Sleep, Fatigue, and Problems With Cognitive Function in Adults Living With HIV

Eeeseung Byun, RN, PhD*
Caryl L. Gay, PhD
Kathryn A. Lee, RN, PhD, FAAN, CBSM

Up to 50% of people living with HIV have some neurocognitive impairment. We examined associations of sleep and fatigue with self-reported cognitive problems in 268 adults living with HIV. Multivariate regression was used to examine associations between cognitive problems, self-reported sleep quality, actigraphy-measured total sleep time and wake after sleep onset, and fatigue severity. Poorer self-reported sleep quality ($p < .001$), *short or long total sleep time (<7 or >8 vs. 7–8 hours,* $p = .015$), *and greater fatigue* ($p < .001$) *were associated with lower self-reported cognitive function scores after controlling for demographic and clinical characteristics. However, objective measure of wake after sleep onset was unrelated to self-reported cognitive function scores. Findings suggest that assessing and treating poor sleep and complaints about fatigue would be areas for intervention that could have a greater impact on improving cognition function than interventions that target only cognitive problems.*

(Journal of the Association of Nurses in AIDS Care, 27, 5-16)

Key words: *cognition, fatigue, HIV, sleep*

Up to 50% of people living with HIV (PLWH) have some neurocognitive impairment (Heaton et al., 2010; McArthur, Steiner, Sacktor, & Nath, 2010), especially in the domains of concentration, attention, and working memory (Ances & Ellis, 2007). Worldwide, approximately 4.2 million PLWH were older than 50 years of age in 2013 (Mahy, Autenrieth, Stanecki, & Wynd, 2014). As the population of PLWH ages, the normal process of aging may contribute to cognitive impairment in this patient population. Age-related comorbidity (Valcour, 2013), inflammatory processes, and cytokine activity (Kraft-Terry, Stothert, Buch, & Gendelman, 2010) also influence cognitive impairment in HIV infection. Schouten, Cinque, Gisslen, Reiss, and Portegies (2011) reported in their review article that risk factors for developing an HIV-associated neurocognitive disorder included CD4+ T cell nadir, aging, microbial translocation, anemia, thrombocytopenia, host genetic factors, and viral genetic factors.

Sleep disturbance and fatigue are prevalent symptoms in HIV disease; up to 75% of PLWH experience sleep disturbance (Rubinstein & Selwyn, 1998) and up to 88% experience fatigue (Jong et al., 2010;

*Eeeseung Byun, RN, PhD, is a postdoctoral fellow, Department of Family Health Care Nursing, University of California, San Francisco, San Francisco, California, USA. (*Correspondence to: Eeeseung.Byun@ucsf.edu; byunjoy@gmail.com). Caryl L. Gay, PhD, is a Research Specialist, Department of Family Health Care Nursing, University of California, San Francisco, San Francisco, California, USA, and Department of Research, Lovisenberg Diakonale Hospital, Oslo, Norway. Kathryn A. Lee, RN, PhD, FAAN, CBSM, is a Professor, Department of Family Health Care Nursing, University of California, San Francisco, San Francisco, California, USA.*

JOURNAL OF THE ASSOCIATION OF NURSES IN AIDS CARE, Vol. 27, No. 1, January/February 2016, 5-16
http://dx.doi.org/10.1016/j.jana.2015.10.002

Millikin, Rourke, Halman, & Power, 2003). We also previously reported high rates of difficulty sleeping (56%) and lack of energy (65%) in our current sample of adults living with HIV (Lee et al., 2009). Sleep disturbance has been related to cognitive impairment in other populations such as older adults or individuals with heart failure (Blackwell et al., 2014; Garcia et al., 2012). Fatigue in HIV has also been well studied (Jong et al., 2010) and is often associated with sleep disturbance (Millikin et al., 2003). However, little is known about the effects of sleep disturbance and fatigue on how cognitive problems are perceived by the patient with HIV, and underlying mechanisms are still not clear.

Mild neurocognitive disorder and asymptomatic neurocognitive impairment are more prevalent than HIV-associated dementia (Valcour, 2013). Cognitive impairment in HIV can affect adherence to antiretroviral therapy (ART) or lead to difficulty managing complex medical regimens related to comorbidities (Schouten et al., 2011). It is, therefore, important to identify factors related to problems with cognitive function. If sleep disturbance and fatigue are associated with poor cognitive function in HIV disease, strategies that improve poor sleep and address complaints about fatigue could also improve cognitive function and quality of life in this population. Thus, the purpose of our study was to examine associations of sleep and fatigue with self-reported cognitive problems in adults living with HIV.

Methods

The Symptom and Genetic Study is a longitudinal study with a convenience sample of adults living with HIV aimed at identifying biomarkers of symptom experiences in HIV-infected adults (Lee et al., 2009). A cross-sectional analysis was conducted to examine the relationships between perceptions of cognitive function, subjective and objective measures of sleep, and fatigue, while controlling for demographic and clinical characteristics. The Committee on Human Research at the University of California, San Francisco, approved the study. Study participants were recruited using flyers at HIV clinics and community sites in the San Francisco Bay Area. All participants provided written informed consent and signed a Health Insurance Portability and Accountability Act release to access their protected medical information.

Participants were included if they were English-speaking adults, at least 18 years of age, and had been diagnosed with HIV at least 30 days before enrollment. To specifically address HIV-related symptom experiences, potential participants were excluded if they were currently using illicit drugs (as determined by self-report or by positive urine drug testing); worked nights (at least 4 hours between 12 a.m. and 6 a.m.); reported having bipolar disorder, schizophrenia, or dementia; or had been pregnant within the prior 3 months. Participants with insomnia were not excluded, but those with other diagnosed sleep disorders, such as apnea and narcolepsy, were excluded.

Sample Characteristics

Demographic characteristics of age, gender, race/ethnicity, education, disability, and income were collected using a demographic questionnaire. Prior AIDS diagnosis and current medication regimen were obtained through self-report. The most recent CD4+ T cell count, HIV viral load values, and hemoglobin values to determine anemia were obtained from patient medical records. Medications were categorized as ART, sleep, antidepressant at therapeutic dose, or opiate, based on the potential for such medications to impact cognition. Trained research staff obtained measures of body mass index (weight in kilograms divided by squared height in meters) during a Clinical Research Center clinic appointment.

Subjective Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI) was used to measure subjective sleep quality and types of sleep disturbances over the previous month (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The scale included 19 items and seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The component scores have usually been scored on a scale of 0 to 3, but the raw scores for each component were used in our analysis to better capture variation in the measured construct. The global sleep quality score