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Prevalence of sleep disorders by sex and ethnicity among older adolescents and emerging adults: Relations to daytime functioning, working memory and mental health[☆]

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ABSTRACT

The study determined the prevalence of sleep disorders by ethnicity and sex, and related daytime functioning, working memory, and mental health among older adolescent to emerging adult college students. Participants were U.S.A. undergraduates ($N = 1684$), aged 17–25, recruited from 2010 to 2011. Participants completed online questionnaires for all variables. Overall, 36.0% of the sample screened positive for sleep disorders with insomnia, restless legs syndrome, and periodic limb movement disorder being the most prevalent. Women reported more insomnia and daytime impairment. African–Americans reported more early morning awakenings and less daytime impairment. Students with insomnia symptoms or restless legs syndrome tended to have lower working memory capacities. Students with nightmares or parasomnias had greater odds for mental disorders. In an older adolescent to emerging adult college student sample, sleep disorders may be a common source of sleep disturbance and impairment. Certain sleep disorders may be associated with lower working memory capacity and poor mental health.

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Sleep dramatically changes both physiologically and behaviorally throughout adolescence (Colrain & Baker, 2011). The transition to adulthood is no exception. Older adolescents to emerging adults (18–25 years; Arnett, 2000) experience greater preference for later bedtimes and rise times, declines in electroencephalography-measured slow wave sleep activity and total sleep time, and increasing prevalence of symptoms of insomnia and other disturbances (Buchmann et al., 2011; Ohayon, Roberts, Zulley, Smirne, & Priest, 2000; Roberts, Roberts, & Chan, 2008; Roenneberg et al., 2004). These natural shifts combined with the transition to college, which often herald increased demands on their time from academic, social, vocational, and other extracurricular sources, likely increase risk for sleep problems in this segment of the older adolescent to emerging adult population.

Abbreviations: RLS, restless legs syndrome; PLMD, periodic limb movement disorder; OSA, obstructive sleep apnea; ISI, Insomnia Severity Index; GSAQ, Global Sleep Assessment Questionnaire; BMI, body mass index; WMC, working memory capacity; Aopsan, Automated Operation Span task; EDS, excessive daytime sleepiness.

[☆] A portion of the data was presented in poster-form at the Associated Professional Sleep Societies 2011 conference in Minneapolis, MN, USA: Ruiter ME, Lichstein KL. Ethnic effects on working memory capacity in sleep disorders. *Sleep* 2011; 34:Abstract supplement:A189.

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Indeed, sleep problems are ubiquitous among older adolescent and emerging adult college students. Two-thirds to three-quarters report at least occasional sleep difficulties (Buboltz, Brown, & Soper, 2001; Coren, 1994). Approximately 9.4–43% of surveyed college undergraduate samples report insomnia symptoms (Fernández-Mendoza et al., 2009; Forquer, Camden, Gabriau, & Johnson, 2008; Taylor et al., 2011) and almost 25% report insufficient sleep (Yang, Wu, Hsieh, Liu, & Lu, 2003). Data suggest these sleep problems are worsening among older adolescent to younger adult college students globally overtime (Hicks, Fernandez, & Pellegrini, 2001; Steptoe, Peacey, & Wardle, 2006). Furthermore, sleep disturbance during older adolescence predicts sleep disturbance in adulthood (Dregan & Armstrong, 2010). Daytime impairment from these sleep problems such as sleepiness and fatigue are reported in 50–75% of college students with 25% experiencing clinically significant excessive daytime sleepiness (EDS; Lund, Reider, Whiting, & Prichard, 2010). Sleep problems and related daytime impairment are risk factors for numerous problems among college students including poor physical and mental health (Lund et al., 2010; Pilcher, Ginter, & Sadowsky, 1997; Steptoe et al., 2006; Taylor et al., 2011), decrements in academic performance (Gaultney, 2010), difficulty concentrating (Pilcher & Walters, 1997), and poorer lifestyle factors, including substance use (Gaultney, 2010; Lund et al., 2010), reduced physical activity (Carney, Edinger, Meyer, Lindman, & Istre, 2006), and less social engagement (Brown, Buboltz, & Soper, 2002).

Older adolescent and emerging adult college students commonly cite stress, nighttime worries, environmental noise, restricted sleep duration, variable sleep schedules, and co-sleeping as reasons for their sleep problems (Brown et al., 2002; Forquer et al., 2008; Lund et al., 2010). However, it is unknown if these sleep disturbances may also be attributable to undiagnosed sleep disorders. There is minimal information on the prevalence of sleep disorders among college students and their impact on mental health, daytime and neurocognitive functioning. Only one study has used a standardized screening instrument to assess the prevalence of sleep disorders among college students (Gaultney, 2010). However, this study did not investigate the impact of disordered sleep on daytime impairment and other daytime functioning factors such as mental health and memory. Gaultney found 25% of students were at risk for a sleep disorder (2011). Narcolepsy was most prevalent (16.0%) followed by insomnia (12%), periodic limb movement disorder/restless legs syndrome (PLMD/RLS, 8.0%), circadian rhythm disorders (7.0%), obstructive sleep apnea (OSA; 4%), hypersomnia (4%), and nightmares (2%). The high prevalence of narcolepsy was likely due to poor specificity of the narcolepsy scale because some of its items loaded onto other sleep disorder scales (Gaultney, 2010); therefore insomnia was likely the most prevalent in that sample. This study also evaluated sleep disorder prevalence by sex and ethnicity. Women were at greater risk for PLMD/RLS, insomnia, and nightmares. There were no significant differences in risk by ethnicity.

Despite known sex and ethnic differences in normal and disordered sleep in other populations (Ruiter, DeCoster, Jacobs, & Lichstein, 2010, 2011; Zhang & Wing, 2006), identification of any disparities in sleep disorder prevalence and related daytime functioning among college students is a neglected area of inquiry. Available data suggest that sex differences in disordered sleep among college students are mixed and most studies only reported on symptoms of insomnia and snoring (Buboltz et al., 2001; Fernández-Mendoza et al., 2009; Forquer et al., 2008; Gaultney, 2010; Pasha & Khan, 2003; Patel et al., 2008; Tsai & Li, 2004). Furthermore, most of these studies did not have ethnically diverse samples, which precluded analytic comparisons. Sex and ethnic identity may contribute to variations in medical and psychiatric diagnosis, perception of illness, treatment-seeking behavior, and preferences for treatment. The accumulation of data on sex and ethnic inequities in prevalence, severity, etiology, sequelae, comorbidity, and course of sleep disorders may prove fruitful in time with respect to developing tailored prevention strategies, targeted treatments, and health education initiatives. Studies on prevalence estimates across ethnic groups among college students are a first step toward addressing ethnicity and sleep in this population and may serve as a springboard for future studies with larger ethnically diverse sample sizes.

Sleep disturbances and related negative consequences are well-documented among college students and may lead to appreciable long-term health, social and vocational problems. Approximately 69% of 2011 USA high school graduates enrolled into college (U.S. Census Bureau, 2009), thus college students represent a sizable portion of the older adolescent to emerging adult population. Standardized measurement of sleep disorders prevalence in this population is important from a prevention and health education perspective.

Within a convenience sample of older adolescents to emerging adults enrolled as undergraduates in college, the present study aims were to a) describe the prevalence of sleep disorders, sleep-related disruptions and daytime impairments, b) identify ethnic and sex differences in sleep disorders and daytime functioning, and c) determine if being at risk for a sleep disorder is associated with working memory impairment, and poorer mental health outcomes. For aim a) we hypothesize that insomnia will be the most prevalent sleep disorder in our sample. Based on previous literature in older populations, for aim b) we hypothesize that a greater proportion of women and non-Hispanic white students will report insomnia symptoms, and African-American students will report more symptoms of obstructive sleep apnea. Lastly, we hypothesize that screening positive for a sleep disorder will be significantly related to working memory impairment and poorer mental health. Compared to the study conducted by Gaultney (2011) and other previous studies (Buboltz et al., 2001; Fernández-Mendoza et al., 2009; Forquer et al., 2008; Pasha & Khan, 2003; Patel et al., 2008; Tsai & Li, 2004), the present study used more conservative diagnostic criteria for insomnia, a standardized measure that screened for a broader range of sleep disorders and disturbances, provided more information on sleep disorders and disturbances by ethnicity and, for the first time, examined working memory capacity in relation to sleep disturbances.

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