) (Bastien et al., 2001) Items correlate significantly with items of sleep diary, but	Change scores demonstrated a significant relationship between sleep efficiency scores and ISI scores (Savard et al., 2004). Clinical cut-off score associated with optimal sensitivity and specificity to detect change	Focus on daytime symptoms of insomnia; brief screening or outcome measure in treatment of insomnia only (Bastien et al., 2001)	Past week; has been used to compare medications versus cognitive-behavioral treatment of insomnia

Name of Tool	Populations	Reliability and Validity	Sensitivity	Clinical Utility	Comment
		<p>correlations between ISI and PSG are weaker (Savard et al., 2004).</p> <p>2) Factor analysis found two factors (severity and impact of the sleep difficulties (Savard et al., 2004).</p>			
Pittsburgh Sleep Quality Index (PSQI)	<p>Adult patients with cancer:</p> <p>1) 170 cases in study 1 and 249 cases in study 2 (Beck, 2004)</p> <p>2) 25 women with breast cancer (Berger, 2002)</p> <p>3) 21 women with breast cancer (Berger, 2003)</p> <p>4) 102 women with breast cancer (Carpenter, 1998)</p> <p>5) 47 caregivers of patients with advanced-stage cancer (Carter, 2002)</p> <p>6) 51 caregivers of patients with advanced-stage cancer (Carter, 2000)</p> <p>7) 15 patients with cancer, 52 healthy adults (Owen, 1999)</p> <p>8) 72 patients with</p>	<p><u>Reliability</u></p> <p>1) Internal consistency: Cronbach's alpha coefficient for global sleep quality index (GSQI) in patients with cancer and caregivers = 0.77–0.81 (Beck et al., 2004; Berger 2002, 2003; Carpenter, 1998; Carter, 2000, 2002). Chronbach's alpha coefficient for GSQI in patients with cancer and controls = 0.75 (Fortner, 2002). Internal consistency among health and chronically ill people and caregivers = 0.83–0.89 (Buysse et al., 1989)</p> <p>2) Test-retest: $r = 0.85$ internal consistency among health and chronically ill people and caregivers = 0.83–0.89 (Buysse et al., 1989)</p> <p><u>Validity</u></p>	<p>Tests support internal consistency reliability and construct validity. Global score of five was shown to differentiate good from poor sleepers without cancer.</p>	<p>Scoring rather cumbersome; otherwise appropriate in adults</p> <p>Integrates nocturnal and daytime assessments; a score of eight and higher is identified as the cut-off score in patients with cancer (Carpenter, 1998); higher than five in healthy adults (Buysse et al, 1989)</p>	<p>One-month recall</p> <p>Most widely used tool throughout sleep studies</p>

Name of Tool	Populations	Reliability and Validity	Sensitivity	Clinical Utility	Comment
	breast cancer (19 pre-cancer treatment, 29 receiving treatment, and 23 post-treatment) and 50 female medical patients presenting for physical examinations) (Fortner, 2002) 9) Healthy adults (Buysse, 1989)	Validity examined by comparing PSQI estimates of sleep variables with those obtained by PSG from healthy adults. There were no significant differences in sleep latency, but subjects tended to overestimate sleep duration and efficiency ($p < 0.001$) (Buysse, 1989).			
Morin's Sleep Diary	Adult patients with cancer: 1) 12 women with breast cancer (Berger & Higginbotham, 2001; Morin, 1993) 2.)10 patients with chronic insomnia and nonmetastatic breast cancer post-chemotherapy and radiation (Quesnel et al., 2003)	Reliability and validity of diaries are major concerns. Some studies have reported high reliability of diary versus observation; others have reported items ranges of 0.38–0.62 for coefficients of stability. Reliable for most patients (Lashley, 2004)	Sensitive to day-to-day or night-to-night fluctuations in sleep and naps	Easy to complete, scoring rather cumbersome and time consuming	Last day and night; inexpensive, may be burdensome; can be used to show adherence to therapy
Epworth Sleepiness Scale (ESS)	1) 180 adults (30 normal men and women and 150 with a range of sleep disorders) (Johns, 1991) 2) 87 healthy medical students for test-retest reliability; 104 medical students and 15 patients with sleep disorders for factor analysis (Johns,	<u>Reliability</u> Internal consistency: Cronbach's alpha coefficient = 0.88 (Johns, 1992); no report (Monga et al., 1997, 1999) Test-retest reliability = 0.82. (Johns, 1992) <u>Validity</u> Factor analysis: only one factor (Johns, 1992)	Total ESS scores significantly distinguished normal subjects from patients in various sleep diagnostic groups. In sleep apnea, ESS scores were correlated with the respiratory disturbance index and the minimum SaO ₂ (Johns, 1991). Sensitive to treatment for	Simple test to measure general level of sleepiness; preferred over multiple sleep latency test (MSLT), which takes all day for the subject and the polysomnographer. Quick and easy to use and score	Past week; important to assess daytime consequences of poor sleep

Name of Tool	Populations	Reliability and Validity	Sensitivity	Clinical Utility	Comment
Epworth Sleepiness Scale (ESS), cont.	1992). 3) 13 prescreened men (60–76 years old) with prostate cancer one or two weeks before radiation therapy (RT), at the end of eight weeks of RT, and at five to six weeks after completing RT (Monga et al., 1997) 4) 36 veterans with localized prostate cancer pre-, during, and post-RT (Monga et al., 1999) 5) Miletin & Hanly, 2003	ESS distinguished between those with and without excessive daytime sleepiness and is a valid measure of sleep propensity in adults. ESS scores were correlated with sleep latency measured during the multiple sleep latency test and during overnight PSG (Johns, 1991). There is little data to support ESS as a measure of daytime sleepiness or sleep propensity, perhaps owing to a lack of consensus over the definition of the concept. ESS may be a more sensitive measure of subjective sleepiness in men than in women (Baldwin et al., 2004)	sleep apnea (Johns, 1992)		
Structured Interview for Sleep Disorders (DSM-III-R) (SIS-D)	Adults being screened for sleep disorders (Schramm et al., 1993)	<u>Reliability</u> Test-retest reliability (Cohen’s kappa: mean = 0.77); reliability: 0.56–0.89; interpreter reliability 97%–100% (Schramm et al., 1993) <u>Validity</u> Validity: concordance between consensus diagnosis and PSG data (90% confirmation) (Schramm et al., 1993)	Sensitive to screen and diagnose sleep disorders	Useful screening instrument; takes 20–30 minutes to complete; includes summary score sheet	Most widely used by clinical sleep medicine professionals

PSG—polysomnography



7. References Related to Instruments to Measure Sleep-Wake Disturbances

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