Impact of Poor Sleep on Physical and Mental Health in Older Women

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KEYWORDS

• Sleep deficiency • Circadian rhythms • Cardiometabolic disorders • Older women
• Metabolic syndrome • Physical health • Mental health • Falls

KEY POINTS

- The prevalence of sleep disorders and disturbances increases with age and older women may be more sensitive to the impact of aging on sleep.
- Short sleep duration, poor sleep quality, insomnia, sleep-disordered breathing, and weakened rest–activity rhythms are associated with adverse cardiometabolic outcomes, including obesity, metabolic disorders, and cardiovascular disease.
- Sleep disorders and disturbances, and weakened rest–activity rhythms, are associated with adverse mental health outcomes, including increased risk of depressive symptoms, dementia, and cognitive decline.
- Disturbances in sleep and treatments for sleep contribute to other outcomes, such as falls, disability, and chronic pain.
- Clinicians should consider special needs of older women in the diagnosis and treatment of sleep problems.

INTRODUCTION

Sleep is an important determinant of human health, and healthy sleep is crucial for healthy aging. In a recent joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society, healthy sleep was defined as "adequate duration, good quality, appropriate timing and regularity, and the absence of sleep disturbances or disorders."[1] The prevalence of sleep disorders and disturbances increases dramatically with advancing age.[2] There is growing evidence that sleep disturbances may accelerate the aging process and contribute to a wide range of chronic diseases. Despite these health consequences, sleep problems frequently are undiagnosed and untreated, particularly in the elderly.[3]

Previous studies have suggested that, compared with men, women may be more sensitive to the impact of aging on sleep and older women are more likely to report sleep problems.[4,5] As the older population continues to grow in many parts of the world, it is important to understand the health effects of sleep disruption in the context of aging. This review synthesizes and presents epidemiologic and clinical evidence on the relationships between sleep deficiency and various health conditions that are highly prevalent in older

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women, explores potential mechanisms underlying such relationships, points out gaps in the literature that warrant future investigations, and considers implications for the clinical and public health settings.

SLEEP IN OLDER ADULTS

Many aspects of sleep change as people age. A 2004 meta-analysis by Ohayon and colleagues[6] synthesized findings from 65 studies with objective measurement of sleep using polysomnography (PSG) or actigraphy. They found that older age was associated with decreases in total sleep time, sleep efficiency and percentage of slow-wave sleep and rapid eye movement sleep; whereas sleep latency, percentage of light sleep, and minutes of wake after sleep onset significantly increased with age. Such changes in sleep architecture are consistent with an increase in sleep complaints in the older population. In more than 9000 people aged 65 years or older, Foley and colleagues[7] assessed the frequencies of reporting common sleep disturbances, including trouble falling asleep, waking up, waking too early, and nonrestorative sleep. In this study, half of the participants reported at least 1 complaint as frequently occurring, and up to a third of the population showed symptoms of insomnia.[7] Similarly high prevalence (15%–25%) of insomnia symptoms has also been reported in the Sleep Heart Health Study (SHHS).[8] Sleep-disordered breathing (SDB), another common sleep disorder, is estimated to affect from 30% to 60% of older adults, depending on the definition used and specific population.[9–13] Moreover, aging coincides with altered circadian activity rhythms, including decreased amplitude (height of rhythm),[14] fragmentation or loss of rhythms (weakening of rhythmic pattern),[15,16] and altered timing of peak rhythm activity. Timing changes in older adults frequently result in earlier onset of sleepiness in the evening and an earlier morning waking time.[16]

Interestingly, a growing body of evidence suggests that there are sex differences both in sleep and age-related changes in sleep.[4] In general, although women tend to have better objectively measured sleep quality, paradoxically, they are more likely than men to report subjective sleep problems, including shorter sleep and poorer sleep quality.[17] A meta-analysis of sex differences in insomnia showed that not only is the risk of insomnia higher in women than in men across all age groups, the difference in insomnia risk between women and men widens with age.[18]

SLEEP AND CARDIOMETABOLIC HEALTH

Sleep plays a vital role in numerous physiologic processes, including the regulation of metabolic, hormonal, and immune function, all of which are essential for cardiometabolic health. Numerous studies have linked disorders and disturbances of sleep to cardiometabolic outcomes, including obesity, hypertension, dyslipidemia, diabetes, and cardiovascular disease (CVD).

Sleep Duration

Short sleep duration is associated with obesity in children and younger adults; however, such a relationship in older adults remains less clear.[19–21] The mixed findings in the elderly may be partially due to the high prevalence of chronic conditions in this population, which may both confound and modify the effect of sleep on weight. In a study of more than 80,000 healthy men and women aged 51 to 72 years, those with self-reported short sleep (<7 hours) at baseline were more likely to experience substantial weight gain (≥5 kg) and risk of developing obesity over 10 years of follow-up.[22] Interestingly, this association may be stronger in older women than in men. Two studies of middle-to-old-aged subjects in Finland and Spain reported an association between short sleep and higher weight gain in women but not in men.[23,24]

Short sleep duration has also been associated with other cardiometabolic consequences. Two meta-analyses showed that short sleep duration was associated with a 23% increase in hypertension risk,[25] a 48% increase in coronary heart disease, and a 15% increase in stroke,[26] and these associations were stronger in women. Another meta-analysis demonstrated that each 1-hour decrease in sleep duration was associated with a significant 9% increase in the risk of type 2 diabetes.[27]

Several studies have also reported an association between long sleep duration and obesity, diabetes, and CVD risk and mortality.[26,28] In a large observational study of older women, Stone and colleagues[29] found that those who reported 10 or more hours of sleep per 24 hours had a 77% increase in risk of cardiovascular-related mortality compared with older women who reported 8 to 9 hours of sleep. Several lines of evidence suggest that these associations with adverse health outcomes related to long sleep duration may be partially explained by comorbidities.[30–32]

Studies using objectively measured sleep duration in the older population are still limited and their findings are mixed. For example, a cross-sectional relationship between objectively measured short