

Longitudinal Study of Insomnia Symptoms Among Women During Perimenopause

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ABSTRACT

Objective: To describe the prevalence of insomnia symptoms among women during perimenopause and to examine differences in self-reported insomnia symptoms at different stages of perimenopause over 10 years.

Design: Secondary analysis of self-reported sleep symptoms and clinical variables using 10 years of publicly available data from the Study of Women Across the Nation (SWAN).

Setting: The data set of women's insomnia symptoms was obtained from publicly available data from the SWAN. The parent study settings included Detroit, Michigan; Northern New Jersey; Los Angeles, California; Boston, Massachusetts; Chicago, Illinois; and Pittsburgh, Pennsylvania.

Participants: Multiethnic midlife women with a mean age of 46 years ($N = 3,302$) categorized as pre- and perimenopausal at baseline.

Methods: Dependent variables included self-reported insomnia symptoms: difficulty falling asleep (sleep latency), wake after sleep onset, early morning awakenings, and sleep quality. Descriptive analysis was completed for each 1-year study interval. Repeated measures logistic regression was used to identify whether insomnia symptoms changed over time by stage of perimenopause.

Results: Insomnia symptoms were present in 31% to 42% of perimenopausal women at any 1-year study interval. Insomnia symptoms were more prevalent in the late stage of perimenopause than the early stage ($p < .001$). The odds of having any insomnia symptoms were 1.3 times greater for women in the late stage of perimenopause than in the early stage (95% confidence interval [1.2, 1.5], $p < .001$).

Conclusion: Insomnia symptoms are prevalent in women transitioning to menopause, and stage of perimenopause may heighten the risk to develop symptoms of insomnia disorder, which is associated with negative cardiometabolic outcomes.

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AWHONN

Sleep disorders are present in 50 to 70 million people (Institute of Medicine, 2006), and insomnia is the most prevalent sleep disorder among the general population (Schutte-Rodin et al., 2008). Although insomnia is a distinctly defined sleep disorder with specific diagnostic criteria, insomnia symptoms are often examined in isolation. It is important to recognize insomnia symptoms in women during perimenopause through health care screenings and patient education for an accurate diagnosis of insomnia disorder. The *Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5)* identifies the criteria for insomnia disorder as any one symptom of prolonged sleep latency, increased wake after sleep onset, and/or the occurrence of early

morning awakenings, that is present for three or more nights per week, for three or more consecutive months, along with daytime impairment and sufficient opportunity for sleep (American Psychiatric Association, 2013).

Within the next decade, it is projected that 500 million women in the United States will be within the estimated age range (35–55 years) to transition to perimenopause (U.S. Census Bureau, 2010). During perimenopause, women begin to experience variations in the menstrual cycle because of the fluctuation of estradiol, progesterone, and follicle-stimulating hormones. They commonly experience symptoms that include hot flashes, night sweats, sleep disruption, and an

Symptoms of insomnia confer negative cardiometabolic consequences and increase the risk of depression and hypertension.

overall decrease in quality of life (Freeman et al., 2007). *Early perimenopause* is distinctly different from *late perimenopause* and is defined as having a menstrual cycle in the preceding 3 months but with irregularity of cycles. On the other hand, *late perimenopause* is defined as having a menstrual cycle in the last 12 months but not in the preceding 3 months (Harlow et al., 2012). Chronic insomnia is a significant risk factor for new onset medical and psychiatry morbidity, and when left untreated it is costly to the individual (up to \$5,000 per annum) and costly to society in the form of poor work productivity and absenteeism (up to \$150 billion per annum in direct and indirect costs; Daley et al., 2009; Ozminkowski et al., 2007). Although the evidence to date consistently indicates that insomnia symptoms and chronic insomnia diagnoses are associated with individual and societal costs and untoward general population outcomes, less is known about insomnia symptoms in women during perimenopause.

Women are at greater risk than men to develop chronic insomnia during their lifetimes (Ozminkowski et al., 2007); a lifetime prevalence rate of 63% was reported among women ages 18 years and older ($N = 511$) in a U.S. study (National Sleep Foundation, 2015). The prevalence of insomnia symptoms increases in women as they enter perimenopause (Ensrud et al., 2011; Freeman et al., 2007), and nearly 40% of women between the ages of 40 and 55 years reported insomnia symptoms (Kravitz et al., 2003). According to the 2007 Sleep in America Poll, 59% of women with perimenopause reported that they experienced insomnia symptoms at least a few nights per week (National Sleep Foundation, 2015), and women who experienced other symptoms of perimenopause, such as hot flashes and depression, were more likely to also report insomnia symptoms (Arakane et al., 2011; Blümel et al., 2012; Piene et al., 2008; Woods and Mitchell, 2010). The alteration of hormones that occurs during the natural progression of perimenopause has the potential to increase the risk of developing insomnia because of the following factors: vasomotor symptoms that disrupt the sleep cycle, coexistent psychological disorders such as anxiety and depression that

contribute to impaired sleep, and altered central neural control of sleep–wake states and thermal threshold associated with hormonal alterations (Freedman, 2005a,b).

Untreated insomnia is a public health concern. In the general U.S. population, the cost of insomnia treatment, loss of productivity at work, and decreased quality of life confer a tremendous burden (Daley et al., 2009; Hatoum et al., 1999; Simon and VonKorff, 1997).

Poor sleep quality in midlife women was associated with primary sleep disorders, anxiety, and depression (Joffe et al., 2010) and hypertension (Vgontzas et al., 2009). Because the number of perimenopausal women will significantly increase during the next several decades in the United States, it is critically important to gain insight into the prevalence of diagnosable insomnia in this high-risk group. Furthermore, little is known about the prevalence of insomnia symptoms across the stages of early and late perimenopause, and such information will potentially support recommendations for the timing of insomnia screening and intervention for prevention and treatment.

The overall purpose of our study was to describe the prevalence of insomnia symptoms in perimenopausal women and to determine the prevalence of insomnia symptoms by perimenopausal stage in midlife women over a period of 10 years. The following study questions were addressed: (a) What is the prevalence of nighttime insomnia symptoms measured annually in perimenopausal women?, (b) What is the prevalence of insomnia symptoms by perimenopausal stage in women?, and (c) Is there a difference in reported insomnia symptoms by perimenopausal stage?

Methods

Design

Our study was a secondary and longitudinal analysis of publicly available data from the Study of Women's Health Across the Nation (SWAN), a multisite, longitudinal study of the natural history of women transitioning to menopause (Sowers et al., 2000) funded by the National Institutes of Health's National Institute on Aging, National Institute of Nursing Research, and Office of Research on Women's Health. The objective of the SWAN was to describe the chronology of the biological and psychological characteristics of the menopausal transition on health and risk factors for age-related chronic illnesses

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