Research Article

A Lifetime of Sleeplessness: A Narrative Review of Biological and Social Influences on Women's Sleep

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ABSTRACT

Sleep plays a critical role in physical and mental health, yet many studies show that women report poorer sleep quality and more sleep-related health problems than men across the lifespan. Although existing research has explored biological and hormonal factors affecting sleep, there is limited understanding of how social roles, structural inequalities, and intersecting identities contribute to gendered sleep disparities over time. Studies also rarely include transgender and nonbinary individuals, despite likely risks. Sixteen peer-reviewed studies published between 1999 and 2024 were identified using academic databases including PubMed and Google Scholar. Sources were identified using academic databases including PubMed and Google Scholar. Given the diversity of methods and populations studied, a narrative approach was adopted to integrate findings across disciplines and life stages. The review examined both biological and social influences on sleep across five key life stages: childhood, adolescence, reproductive years, midlife, and older adulthood. Findings showed that women face unique sleep challenges at each stage of life, shaped by hormonal changes, caregiving demands, social expectations, and socioeconomic pressures. These sleep difficulties often begin early and build up over time, with greater risk for women from marginalized groups, including women of color, low-income women, and those with caregiving responsibilities. Sleep disparities are not only biological but also deeply social. An intersectional, life course approach is needed to understand and address gendered sleep inequalities. More inclusive research is required to ensure sleep health strategies meet the needs of all genders, particularly those most at risk of being overlooked.

Keywords: Sleep disparities; Gender differences; Life course; Hormonal influences; Intersectionality; Women's health

INTRODUCTION

Sleep is vital for physiological regulation, cognitive performance, and emotional well-being (1). It supports immune function, hormonal balance, memory consolidation, and cardiovascular and metabolic health (2). Chronic sleep deprivation or poor sleep quality is associated with elevated risks of type 2 diabetes, obesity, hypertension, depression, cognitive decline, and mortality (3). In this review, sleep is examined across multiple dimensions: duration, quality, timing, continuity, and symptoms of insomnia, to capture a more comprehensive understanding of disparities. Although sleep is crucial for everyone, men and women experience it differently.

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Across cultures, women report more sleep problems and fatigue than men, despite often sleeping the same amount or more (4). This pattern, known as the "sleep gender gap," has drawn research attention, but the reasons behind it remain unclear (5).

Sleep disparities between men and women arise from a combination of biological and social influences (6). Hormonal fluctuations associated with menstruation, pregnancy, postpartum recovery, and menopause significantly impact women's sleep (7). Simultaneously, gendered social roles, including caregiving responsibilities, financial stress, and normative expectations, contribute to these disparities (8). These factors may shift across the life course; for example, adolescence and early adulthood are marked by hormonal transitions, whereas midlife and older adulthood are shaped more by caregiving burdens and economic stressors (9). A life course approach recognizes that sleep disparities are not static but shaped by developmental transitions, cumulative exposures, and shifting social roles across the lifespan.

Taking a lifespan perspective highlights how biological, psychological, and structural factors influence each other across different stages of life (10). Sleep disparities do not occur in isolation but accumulate through exposure to early adversity, repeated disruptions, and sustained inequality. For example, a teenage girl experiencing insomnia due to school stress and circadian shifts may carry those sleep difficulties into adulthood, where they may be exacerbated by parenting duties, occupational stress, or menopausal changes (11). Additionally, women from racial and socioeconomic minority groups may encounter compounded barriers, such as unsafe housing, shift work, systemic discrimination, and chronic stress, that intensify sleep disparities and health risks (12). A life course and intersectional perspective is therefore essential to understand how risk factors build upon one another and disproportionately burden those with multiple marginalized identities.

Therefore, this review adopts a life course and intersectional framework to examine how biological and social drivers of gendered sleep disparities unfold across developmental stages and intersect with systems of inequality over time. Marginalized groups—including women of color, low-income women, single mothers, and transgender and nonbinary individuals—tend to face disproportionate challenges in achieving adequate, high-quality sleep (13) sleep health is considered only rarely by policy makers, employers, schools, and others whose policies and structures can adversely affect sleep. An inadequate duration of sleep and poor-quality sleep are prevalent in minority and low-income populations, and may be fundamental to racial and socioeconomic status inequities that contribute to a range of health conditions, including cardiovascular disease (CVD. Yet these populations remain underrepresented in sleep research, limiting the field's ability to address structural inequities. Drawing on 16 peer-reviewed studies, including large-scale surveys, biological research, and qualitative analyses, this review synthesizes evidence on how hormonal changes, gendered social roles, caregiving demands, and structural inequalities shape sleep outcomes across key life stages. Specifically, it (i) identifies when and how gender differences in sleep appear over time; (ii) explores the biological, social, and structural drivers of poor sleep among women; and (iii) highlights critical gaps in the literature. The aim is to guide the development of more equitable, inclusive, and developmentally informed strategies to promote sleep health across diverse populations.

METHODS AND MATERIALS

This study is a narrative literature review that synthesizes findings from peer-reviewed papers on gender disparities in sleep across the lifespan. It adopts a developmental and intersectional framework to examine how biological, social, and structural influences shape sleep outcomes from infancy through older adulthood.

Search Strategy and Sources

Relevant literature was identified using databases including PubMed, PsycINFO, and Google Scholar. In addition, reference lists from key articles were manually reviewed to identify further relevant studies. Keyword combinations included "sleep," "gender differences," "sex differences," "women," "men," "transgender," "insomnia," "life course," "caregiving," "hormones," "intersectionality," and "sleep disparities." These terms were chosen to encompass both biological and social dimensions of gender-related sleep disparities across the life span.

Inclusion and Exclusion Criteria

To be included, studies had to meet the following criteria: (I) peer-reviewed article published in English between 1999 and 2024, (ii) empirical studies involving human participants, (iii) research that examined gender-related differences in sleep across one or more life stages, and (iv) studies that addressed biological, psychological, or social factors contributing to sleep disparities. Articles

were excluded if they: focused exclusively on medical sleep disorders without addressing gender or psychosocial context, or if they were non-empirical with limited relevance to the review aims.

Selection and Screening Process

A total of 785 records were identified through database searches, including 245 from PubMed, 212 from PsycINFO, and 328 from Google Scholar. An additional 14 records were identified through reference chaining of relevant studies. After removing 102 duplicates, 697 unique records remained for screening. Titles and abstracts were reviewed to assess relevance based on the inclusion criteria. Of these, 93 full-text articles were assessed in detail. Seventy-seven articles were excluded for the following reasons: 25 were not empirical (e.g., reviews or commentaries), 22 lacked gender-specific analysis, 18 focused exclusively on clinical sleep disorders without social or biological context, 8 did not address any life-course stage or female-specific group, and 4 were found to be overlapping or redundant. A total of 16 empirical studies met all inclusion criteria and were included in the final narrative synthesis. These studies represent a mix of observational, experimental, and review-based research, spanning various age groups, countries, and populations. See Table 1 for an overview of study characteristics, including design, sample, sleep measures, and key findings. A PRISMA-style flow diagram (Figure 1) illustrates the selection process.

Table 1. Characteristics of included studies

S No.	Author(s), Year	Objective	Study Design	Sample Characteristics	Measure of Key Sleep Variables	Key Findings
1	Blair et al., 2012	To provide reference data on sleep duration throughout childhood and explore the demographic characteristics associated with sleep	Longitudinal	11,500 children; 0-11 years of age	Combined daytime and nighttime sleep; Frequency of awakenings	Total sleep duration decreased from 13 hours and 12 minutes at 6 months to 9 hours and 49 minutes at 11 years. Girls consistently slept longer than boys by 5–10 minutes, attributed to later wake times.
2	Lee, McEnany & Weekes, 1999	To explore gender differences in weekday and weekend sleep patterns among early adolescents, including parasomnias and caffeine use.	Cross-sectional	Early adolescents; 144 students in 6th to 8th grade, ranging from 11 to 14 years old; Racially diverse urban sample	Self-reported questionnaires on sleep patterns and caffeine consumption	Boys woke later on weekdays and consumed more caffeine, correlating with more parasomnias. Girls reported higher levels of daytime sleepiness.
3	Organek et al., 2015	To examine disparities in sleep duration and quality by sex and racial/ ethnic group in a diverse sample of adolescents.	Cross-sectional	1,543 adolescents (mean age 12.31); 62.7% White, 23.7% Hispanic/Latino, 10.4% Black, 3.2% Asian	Self-reported sleep duration and quality questionnaires	Girls and minority adolescents reported shorter and poorer-quality sleep than boys and White peers. Gender and race/ethnicity were significant predictors of sleep disparities.
4	Markovic, Kaess & Tarokh, 2020	To identify sex differences in sleep neurophysiology during adolescence using high-density EEG.	Cross-sectional	61 adolescents (31 girls, 30 boys; mean age = 12.48)	High-density EEG during NREM sleep	Girls showed higher EEG power in delta and sigma bands, indicating sex-based differences in sleep neurophysiology.

Continued Table 1. Characteristics of included studies

S No.	Author(s), Year	Objective	Study Design	Sample Characteristics	Measure of Key Sleep Variables	Key Findings
5	Miguez, Bueno & Perez, 2020	To evaluate how sex, age, and migration status influence adolescent sleep health.	Cross-sectional	500 adolescents; Mean Age 13.7 years (SD = 2.0); 47% male, 53% female	Self-reported sleep timing and quality	75% of preadolescents and 45% of adolescents had sleep problems; disparities by sex and migration status were significant predictors.
6	Fatima et al., 2016	To assess gender differences in sleep quality and its association with socio-demographic and health factors.	Cross-sectional survey	3,778 young adults (mean age = 20.6); 65.1% female, 34.9% male	Pittsburgh Sleep Quality Index (PSQI)	Poor sleep quality more prevalent in females (65.1%) than males (49.8%); gender remained a significant predictor after adjusting for confounders.
7	Genzel et al., 2012	To examine how the menstrual cycle phase modulates sleep-dependent memory consolidation in men and women.	Experimental	40 healthy young adults; 20 males and 20 females	Polysomnography, memory tasks	Men showed enhanced memory after naps; women only showed improvements during the luteal phase, suggesting hormonal modulation of sleep-memory links.
8	Ferrara et al., 2015	To examine how sleep deprivation affects economic decision-making differently in men and women.	Experimental study	32 university students; Balanced (16 males and 16 females)	Compliance with regular sleep-wake cycles for the three days	Sleep deprivation increased risk-taking in men but not in women; women showed reduced inequality aversion when sleep deprived.
9	Walsemann et al., 2017	To investigate how sleep disparities by gender and race/ethnicity change from adolescence to early adulthood using longitudinal data.	Longitudinal	National U.S. sample; 8984 individuals 18 to 31 years old; 49% female; 66% While, 14% Black, and 15% Hispanic	Self-reported sleep duration over time	Women slept less than men at age 18 but more by age 28. Black adults showed widening sleep deficits compared to White peers over time. Education and employment partly explained disparities; family responsibilities worsened them.
10	Burgard & Ailshire, 2013	To analyze gender differences in time allocated to sleep using time-use diary data.	Secondary data analysis (American Time Use Survey)	56,149 respondents; 18 to 64 years	Time-use diaries (sleep duration)	Women slept more than men overall, but the gap varied based on family and work responsibilities. Gender roles significantly shaped sleep time.
11	Jonasdottir et al., 2021	To examine gender differences in sleep duration, timing, and variability using large-scale wearable device data.	Observational (wearables)	69,650 adults (ages 19-67) from 47 countries; 11.14 million nights of data	Wearable activity trackers (sleep duration, onset, offset, variability)	Women slept longer but had more awakenings than men; sleep timing became earlier with age; child-rearing periods marked higher sleep variability for women.

Continued Table 1. Characteristics of included studies

S No.	Author(s), Year	Objective	Study Design	Sample Characteristics	Measure of Key Sleep Variables	Key Findings
12	Wang et al., 2024	To investigate how perceived sleep quality affects creative work behavior through engagement, with gender as a moderator.	Cross-sectional survey study	322 full-time employees; 56% male and 44% female participants. Mean Age 38.9 years (SD = 9.9)	Self-reported sleep quality, work engagement, creative behavior scales	Sleep quality positively affected creativity through engagement; effect was stronger in men than women, showing gendered mediation.
13	Polo-Kantola et al., 2016	To compare actual and preferred sleep durations by gender among employed adults in Finland.	Cross-sectional Survey	1,875 employed adults aged 30 to 64 years; 53% women and 47% men	Self-reported actual and preferred sleep durations	Women reported longer actual and preferred sleep durations than men on both workdays and leisure days; greater mismatch between actual and preferred sleep for women.
14	Suarez, 2008	To explore associations between sleep disturbances and inflammation, insulin resistance, and stress and whether they differ by gender.	Cross-sectional	210 healthy middle-aged adults; 110 men and 100 women	Self-reported sleep, IL-6, CRP, insulin resistance markers	In women but not men, poor sleep was linked with higher inflammation and metabolic dysfunction.
15	Miller et al., 2009	To assess gender-specific associations between sleep duration and inflammation in a large occupational cohort.	Cross-sectional	4,642 participants for IL-6 analysis; 4,677 participants for hs-CRP analysis	Self-reported sleep, IL-6, hs-CRP	Short or long sleep was associated with higher inflammation markers in women but not men, indicating gender differences in sleep-inflammation pathways.
16	Baldwin et al., 2009	To explore how gender differences in sleep disruption and fatigue affect quality of life in patients with ostomies.	Cross-sectional	286 colorectal cancer survivors with ostomies (118 women, 168 men)	Self-reported sleep and fatigue scales	Women reported significantly more sleep disturbance and fatigue than men, even after controlling for age and illness severity.

RESULTS

Studies were categorized by five major life stages: infancy/childhood, adolescence, reproductive years, midlife, and older adulthood. Within each stage, findings were analyzed through a developmental and intersectional lens to explore how gender interacts with hormonal change, caregiving roles, social expectations, and structural inequalities in shaping sleep patterns and disparities.

Particular attention was given to underrepresented populations, including women of color, low-income women, single mothers, and transgender and nonbinary individuals, to identify research gaps and inform more inclusive sleep health frameworks. The review demonstrated that sleep disparities are shaped not only by biological processes but also by social and structural forces, with the compounding effects of gender, race, class, and caregiving responsibilities contributing to greater vulnerability across the life course.

Sleep in Infancy and Childhood

Sleep during infancy and childhood is critical for brain maturation, emotional regulation, physical health, and the establishment of healthy long-term sleep behaviors. Throughout these early developmental stages, children experience significant changes in sleep patterns, transitioning from the frequent, short sleep cycles characteristic of newborns to more consolidated nighttime sleep by toddlerhood and preschool age. These changes are influenced by both neurological maturation and environmental factors.

Although much of the existing literature has emphasized typical patterns of sleep development, emerging evidence highlights small yet meaningful sex-based differences. From infancy through early childhood, girls generally exhibit longer sleep duration, faster sleep onset, and fewer nighttime awakenings compared to boys (14, 15). Data from sleep-tracking studies suggest that girls tend to have more efficient and uninterrupted sleep. These observed differences may be attributed, in part, to neurodevelopmental processes and prenatal exposure to sex hormones, such as estradiol and testosterone, which influence brain development in utero (16). Nevertheless, despite these early advantages, girls may become increasingly susceptible to sleep disturbances over time due to the influence of social and emotional factors in their environment. As children move into middle childhood, emerging gender differences in stress response and hormonal change begin to reshape early sleep advantages (15).

Biological and Physical Factors. Several studies have found that newborn boys tend to experience more fragmented sleep and awaken more frequently after falling asleep than girls (16). This pattern suggests a slight

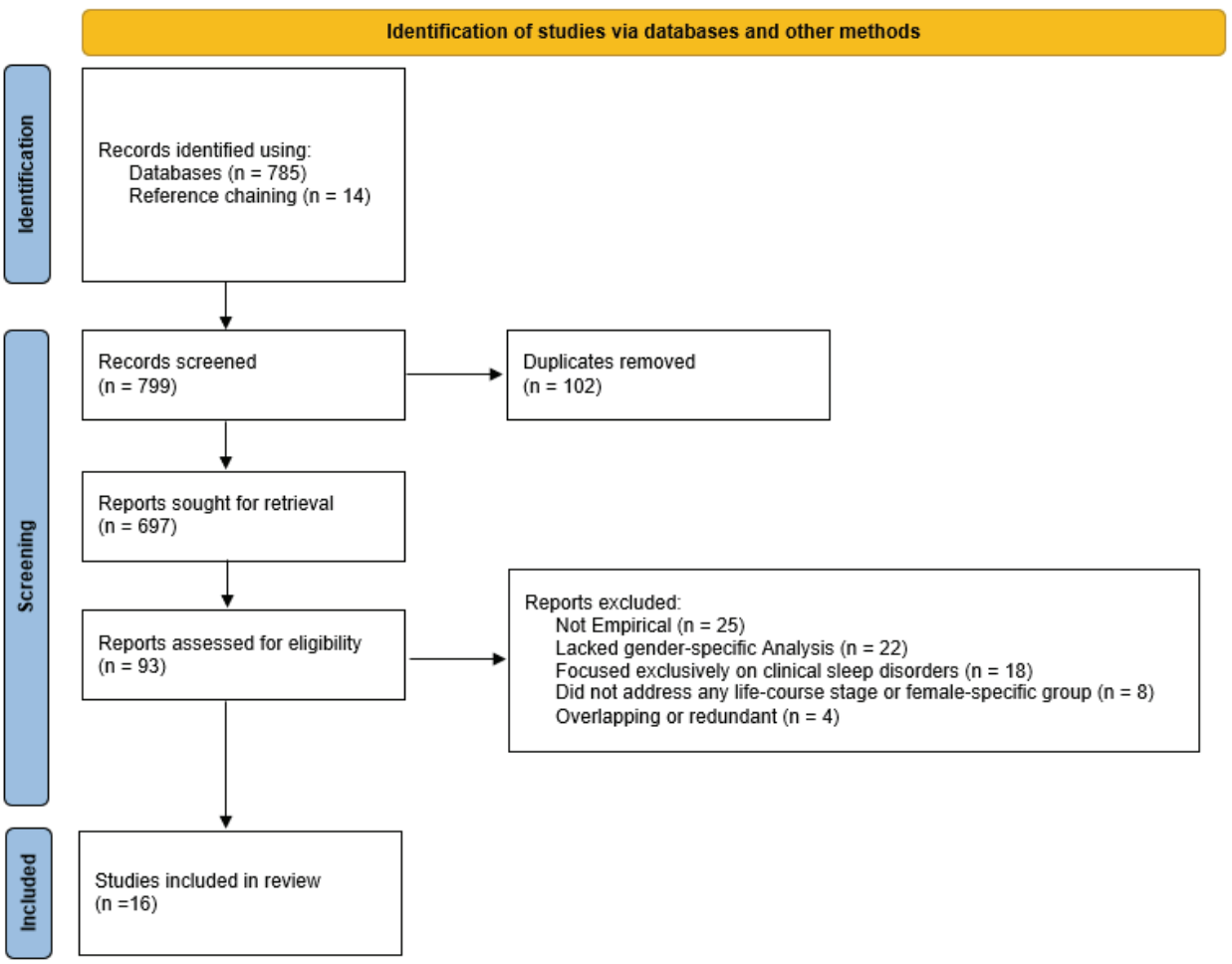

Figure 1. PRISMA-style flow diagram of study Selection for empirical Literature on gendered sleep disparities across the life course.

early advantage for girls. They tend to develop a stronger sleep drive at an earlier age, which supports better sleep regulation during the first years of life. However, this initial advantage becomes more complicated as children grow older. Due to earlier pubertal onset, girls begin to lose deep, slow-wave sleep at a younger age, typically starting around ages 11–12, with a decline of approximately 66% by age 17 (17). As a result, although girls may sleep slightly more than boys during early childhood, they face a more rapid reduction in both sleep duration and quality during later childhood and adolescence. This trend contributes to a greater accumulation of sleep debt over time.

Caregiving and Social Differences. Caregiving practices differ by gender. Mothers, who tend to take on a larger share of nighttime caregiving responsibilities, even in households where both parents are employed, often respond differently to boys and girls (15). Girls are frequently perceived as more emotionally sensitive, while boys are seen as more physically active. As a result, parents may be more likely to respond quickly to girls when they awaken at night, which could unintentionally hinder the development of self-soothing skills. These gendered caregiving patterns may also heighten girls' sensitivity to stress. For instance, a study found that among Latinx immigrant families, girls' sleep was more affected by maternal stress than boys' sleep (18). This suggests that girls may be particularly vulnerable to changes or stressors in the caregiving environment.

Emotional and Developmental Impact. Sleep patterns in early life play a critical role in shaping emotional and social development, with notable differences between boys and girls. Reduced sleep duration in infant girls was associated with a higher likelihood of behavioral problems and traits related to autism spectrum conditions during toddlerhood (15). In contrast, boys who slept for longer periods as infants tended to experience poorer sleep quality and greater difficulties with self-regulation (16). These findings suggest that sleep quality may serve as a more important developmental predictor for girls than for boys (15, 16). Gender differences are also evident in the types of sleep disturbances experienced during childhood. For instance, sleepwalking and night terrors are more frequently reported in boys during early childhood, while girls are more prone to insomnia and anxiety-related sleep issues as they grow older (17). These patterns reflect a combination of biological factors, such as variations in stress hormone levels and neural responses, and social influences that shape children's experiences and reactions to sleep-related difficulties. These early biological differences are magnified by gendered caregiving responses and environmental adversity, creating a feedback loop that disproportionately affects girls' emotional and sleep regulation (18).

Environmental and Social Challenges. Many sleep studies categorize gender in binary terms and often fail to consider the additional influences of socioeconomic status, race, and cultural background. Children from low-income or minority households are more likely to encounter sleep disruptions due to environmental and social stressors, such as household noise, overcrowding, irregular routines, and parental night-shift work (12, 19). When these challenges intersect with gendered patterns of caregiving and emotional development, the consequences for girls' sleep may be especially pronounced. For instance, girls may be more inclined to internalize family stress or become attuned to household tensions, increasing their risk of sleep disturbances (20).

Cumulative Trajectory of Risk and Disadvantage. Despite early advantages in sleep duration and efficiency, girls face a convergence of biological, emotional, and environmental factors that increase their vulnerability to sleep disruption over time. Early pubertal onset, heightened sensitivity to stress, and gendered caregiving expectations contribute to a trajectory of increasing sleep difficulty. These disparities often persist in adolescence and adulthood, with lasting consequences for mental and physical health.

Sleep in Adolescence

Adolescence represents a critical period for brain maturation, identity formation, and increasing autonomy. However, it is also one of the most sleep-deprived and disrupted stages of life. Despite ongoing developmental needs, adolescents require 8–10 hours of sleep per night, yet many fail to meet this recommendation (21). Biological, psychological, and social transitions contribute to reduced sleep duration and quality. Notably, these challenges are not uniformly distributed. Adolescent girls report higher rates of sleep disturbances, insomnia, and emotional distress compared to boys (22). These disparities are influenced by both biological and social mechanisms.

Biological and Neurological Changes. During adolescence, the brain undergoes substantial remodeling, particularly in regions involved in sleep regulation. One prominent change is a significant reduction in slow-wave sleep (SWS) and associated slow-wave activity (SWA), beginning around ages 11–12 and declining by approximately 66% by age 17 (17). These changes correspond with cortical thinning and synaptic pruning, resulting in lighter and more fragmented sleep (18).

REM sleep also decreases in absolute time, although its proportion relative to total sleep remains consistent. Overall sleep duration declines by approximately 14 minutes per year on school nights (23). A large multi-site study reported an average of 8.27 hours of sleep per night among adolescents, which is below the recommended 9.25 hours. Boys averaged 8.33 hours of sleep, while girls averaged 8.20 hours; although this difference was not statistically significant (P = 0.067), it may still result in meaningful cumulative sleep debt for girls over time (22). This gap between ideal and actual sleep reflects a broader misalignment between adolescents' biological rhythms and the demands of school, work, and caregiving responsibilities (24).

Circadian Rhythms and Sleep Timing. A key biological shift during adolescence is the circadian phase delay, often referred to as the "sleep phase delay." This shift reflects delayed melatonin release in the evening, which impairs the ability to fall asleep early. Although all adolescents experience this delay, girls may be more affected due to hormonal fluctuations. Estradiol enhances sleep continuity and REM sleep, while progesterone can disrupt sleep by increasing core body temperature. These effects are most relevant during specific phases of the menstrual cycle, which can cause increased sleep variability (22). This circadian shift emerges earlier in girls due to earlier pubertal onset, but boys ultimately exhibit a stronger preference for later sleep-wake patterns by late adolescence. Despite this, girls tend to awaken earlier on school days (P = 0.01), likely due to obligations such as grooming, caregiving, or household tasks (25). This mismatch increases weekday sleep debt, which many attempt to compensate for on weekends.

Although differences in nighttime wake time between sexes are not statistically significant, girls are more than twice as likely to report falling asleep during their commute home from school (33% vs. 16.7%, P = 0.027), suggesting heightened daytime sleepiness and more fragmented nighttime sleep. When sleep is unrestricted, girls tend to sleep slightly longer and more efficiently than boys, yet they still report more sleep complaints, reduced sleep quality, and greater daytime fatigue (18). Their later wake times combined with unchanged bedtimes further exacerbate misalignment between biological rhythms and social demands. This discrepancy is likely related to earlier reductions in homeostatic sleep pressure during puberty (22). Globally, early school start times conflict with adolescents' delayed circadian rhythms, contributing to chronic sleep restriction. The impact is particularly severe in countries such as the United States and South Korea, where academic pressures and social expectations, especially for high-achieving girls, are intense (24).

Hormonal Influences and Sleep Architecture. Pubertal hormones significantly influence sleep-wake patterns. Estradiol and progesterone, which fluctuate during puberty and menstrual cycles, affect sleep spindles, REM regulation, and thermal balance, thereby shaping sleep quality and continuity (22). Girls' shorter intrinsic circadian cycles and earlier decline in sleep drive further complicate alignment with imposed schedules and hinder sleep initiation, even when sleep duration appears sufficient (24).

Rates of insomnia increase notably in girls during adolescence. While boys are more prone to sleep difficulties in early childhood (ages 4–8), girls aged 12–16 are 2.5 times more likely to report insomnia (25). This gender divergence is not solely hormonal; girls exhibit heightened stress reactivity, elevated cortisol levels, and greater emotional sensitivity, all of which contribute to insomnia risk (18). Supportive family routines, flexible school schedules, and awareness of adolescent mental health needs can act as protective factors that help mitigate these effects.

Research rarely disaggregates data for transgender and nonbinary adolescents, despite likely exposure to gender-related stressors that can disrupt sleep, such as discrimination, identity-related anxiety, or lack of inclusive support systems. Disaggregation is important to understand and address the distinct sleep challenges faced by gender-diverse youth.

Emotional and Mental Health Implications. Psychosocial stressors further compound sleep disturbances in adolescent girls. Pressures related to appearance, academic performance, and interpersonal relationships increase cognitive arousal at night. Girls are more likely to engage in rumination, worry about academic and social matters, and feel responsible for resolving familial or peer-related conflicts. These behaviors delay sleep onset and degrade sleep quality, especially when combined with nighttime technology use. Social media exacerbates these challenges. Girls are generally more frequent users and are more likely to engage in social comparison and seek online validation. This behavior is linked to delayed bedtimes, nocturnal awakenings to check devices, and heightened nighttime alertness. High social media use among girls has been associated with poorer sleep quality and more frequent insomnia symptoms (26). Girls consistently reported shorter and poorer sleep compared to boys, even after controlling for socioeconomic variables (18). Notably, racial and ethnic

minority girls reported the most significant sleep deficits, suggesting that the intersection of gender and race exacerbates vulnerability to sleep-related health issues.

Neuroimaging studies support these findings. While girls exhibited greater slow-wave activity, they also experienced more fragmented sleep and reduced sleep efficiency relative to boys (22). Thus, even when deep sleep is present, it may be more frequently interrupted for girls. Girls also demonstrate greater sensitivity to the emotional consequences of poor sleep. They show elevated cortisol responses to stress and higher rates of depression and anxiety (18). Emotional labor and excessive engagement with social media intensify these outcomes, often initiating a self-perpetuating cycle of sleep disturbance and emotional dysregulation.

Cultural and Environmental Influences. Environmental and familial contexts further shape sleep experiences in adolescent girls. In lower-income households, girls are more likely to engage in household labor or care for siblings, further reducing available sleep time. Early school start times are particularly detrimental for girls with morning responsibilities or caregiving duties. Caregiving burdens disproportionately fall on mothers and older daughters in many households, especially in single-parent and minority families. Girls may assume informal caregiving roles, such as helping with younger siblings or supporting parental needs, which can encroach on sleep time and increase stress levels. Girls more frequently report dissatisfaction with their sleep and greater daytime fatigue. These complaints were linked to lower self-esteem and increased emotional distress (24). Many girls described sleep not as restorative, but as a source of anxiety or a lost opportunity for productivity. These early patterns of disrupted sleep often continue into young adulthood, laying the foundation for sleep-related health disparities later in life, including heightened risks for reproductive health issues, chronic insomnia, and emotional disorders such as anxiety and depression.

Cumulative Trajectory of Risk and Disadvantage. By adolescence, early biological advantages for girls have been overtaken by hormonal volatility, sleep phase delays, and intensified psychosocial stress. Adolescent girls face an emerging convergence of risk: disrupted circadian rhythms, rising insomnia rates, academic pressure, caregiving duties, and emotional labor—all of which interfere with consistent and restorative sleep. These disruptions are not transient. They initiate long-term cycles of sleep deprivation and mood dysregulation that can persist into adulthood. When layered with structural stressors such as racial and economic disadvantage, adolescent sleep loss becomes an early and potent marker of cumulative health risk.

Sleep in Reproductive Years

The reproductive years, generally spanning ages from later teens to the 40s, are characterized by significant biological and social transitions that uniquely influence women's sleep. During this period, sleep is shaped not only by hormonal fluctuations but also by evolving social roles, caregiving responsibilities, and the demands of balancing work and family life. Women are particularly vulnerable to sleep disturbances during this life stage, as biological susceptibilities and external pressures often converge to reduce both sleep quantity and quality.

Hormonal Rhythms and Sleep Across the Menstrual Cycle. One key biological factor during the reproductive years is the menstrual cycle. Estradiol supports sleep stability by enhancing sleep spindle activity, while progesterone facilitates sleep onset but may also disrupt sleep due to thermoregulatory effects. Hormonal fluctuations across the menstrual cycle can affect both sleep quality and memory consolidation (27). Many individuals with regular cycles report worsened sleep in the premenstrual phase due to hormonal withdrawal, contributing to cumulative sleep burden.

Sleep duration generally decreases with age, declining by approximately 3.3 minutes per year between ages 18 and 31. At age 18, women sleep about 11 minutes less than men; however, this pattern reverses by age 28, when women sleep approximately 7 minutes more. This reversal is partly attributed to gender differences in college attendance, employment patterns, and caregiving demands (8, 28). Additionally, women tend to have a slightly shorter endogenous circadian period than men, predisposing them to greater misalignment between internal rhythms and externally imposed schedules, especially under irregular or shift-based work conditions (26).

Pregnancy, Postpartum, and Sleep Architecture. Pregnancy introduces substantial physiological changes that influence sleep architecture. In early pregnancy, elevated progesterone levels often lead to increased sleepiness and longer sleep duration. However, sleep quality typically worsens in later trimesters due to physical discomfort, nocturia, fetal movement, gastroesophageal reflux, and symptoms such as restless leg syndrome. Sleep disruption peaks in the third trimester, when frequent awakenings and difficulty maintaining sleep are most pronounced (6).

Postpartum sleep disturbance is common, particularly

in the first six months when infant care requires repeated nighttime attention. Empirical studies suggest that postpartum sleep loss increases the risk of depressive symptoms, anxiety, cognitive impairments, and persistent sleep difficulties (29). Although breastfeeding benefits infant health, it often contributes to fragmented maternal sleep due to its frequency and unpredictability (6). The effects of estradiol and progesterone, described earlier, continue to influence sleep regulation during this period.

Caregiving, Time Poverty, and the Gendered Division of Labor. Social factors also shape women's sleep throughout the reproductive years. Women continue to bear a disproportionate share of unpaid labor, including household duties, emotional labor, and caregiving for children and elderly relatives. Employed mothers, even those working full-time, obtain significantly less sleep than employed fathers (8). Single mothers, particularly those from marginalized racial and ethnic backgrounds, experience some of the most pronounced sleep deficits due to the combined effects of economic strain, caregiving demands and limited social support. Black and Latina women report shorter and lower-quality sleep compared to White women, with socioeconomic stressors and caregiving intensity as key mediators (19).

Living with children under the age of six reduces sleep by approximately 11.7 minutes per day, while employment or student status is associated with a reduction of about 11 minutes (8). These losses are compounded by the psychological and emotional toll of multitasking and role strain. While cohabitation with a partner is associated with a modest increase in sleep time (around 7.6 minutes), it does not fully offset these burdens. On average, women experience more frequent nocturnal awakenings related to caregiving, contributing to an estimated daily sleep loss of 25 minutes (8).

Workplace Pressures and Cultural Expectations. The workplace demands further exacerbate gendered sleep disparities. Shift work, inflexible hours, and the mental load of dual roles contribute to increased fatigue, insomnia, and sleep variability. Women sleep longer than men on both workdays and leisure days—by approximately 14 and 27 minutes, respectively ($p < 0.002$)—and also report a longer ideal sleep duration, exceeding men's by about 32 minutes ($p < 0.001$). However, actual sleep duration on workdays falls short of these preferences for both genders, with a greater shortfall among women (1 hour 16 minutes) compared to men (57 minutes) ($p < 0.001$). On non-workdays, both groups regain sleep, with women gaining slightly more (1 hour 57 minutes vs. 1 hour 42 minutes) (8).

Sleep timing stability also varies. Weekday sleep onset variability is approximately 1.1 hours, increasing to 1.3 hours on weekends. Sleep offset variability declines until around age 35–39, then plateaus. Although women maintain more consistent weekday bedtimes, they exhibit slightly more variability in weekend sleep timing (8). Cultural expectations around appearance, emotional regulation, and achievement also place additional psychological burdens on women. Young women experiencing high academic and social demands report poorer sleep and greater insomnia than their male peers (26).

These disruptions often compound into midlife, where hormonal decline and continued caregiving responsibilities further intensify sleep challenges.

Cumulative Trajectory of Risk and Disadvantage. Sleep in the reproductive years reflects the full convergence of biological sensitivity and gendered social obligation. Hormonal fluctuations across the menstrual cycle, pregnancy, and postpartum recovery intersect with escalating demands for caregiving and professional labor. Women in this stage often sleep less than men, not due to choice, but because of chronic "time poverty" and role overload. These compounded pressures fragment sleep and increase vulnerability to long-term mental and physical health deterioration. Disparities deepen for single mothers, shift workers, and women of color—groups that face intensified structural barriers. What begins as nightly sleep debt becomes a chronic, embodied consequence of systemic inequality.

Sleep During Menopause and Midlife

Menopause and midlife represent a significant transitional period in women's lives, particularly in relation to sleep health. This stage, typically spanning from the late 40s to early 60s, is shaped by hormonal shifts, biological aging, evolving family responsibilities, and changes in physical and mental health. These overlapping factors often contribute to increased sleep difficulties and instability. Sleep disturbances that may have begun earlier in life frequently intensify during this stage, making midlife one of the most disrupted periods for women's sleep. During midlife, many women undergo menopause, a complex biological and psychosocial transition. The prevalence of sleep disturbances rises sharply during this time, with chronic insomnia affecting up to 61% of women (30). Contributing factors include declines in reproductive hormones, vasomotor symptoms, psychosocial stress, and social inequities such as caregiving burdens and financial insecurity.

Hormonal Changes and Sleep Regulation. Recent

research emphasizes that sex differences in sleep patterns are not solely behavioral but are deeply rooted in biological mechanisms. Fluctuations in gonadal hormones significantly influence sleep architecture and circadian rhythms, leading to distinct sleep patterns between men and women (31). In women, estrogen and progesterone are central to sleep regulation. Estrogen promotes sleep stability by enhancing serotonin production, maintaining thermoregulation, and supporting deep non-REM sleep, while progesterone facilitates relaxation through its interaction with GABA, a calming neurotransmitter. During menopause, the decline of both hormones is associated with difficulty initiating sleep, fragmented sleep architecture, hot flashes, and night sweats (32). These symptoms contribute to chronic sleep deprivation, daytime fatigue, and diminished quality of life. Recent findings show that estradiol suppresses sleep by altering adenosinergic signaling in the basal forebrain, effectively reducing the homeostatic drive for NREM sleep in female animals (33). This may partly explain why midlife women report increased difficulty achieving deep, restorative sleep following hormonal decline. In terms of circadian rhythms, women tend to have slightly later sleep timing than men during early adulthood, but this reverses after age 50 as women begin to experience earlier bed and wake times. This shift, combined with hormonal withdrawal, often exacerbates feelings of fatigue and sleep misalignment in midlife.

Vasomotor Symptoms and Sleep Disturbances. A primary cause of midlife sleep disruption is vasomotor symptoms. These symptoms may occur multiple times per night, causing abrupt awakenings and difficulty returning to sleep. A strong association has been found between the frequency and severity of hot flashes and increased rates of insomnia and sleep dissatisfaction during the perimenopausal period (30). Unpredictable hormonal fluctuations during perimenopause can also lead to irregular menstruation, mood swings, and disrupted sleep quality, particularly among women with a history of emotional vulnerability.

Sleep Disorders During Menopause. In addition to insomnia, midlife women face rising risk of sleep apnea. Although obstructive sleep apnea (OSA) is often associated with men, nearly one-third of postmenopausal women meet diagnostic criteria (34). The decline in progesterone reduces upper airway muscle tone, and midlife weight gain may further elevate OSA risk. However, women's symptoms—insomnia, fatigue, or morning headaches—are often misattributed to aging or mood disorders, delaying diagnosis and treatment (4). This reflects a broader gender bias in sleep medicine, where diagnostic standards and symptom profiles have historically centered on male patterns.

Psychosocial Stress, Mental Health, and Insomnia. Midlife is also marked by heightened psychosocial stress. Women often juggle caregiving for aging parents and dependent children, professional responsibilities, and changing personal relationships. These demands elevate cognitive and emotional arousal, increasing the risk of insomnia. Midlife women with chronic sleep disturbances exhibit higher levels of inflammatory markers such as C-reactive protein and interleukin-6, linking sleep disruption to cardiovascular and mental health risks. Sleep disturbance plays a key mediating role in the relationship between depression and cardiovascular disease, particularly in older women (35). Chronic sleep loss in late life may therefore contribute to multimorbidity via both behavioral and physiological pathways. Anxiety and depression are prevalent during this life stage and often co-occur with sleep problems. The bidirectional relationship is evident: poor sleep worsens mental health, and mood disorders exacerbate sleep disruption (4). Women with preexisting psychological conditions are particularly vulnerable during the menopausal transition.

Social Inequities and Sleep Disparities. Structural inequities further shape sleep health during midlife. Women from marginalized racial, ethnic, and socioeconomic backgrounds often report shorter and lower-quality sleep than their white or higher-income counterparts (19). Chronic stress, healthcare inaccessibility, and cumulative discrimination compound these disparities. Black women, in particular, are more likely to experience early and severe menopausal symptoms yet are less likely to receive appropriate treatment.

Women in shift work or physically demanding jobs face circadian misalignment, sleep fragmentation, and increased health risks. Caregiving obligations—whether for children, ill partners, or aging relatives—often require women to reduce their own sleep. Women frequently sacrifice sleep to meet others' needs, a burden rarely accounted for in clinical settings (8). The consequences of poor sleep in midlife extend beyond fatigue. Sleep loss undermines physical health, emotional well-being, self-esteem, and sexual health, creating a feedback loop of declining quality of life. For many women—especially those working multiple jobs or living under chronic financial strain—sleep is not merely a health outcome but a reflection of broader social injustice. For some women, these midlife sleep challenges do not resolve but evolve into new forms in later life, as aging, health changes, and

role transitions continue to shape sleep in older adulthood.

Cumulative Trajectory of Risk and Disadvantage. Midlife marks a critical inflection point where decades of hormonal, emotional, and caregiving strain coalesce into more persistent sleep disorders. The menopausal transition introduces new physiological challenges, including insomnia, vasomotor symptoms, and sleep apnea—many of which go underdiagnosed in women due to clinical bias. Simultaneously, the "sandwich generation" burden of caring for both children and aging parents amplifies emotional exhaustion and cognitive arousal. Women in this stage often sacrifice sleep to meet others' needs, reinforcing a lifetime pattern of self-neglect. For many, the disruptions of midlife do not resolve but rather entrench earlier disadvantages, solidifying a trajectory of cumulative loss.

Sleep in Older Age (65+)

Older adulthood brings complex changes to sleep, shaped by the biological effects of aging and the cumulative impact of social roles, caregiving histories, economic hardship, and gendered health inequities. For women, these transitions often intensify sleep disruption—while simultaneously reducing access to diagnosis and support. For many older women, poor sleep in late life reflects not only biological aging but decades of accumulated disadvantage—including economic hardship, caregiving stress, and untreated sleep disorders. This section examines how physiological aging, chronic illness, emotional stress, and systemic neglect interact to shape sleep in later life.

Biological Aging, Sleep Architecture, and Cognitive Decline. Normal aging leads to pronounced changes in sleep architecture. Older adults experience reduced total sleep time, diminished slow-wave and REM sleep, longer sleep latency, and more frequent nighttime awakenings. Advanced sleep phase syndrome—marked by earlier bed and wake times—is also common. While these shifts are seen in all older adults, women tend to experience greater sleep fragmentation and spend less time in restorative stages than men (36). These sex differences reflect broader hormonal influences: ovarian hormones shape both sleep architecture and cognitive performance across the lifespan, with their decline in later life compounding sleep vulnerability in older women (31).

These physiological changes are not benign. Sleep quality in older adulthood has a powerful impact on cognitive aging. Both short (<6 hours) and long (>9 hours) sleep durations have been linked to greater risk of memory decline and dementia, even when accounting for depression or comorbid conditions (36). More recent studies underscore that sleep variability—inconsistency in sleep and wake times—is a particularly strong predictor of cognitive impairment in adults over age 65 (37,38). Among women, greater daytime sleepiness and unstable sleep-wake cycles have been associated with more than twice the risk of dementia, revealing a critical but modifiable vulnerability.

Chronic Health Conditions, Pain, and Medication Use. A wide range of chronic illnesses disrupt sleep in older adults. Conditions like arthritis, osteoporosis, cardiovascular disease, and incontinence are more prevalent in women and contribute to frequent nighttime awakenings and reduced sleep quality (39). The relationship between pain and sleep is bidirectional: poor sleep increases pain sensitivity, and chronic pain erodes sleep maintenance, creating a feedback loop of discomfort and fatigue (40).

Sleep in later life is also shaped by polypharmacy. Older women are more likely to be prescribed multiple medications, including diuretics, beta-blockers, corticosteroids, and antidepressants, many of which interfere with sleep (26). Though women are also more likely to receive prescription sleep aids, long-term use carries elevated risks—such as confusion, sedation, falls, and daytime dysfunction. These dangers are particularly acute in physically frail women, yet pharmacological sleep support is often prioritized over non-drug interventions, perpetuating a cycle of overmedication and under-care (24).

Psychosocial Stress, Widowhood, and Role Loss. Older women face substantial psychosocial challenges that impact sleep. Widowhood—more common among women due to longer lifespans and older partners—disrupts daily routines, removes emotional support, and often results in chronic loneliness. This loss of social anchoring has been linked to sleep dissatisfaction, insomnia, and delayed sleep timing. Without the shared structure of partnered life, many women experience declining circadian stability.

The transition into retirement or reduced caregiving roles can also generate a sense of purposelessness, especially for those who derive identity from family care. Women who previously cared for ill spouses continued to report poor sleep even after caregiving ended, suggesting that the emotional labor and physiological toll of caregiving persist long after its formal conclusion (40). These stressors are intensified by structural isolation—including economic precarity, inadequate housing, or lack of transportation—which limits social interaction and narrows access to supportive health services (41).

Underdiagnosis, Gender Bias, and Continued Caregiving. Older women's sleep disorders are often underdiagnosed or misdiagnosed due to enduring gendered assumptions in clinical practice. OSA, for example, becomes more common with age, but its presentation differs by sex: while men often report loud snoring or apneic events, women are more likely to describe insomnia, fatigue, or morning headaches—symptoms easily misattributed to depression or aging (31). These differences contribute to delays in diagnosis and treatment, with older women remaining undiagnosed for years.

Moreover, beyond external barriers, internalized ageism and distress normalization play a role. Many women assume that poor sleep is "just part of aging" or an acceptable cost of lifelong caregiving. This belief reduces help-seeking, even when sleep problems significantly impair functioning (4).

Importantly, caregiving often continues into older age. Many women support adult children, ill spouses, or grandchildren, with minimal assistance or recognition. This ongoing emotional labor often occurs at the expense of their own rest and recovery. The invisible toll of late-life caregiving underscores how gendered expectations persist into older adulthood, deepening sleep inequalities long into the later stages of life.

Cumulative Trajectory of Risk and Disadvantage. In later life, sleep vulnerabilities often culminate in compounded health risks. Biological aging reduces sleep quality and stability, but for older women, these changes are magnified by chronic illness, pain, bereavement, and social isolation. Prior caregiving responsibilities leave physiological and emotional imprints that continue long after duties end. Gendered expectations persist—many women remain caregivers into their 70s and 80s, often with little support. Sleep disorders are frequently misdiagnosed or dismissed as normal aging, reflecting systemic neglect. The result is not only diminished rest, but a legacy of unaddressed disadvantages, as a final reflection of lifelong inequity. Despite the high prevalence and health impact of sleep disturbance in older women, research and policy responses remain limited, highlighting a critical gap in public health planning for ageing populations.

DISCUSSION

Sleep is essential not only for physical and mental health but also as a reflection of broader social structures. Throughout life course, women's ability to achieve restful and restorative sleep is shaped by the complex interplay of biological factors, social roles, and systemic conditions. This review synthesizes findings from 16 research studies to examine how sleep disparities emerge and persist for women, from infancy through older adulthood. The evidence highlights the significant impact of hormonal changes, caregiving responsibilities, social expectations, and structural inequalities, each of which intensifies during critical life stages. Although biological differences in sleep between girls and boys are minimal in infancy, gendered sleep disparities rapidly widen across the life course, shaped more by social conditions than by innate biology. From early childhood, caregiving patterns often differ by gender, with mothers disproportionately responsible for nighttime care and daughters receiving different sleep expectations than sons (20). These early patterns—though subtle—form the foundation for cumulative disadvantage, in which sleep loss becomes increasingly structured by unequal social roles, time burdens, and health risks.

During adolescence, girls begin to experience compounded disruptions due to hormonal changes, academic pressure, and heightened social expectations. These challenges are intensified by factors such as social media use and emotional labor, placing girls at greater risk for insomnia and mood dysregulation than their male peers (26). In the reproductive years, sleep becomes even more vulnerable to disruption—due to menstrual cycles, pregnancy, postpartum changes, and the unequal distribution of caregiving responsibilities. Women frequently juggle full-time employment with nighttime childcare, leading to chronic sleep deprivation during a biologically sensitive period for long-term health (42).

Midlife and menopause represent a critical inflection point, when biological transitions intersect with intensified caregiving for both children and aging parents. Hormonal fluctuations increase the likelihood of insomnia, hot flashes, and sleep apnea—yet the sociocultural expectation to "manage it all" often prevents adequate rest or treatment (31). These stressors rarely abate with age; instead, older adulthood introduces new forms of sleep vulnerability through widowhood, social isolation, chronic illness, and underdiagnosed sleep disorders (40, 41).

Despite these age-specific challenges, a unifying pattern emerges that women's sleep is persistently fragmented not just by biology but by their social positioning—as caregivers, workers, partners, and organizers of emotional and domestic life. Across every life stage, structural forces—rather than individual behaviors—shape sleep access and quality. The result is a deeply gendered trajectory in which temporary disruptions become

chronic, and nightly awakenings reflect far more than the body's rhythms: they echo society's uneven demands. Additional determinants such as race, socioeconomic status, and gender identity also shape sleep outcomes. Women of color often face greater obstacles in accessing safe housing, stable employment, and equitable healthcare. Low-income women, single mothers, and those in shift-based occupations frequently contend with chronic stress and time scarcity, making adequate sleep difficult to attain (43). Furthermore, transgender and nonbinary individuals are largely absent from sleep research, despite likely experiencing significant sleep disruptions due to stigma, discrimination, and inadequate care (4).

Cross-Cutting Factors and Intersectionality. A comprehensive understanding of gender differences in sleep requires attention not only to biological factors but also to the social, economic, and cultural forces that shape sleep patterns across the life course. Gender does not function in isolation; rather, it intersects with other social categories such as race, socioeconomic status (SES), caregiving responsibilities, sexual orientation, and gender identity. These overlapping factors contribute to complex patterns of advantages and disadvantages in sleep health.

The concept of intersectionality, first introduced by legal scholar Kimberlé Crenshaw, provides a valuable framework for examining how multiple social identities interact to create unequal access to resources and increased vulnerability. Applying an intersectional perspective allows us to understand how disparities in sleep accumulate over time, with the most severe consequences often experienced by women facing multiple forms of marginalization (4).

Socioeconomic Status and Time Poverty. Women from lower socioeconomic backgrounds often encounter additional barriers to healthy sleep. These may include night shift work, job instability, overcrowded or unsafe housing, and limited access to health care (19). Lower levels of education and income are also associated with "time poverty," where the demands on a woman's time are so great that basic health needs, including sufficient sleep, are frequently unmet. This issue is particularly pronounced for single mothers, caregivers, and women working multiple jobs (8).

The intersection of low income and gender can create a self-reinforcing cycle of sleep deprivation. Women with fewer financial resources are more likely to experience high-stress conditions such as crowded living environments, irregular work hours, and food insecurity, all of which negatively affect sleep quality. Young adult women experiencing job stress and a lack of control over their time are more likely to report poor sleep quality (26). Financial barriers also influence access to sleep-related treatment. Even when services are available, practical challenges such as transportation, inflexible appointment times, and caregiving responsibilities make it difficult for many women to pursue care. These barriers are seldom addressed in routine clinical practice (4).

Caregiving and Emotional Labor. Women frequently take on most unpaid caregiving duties, which significantly impact their ability to rest. These responsibilities span the life course, from caring for infants to supporting aging family members. Beyond physical caregiving, women often perform emotional labor, managing the emotions, well-being, and interpersonal dynamics of others, which adds to their mental load and further disrupts sleep (40). Women caring for chronically ill spouses experience more nighttime awakenings, reduced total sleep, and lower sleep satisfaction compared to their male counterparts (40). These effects often persist even after caregiving ends, indicating the long-term physiological impact of sustained stress. In dual-parent households, women typically continue to serve as the primary nighttime caregivers, regardless of their employment status, perpetuating unequal sleep opportunities (29). Cultural norms that position women as perpetual caregivers reinforce the idea that self-sacrifice is a moral virtue. This belief discourages women from prioritizing their own rest and often leads to guilt when they attempt to do so. Many women perceive sleep as a luxury rather than a necessity, a perception that can normalize chronic fatigue and discourage help-seeking behavior (4).

Toward a Life Course Framework for Sleep Equity. To fully understand how gendered sleep disparities emerge and persist, it is essential to adopt a life course perspective—one that considers how sleep is shaped over time by biology, social structure, and cumulative stress. While sleep disturbances may appear episodic—worsening during adolescence, postpartum recovery, or menopause—they often represent trajectory-shaping events that initiate long-term health consequences. For women, these disruptions frequently occur during sensitive periods when sleep is both biologically fragile and socially constrained (41). The concept of cumulative disadvantage is particularly relevant to sleep. Seemingly minor sleep losses in early adulthood, if sustained across decades of unpaid caregiving or time poverty, can lead to chronic insomnia, emotional dysregulation, and cardiometabolic decline (36). These disparities rarely correct themselves; they intensify over time, especially for women who face additional marginalizations such as racism, economic

insecurity, or gender-based violence (19).

A life-course lens also draws attention to linked lives: the way one person's well-being is embedded in the well-being of others. Women's sleep is consistently shaped by the needs of children, partners, elders, and employers. These interconnected demands result in sleep patterns that reflect social obligation more than circadian rhythm. Moreover, the intergenerational effects of chronic sleep deprivation—such as stress-related health conditions or modeled sleep behaviors—mean that disrupted rest in one generation can echo into the next (4). Ultimately, sleep is not just a momentary biological state—it is a social process that mirrors inequality, adapts to burden, and accumulates harm across time. Incorporating a life course framework not only helps explain the longitudinal patterning of sleep disparities but also guides more equitable and preventive approaches to women's health.

Advancing an Intersectional Approach. Addressing gender-based disparities in sleep requires that researchers, clinicians, and policymakers adopt an intersectional framework, one that acknowledges the overlapping systems of privilege and disadvantage influencing health outcomes. This approach should inform the development of sleep interventions that are culturally competent, trauma-informed, and accessible to women from marginalized backgrounds. Health systems should prioritize routine screening for sleep disorders, particularly among high-risk groups such as women of color, low-income women, caregivers, and transgender individuals (4). Public health efforts must also work to reduce stigmas around sleep problems, challenge unrealistic societal expectations related to caregiving and productivity, and promote the recognition of sleep as a fundamental human right and a matter of social justice.

Limitations

This review has several limitations that may affect the interpretation and generalizability of its findings. First, the scope of evidence across life stages was uneven, with relatively fewer studies focusing on early childhood and older adulthood. This may lead to an underrepresentation of key mechanisms or disparities during these stages. Second, many studies employed binary frameworks of sex or gender, often conflating the two or failing to account for nonbinary and transgender populations. Although this review aims to explore disparities across the female life course, it is limited by the overwhelming focus on cisgender women in the existing literature. The exclusion of studies specifically addressing transgender and nonbinary individuals represents a significant gap. Without such inclusion, the review cannot fully capture the sleep experiences of all individuals assigned female at birth or those who identify outside the gender binary. Third, the reliance on self-reported sleep data in many studies raises concerns about accuracy, as subjective reports can be shaped by memory, social desirability, and individual perception. While useful, they are less reliable than objective tools such as actigraphy or polysomnography. Finally, most included studies were conducted in high-income countries, particularly the United States and Western Europe. This limits the global relevance of the synthesis, as sleep disparities in low- and middle-income countries may be shaped by different environmental, cultural, or policy contexts that remain underexplored.

Directions for Future Research

To advance sleep equity across the female life course, future research must address both persistent knowledge gaps and emerging questions. First, longitudinal studies are needed to trace how sleep disparities accumulate over time and interact with changing hormonal, social, and structural contexts. Few studies currently follow women from adolescence through older adulthood, making it difficult to disentangle short-term disruptions from long-term trajectories. Second, intersectional approaches must be prioritized. While this paper highlights disparities shaped by gender, most large-scale studies continue to underrepresent women of color, low-income women, and gender-diverse populations. Disaggregated data by race, ethnicity, income, sexual orientation, and gender identity is essential to understand the compounding impact of multiple marginalizations on sleep health. Third, there is a pressing need to study the efficacy and accessibility of non-pharmacological interventions, including cognitive behavioral therapy for insomnia (CBT-I), flexible work and caregiving arrangements, and community-based support systems. Most current sleep interventions do not consider the socioecological factors that constrain women's sleep opportunities, particularly in caregiving-intensive or resource-limited environments. Finally, the field would benefit from incorporating biomarkers of stress and inflammation to better understand the physiological toll of chronic sleep deprivation in women. Integrating qualitative research can also help center women's lived experiences and identify cultural narratives that normalize fatigue and discourage help-seeking. Future research should not only describe disparities but actively inform policies and practices that promote restorative, equitable sleep across all stages of women's lives.

CONCLUSION

Sleep problems in women are shaped by both biological changes and social conditions. Hormonal shifts, caregiving demands, emotional labor, and structural time poverty all contribute to unequal sleep opportunities—especially for women who face compounded disadvantages due to income, race, or gender identity. These disparities are not incidental; they reflect broader systems of care, labor, and access that privilege some bodies over others. Improving sleep health for women will require more than individual-level interventions. Sleep must be recognized as a basic human need and a matter of equity. Inclusive research, trauma-informed healthcare, and structural policy reform are all critical. Sleep equity must be viewed not as a luxury, but as a metric of justice.

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