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282

The Association of Subjective Measures of Sleep and Physical Function in Elderly Women: The Study of Osteoporotic Fractures

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Introduction: Little literature exists regarding the association between self-reported sleep habits and physical functioning in elderly women. This analysis explores this relationship in 6051 elderly community-dwelling women. We hypothesized that women with poor sleep habits would have decreased physical functioning.

Methods: The Study of Osteoporotic Fractures is a longitudinal study of 9704 Caucasian women that began in 1986 and was enhanced by the addition of 662 African American women 10 years later. At this sixth visit in 1996, 6051 women were evaluated and were asked about their sleep and nap habits. Physical function data included time to complete 5 chair stands, time to walk 282 meters, and grip strength. Reported total sleep time was categorized as <4, 4-6, 6-8 (reference group), and >8 hours per night. Women who answered often or almost always to one or more of the following questions were defined as having daytime sleepiness: feel unrested during the day, feel excessively sleepy during the day, do not get enough sleep. Linear regression and least squared means models were adjusted for covariates associated with the outcome (physical functioning) and predictor (subjective measures of sleep) at p=0.10. Models were adjusted for age, race, self-reported health, body mass index, exercise, smoking, alcohol use, history of cardiovascular disease/stroke, depression, cognitive impairment, and use of sleep medications.

Results: The mean age of these women was 79.9 years (SD=4.7), and 10.9% of the women were African American. On average, women who slept less took slightly less time to complete chair stands. Adjusted means were: ≤4 hours: 13.1 seconds, 95% CI=(12.1, 14.1); 4-6 hours: 13.3, 95% CI=(13.0, 13.6); 6-8 hours: 13.7, 95% CI=(13.5, 13.9); >8 hours: 14.6, 95% CI=(14.2, 15.0) (p-for-trend<0.0001). Compared to women who slept 6-8 hours per night, the only group that had significantly slower walking speeds were women who slept >8 hours (adjusted mean ± standard error (SE) = 0.83 ± 0.007 vs. 0.88 ± 0.003 m/sec, p<0.0001). The more the women slept, the weaker their grip strength - adjusted means were: ≤4 hours: 17.9 kg, 95% CI=(17.1, 18.6); 4-6 hours: 17.4, 95% CI=(17.1, 17.6); 6-8 hours: 17.1, 95% CI=(16.9, 17.2); >8 hours: 16.5, 95% CI=(16.2, 16.8) (p-for-trend<0.0001). Women who napped daily had slower chair stand times (adjusted mean ± SE =14.8 ± 0.22 vs. 13.6 ± 0.08 sec, p<0.0001), slower walking speeds (0.82 ± 0.008 vs. 0.89 ± 0.003 m/sec, p<0.0001), and weaker grip strength (16.4 ± 0.16 vs. 17.2 ± 0.06 kg, p<0.0001). Women with daytime sleepiness did not have significantly slower chair stand times (13.8 ± 0.15 vs. 13.6 ± 0.09 sec, p<0.0001), but had slower walking speeds (0.87 ± 0.005 vs. 0.88 ± 0.003 m/sec, p=0.0099) and weaker grip strength (16.9 ± 0.11 vs. 17.1 ± 0.07 kg, p=0.0463).

Conclusion: On average, women reporting poorer sleep habits (longer nighttime sleep, daily napping, daytime sleepiness) have decreased physical functioning compared to women reporting better sleep habits. Future studies need to determine if poorer sleep habits are associated with an increased rate of decline in physical function.

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283

Usefulness of the PSQI Among Community-Residing Older Adults: Consideration of Ethnic Differences


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Introduction: The Pittsburgh Sleep Quality Index (PSQI) is a widely utilized measure of sleep quality. It differentiates between “good” and “poor” sleepers across a variety of populations including individuals with psychiatric, sleep, and somatic disorders, and it discriminates between individuals of varying ages and genders. It remains uncertain whether the PSQI is useful in discriminating among persons of different ethnicities. This study evaluated the usefulness of the PSQI in a community-based sample.

Methods: Volunteers (n = 64, age range = 60-85, Black = 59% and White 41%) were enrolled in a multifactorial study examining relationships between sociodemographic and circadian rhythm measures. Consented men (27%) and women (73%) provided subjective ratings of sleep quality, depressed moods, demographic, and health data. Additionally, they provided recordings of sleep and wakefulness for seven days (Actiwatch-L). Sleep quality was measured with the PSQI (α = 0.83). Depression was assessed with the Geriatric Depression Scale (GDS) (α = 0.79). Actigraphic data were scored with software provided by the manufacturer, aided by judgement of the score.

Results: Subjective sleep durations (SSD) and actigraphic sleep durations (ASD) were modestly correlated (r = 0.29, p < 0.01), and both showed acceptable night-to-night reliability (SSD: α = 0.80 and ASD: α = 0.85). Scores on the PSQI and the GDS were significantly correlated (r = 0.47, P < 0.01). Sixty-six percent of the volunteers were good sleepers and 34%, poor sleepers, with a mean global score of 4.66 ± 3.02. Consented men (27%) and women (73%) provided subjective ratings of sleep quality, depressed moods, demographic, and health data. Additionally, they provided recordings of sleep and wakefulness for seven days (Actiwatch-L). Sleep quality was measured with the PSQI (α = 0.83). Depression was assessed with the Geriatric Depression Scale (GDS) (α = 0.79). Actigraphic data were scored with software provided by the manufacturer, aided by judgement of the score.

Conclusion: As shown previously, sleep quality was predictive of depressed moods. Both good and poor sleepers showed the same level of variability in estimating their nocturnal sleep duration, and both under-