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REVIEW

Sleep Quality and Its Associated Factors in Older Adults: A Systematic Review of Cross-Sectional Studies

Indah Permata Sari[1,2], Tita Hariyanti[3], Retno Lestari[4], Respati Suryanto Dradjat[5,6]

[1]*Doctoral Program in Medical Science, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia*
[2]*Department of Nursing, Institut Citra Internasional, Bangka Belitung, Indonesia*
[3]*Department of Public Health, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia*
[4]*Department of Nursing, Faculty of Health Sciences, Universitas Brawijaya, Malang, Indonesia*
[5]*Department of Orthopaedics and Traumatology, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia*
[6]*Dr. Saiful Anwar General Hospital, Malang, Indonesia*

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Corresponding Author:
Indah Permata Sari
Doctoral Program in Medical Science, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
E-mail: ndah.nedu@gmail.com

Abstract

Background: Sleep quality is essential for overall health and well-being, particularly in older adults who are at increased risk of sleep disturbances such as insomnia and sleep apnea. Poor sleep is associated with declines in physical, cognitive, and emotional functioning in aging populations. However, existing reviews often focus on single domains, limiting understanding of how multiple factors are jointly associated with sleep quality in older adults.
Purpose: This systematic review aimed to synthesize cross-sectional evidence on factors associated with sleep quality in older adults.
Methods: A systematic search was conducted in PubMed, ScienceDirect, and BioMed Central (BMC) using combinations of the following terms: ("sleep quality" OR "sleep disturbances") AND ("older adults" OR "elderly") AND ("factors" OR "determinants") AND ("cross-sectional"). Articles published between January 2020 and April 2025 were included. The review followed PRISMA 2020 guidelines, and study quality was appraised using the Joanna Briggs Institute (JBI) checklist. Data were synthesized narratively by grouping findings into key domains influencing sleep quality.
Results: Nineteen cross-sectional studies were included. Sleep quality, most commonly measured using the Pittsburgh Sleep Quality Index (PSQI), varied widely across studies (6%–79% poor sleep). The synthesis identified six domains of factors associated with sleep quality: gender-related differences, physiological factors, psychological factors, medical comorbidities, social-environmental conditions, and lifestyle factors. Frequently reported factors associated with poor sleep included female gender, frailty, depression, anxiety, multimorbidity, and low social support. Considerable heterogeneity was observed in study populations and measurement approaches.
Conclusion: Evidence from cross-sectional studies indicates multiple interacting factors are associated with sleep quality in older adults; however, causal relationships cannot be established. Longitudinal research is needed to clarify these associations and support the development of integrated care strategies.

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1. Introduction

Sleep quality is crucial for maintaining overall health and well-being, especially among older adults who often experience a decline in sleep as they age (Xu et al., 2023). Elderly people are more susceptible to sleep disorders such as insomnia, sleep apnea, and restless legs syndrome, which not only affect physical health but also lead to decreased cognitive function and emotional distress (Chen et al., 2023; Shen et al., 2021). Poor sleep can increase the risk of fatigue, worsen chronic conditions, and even reduce life expectancy. Understanding the factors that influence sleep quality in older adults is essential for developing effective interventions, as poor sleep quality is associated with increased frailty and decreased quality of life (Lorber et al., 2023).

From a biological perspective, natural fluctuations in melatonin production, age-related changes in circadian rhythm, and the presence of chronic diseases such as hypertension, diabetes, cardiovascular disease, or chronic pain contribute substantially to sleep disturbances in later life. Pharmacological treatments used to manage these conditions may also produce adverse effects, including insomnia or sleep-disordered breathing, that further impair sleep (Yue et al., 2022; Zhang et al., 2024). In addition to these biological mechanisms, psychological factors are also important. Depression, anxiety, loneliness, and bereavement are prevalent among older adults and closely linked to poor sleep quality. Depression is frequently associated with insomnia, whereas anxiety contributes to difficulty initiating and maintaining sleep (Alfian et al., 2024; Diniari, 2022). These emotional stressors exacerbate sleep disruption and can create a bidirectional worsening between mental health and sleep problems (Kilic et al., 2023).

Moving beyond individual factors, social and environmental determinants also play a critical role. Limited social support, living alone, or institutional residence may alter daily routines and increase feelings of isolation, thereby affecting sleep. Environmental conditions such as noise, lighting, temperature, and bedroom comfort additionally influence sleep quality (Sindi et al., 2020; Yang et al., 2022). Nocturnal behaviors such as frequent nighttime urination can further reduce sleep duration and continuity (Idalino et al., 2023; Okuda et al., 2021). These biological, psychological, social, and environmental influences together underscore the multifactorial nature of sleep problems in older adults and the need for holistic approaches (Sharifi et al., 2022; Vizeshfar & Ghelbash, 2021).

Although sleep disorders in older adults have been widely studied, there is currently limited systematic evidence that comprehensively synthesizes multidimensional factors associated with sleep quality. Existing reviews often examine these domains separately. Some studies focus only on medical conditions, such as chronic diseases or medication use (Santos-Orlandi et al., 2024), whereas others emphasize social aspects, such as support networks or living arrangements, without considering their interaction with health-related factors (Seo & Mattos, 2024). This fragmented approach may overlook how multiple factors jointly relate to sleep quality. To address this gap, this systematic review aimed to synthesize cross-sectional evidence on factors associated with sleep quality among community-dwelling older adults. The guiding research question is: "In community-dwelling older adults, what factors are associated with poor sleep quality as identified in cross-sectional studies?"

2. Methods

2.1. Research design

This study used a systematic review approach to synthesize evidence from cross-sectional studies examining multidimensional factors associated with sleep quality in older adults. This review was not registered in PROSPERO. To ensure clarity, consistency, and transparency, the review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The design of this systematic review was guided by a PECO framework, as outlined in Table 1.

Table 1. Description of PECO

Component	Description
Population	Older adults (>50 years)
Exposure	Factors and determinants
Comparison	Not applicable
Outcome	Sleep quality (measured using tools like PSQI or self-reported sleep assessments)

2.2. Search methods

A comprehensive literature search was conducted between February and April 2025 using three electronic databases: PubMed, ScienceDirect, and BioMed Central (BMC). The search strategy was developed using Boolean operators to combine keywords related to sleep quality, older adults, factors or determinants, and cross-sectional study design. The final search string applied across databases was: ("sleep quality" OR "sleep disturbances") AND ("older adults" OR "elderly") AND ("factors" OR "determinants") AND ("cross-sectional" OR "cross sectional" OR

"cross-sectional study"). Database-specific filters were applied where appropriate to optimize the retrieval of relevant records.

2.3. Inclusion and exclusion criteria

Studies were eligible for inclusion if they employed a cross-sectional design and reported sleep quality as a primary or secondary outcome that could be independently extracted. Included studies focused on older adults (≥50 years) and examined factors associated with sleep quality. Only peer-reviewed articles written in English were considered. Studies were excluded if sleep quality was examined solely as a predictor or risk factor for other outcomes, or if they were editorials, commentaries, case reports, or not focused on the older adult population.

2.4. Screening articles

The review process was conducted by two independent reviewers (I.P.S. and T.H.) to ensure objectivity and minimize the risk of bias. Both reviewers independently screened titles and abstracts of the identified records, removed duplicates, and assessed full-text articles for eligibility. Any discrepancies between reviewers were resolved through discussion and consensus. Following study selection, data were extracted using a structured approach, and the included studies were narratively synthesized to identify patterns, trends, and gaps in the existing literature on factors influencing sleep quality in older adults.

2.5. Data extraction

Data extraction was also performed independently and categorized into key thematic areas: biological, medical, social, and environmental factors. The included studies specifically focused on cross-sectional designs. This design was selected because it allows for a snapshot of sleep quality and its associations with various factors at a specific point in time, providing insight into the prevalence and correlates of sleep disturbances in older populations (Wang & Cheng, 2020). Study selection, data extraction, and qualitative synthesis were undertaken collaboratively by the review team. Initial screening and data extraction were performed by two reviewers (I.P.S. and T.H.), with oversight, methodological input, and verification of extracted data provided by the co-supervisors (R.L. and R.S.D.). Key information extracted from each study included authorship, country of study, total sample size, and a summary of the main findings related to sleep quality and its associated factors. Keywords and core concepts related to sleep quality in older adults were identified through team discussion. The complete data extraction results are presented in the Appendix (Table 2).

2.6. Quality appraisal

The selected articles underwent quality assessment using the Joanna Briggs Institute (JBI) critical appraisal checklist for cross-sectional studies. The JBI checklist was selected as the risk of bias assessment tool because it provided a comprehensive evaluation framework for observational designs, including cross-sectional studies. The checklist consisted of eight key questions, each scored as "yes" (1 point), "no" (0 points), or "unclear/not applicable" (0 points). In addition to overall scores, common sources of bias were qualitatively summarized, including frequent use of convenience sampling, reliance on self-reported sleep measures such as the PSQI, insufficient control for confounding variables, and unclear response rates. To examine the robustness of the findings, a sensitivity analysis was conducted by repeating the synthesis after excluding studies rated as lower quality, allowing assessment of whether the conclusions were dependent on studies with a higher risk of bias (Karim et al., 2023; Munn et al., 2019; Sterne et al., 2016).

2.7. Data analysis

A narrative synthesis approach, as outlined by Popay et al. (2006), was followed, with emphasis placed on the identification and grouping of key factors associated with sleep quality in older adults. Studies were grouped during the synthesis process according to emerging factor domains, measurement tools, population characteristics, and geographic regions to facilitate structured comparisons. Heterogeneity was addressed by comparing study designs, sampling strategies, outcome definitions, and effect estimates across subgroups, and potential sources of heterogeneity were explored narratively. Because of substantial variability in study designs, populations, and measurement tools, meta-analysis was not undertaken. Publication bias was

explored narratively by considering selective reporting of positive findings, language restrictions, and patterns in study characteristics. The robustness of the overall evidence was appraised based on methodological quality, risk of bias, and consistency across studies.

3. Results

3.1. Search outcomes

A total of 8,363 records were identified through database searching, including PubMed (n = 5,259), ScienceDirect (n = 1,549), and BioMed Central (n = 1,555). After removing 2,145 duplicate records prior to screening, 6,218 records remained for further processing. These records were filtered based on publication year, language, and document type, resulting in the exclusion of 4,855 records. Consequently, 1,363 records were screened by title and abstract. During the screening stage, 1,333 records were excluded for the following reasons: irrelevant population (n = 412), sleep quality not identified as the main outcome (n = 368), lack of focus on factors or determinants (n = 297), and non–cross-sectional study design (n = 156). This process resulted in 30 reports being retrieved and assessed for full-text eligibility. At the eligibility stage, 11 full-text articles were excluded because they focused on unrelated health outcomes (n = 5), had inaccessible full text (n = 2), or provided insufficient data for narrative synthesis (n = 4). Ultimately, 19 studies met the inclusion criteria and were included in the final review. The study selection process is illustrated in the PRISMA flow diagram (Figure 1).

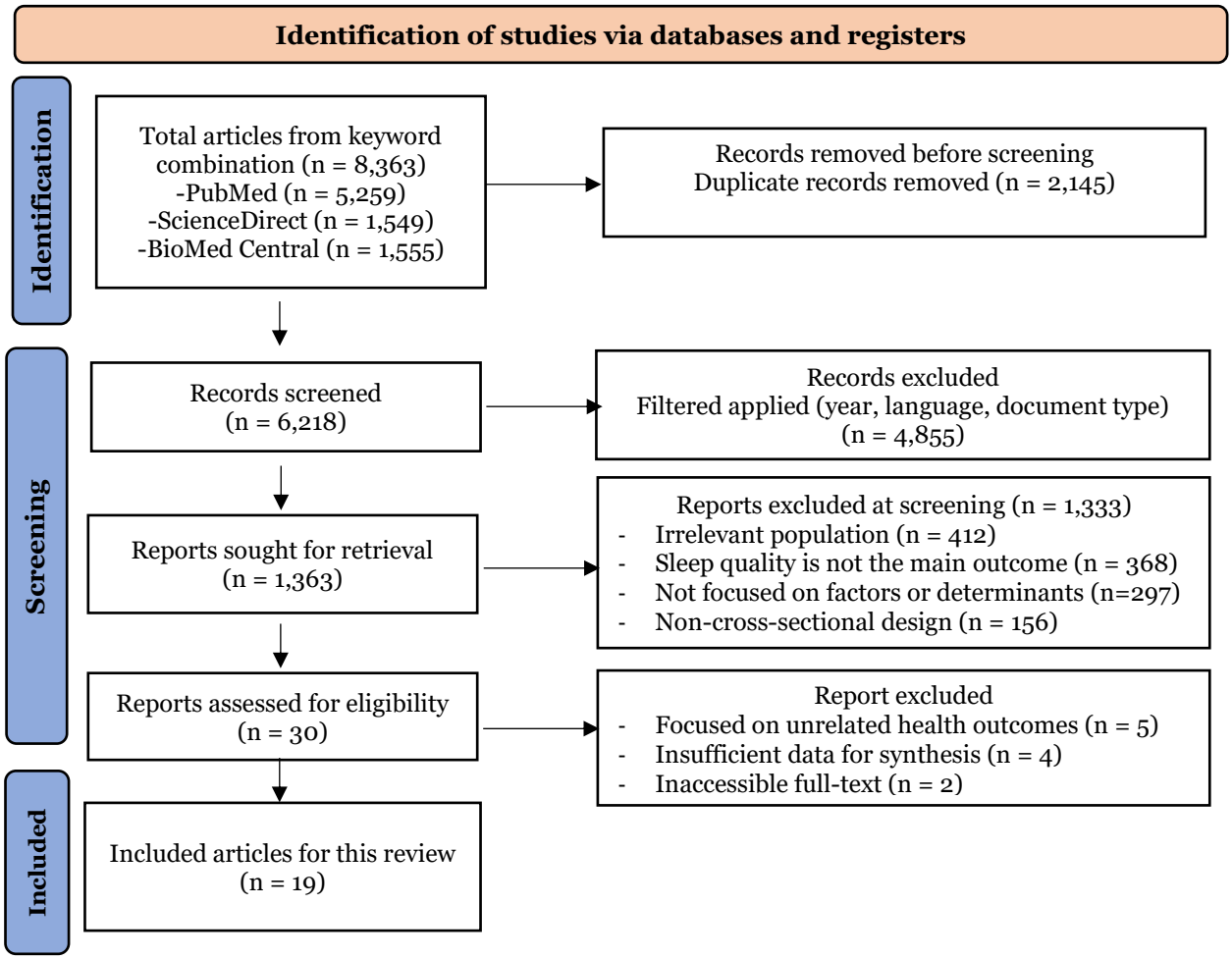

Figure 1. PRISMA 2020 flow diagram of the study selection process

The final review included 19 cross-sectional studies published between 2020 and 2025. Geographically, most studies were conducted in Asia (n = 14), followed by Europe (n = 3), and the United States and South America (n = 1 each). The study populations consisted primarily of

community-dwelling older adults, although some studies involved institutionalized or clinical populations such as hemodialysis patients or individuals with comorbidities. Most studies employed the Pittsburgh Sleep Quality Index (PSQI) as the primary tool to assess sleep quality, allowing for consistent comparison across findings. Sample sizes varied widely, ranging from 59 participants to several thousand participants. Social, medical, psychological, and environmental factors were explored in diverse contexts, with several studies investigating multiple overlapping domains. A detailed summary of each study's characteristics, including authors, country, sample size, target population, sleep assessment tools, and key findings, is presented in Table 2 (see Appendix).

3.2. Quality assessment of included studies

To assess methodological rigor, all included studies were appraised using the Joanna Briggs Institute (JBI) critical appraisal checklist for analytical cross-sectional studies. Most studies met the majority of the appraisal criteria. Three studies scored slightly lower (7 out of 8 items) but were still considered to demonstrate acceptable methodological quality. Overall, all included studies were rated as having moderate to high methodological quality and were deemed suitable for inclusion. Common sources of potential bias included the use of convenience sampling and reliance on self-reported sleep measures. Detailed results of the quality appraisal are presented in the Appendix (Table 3).

3.3. Thematic categorization of findings from included studies

To facilitate a structured synthesis, the included studies were organized into thematic categories derived from the reported focus of each study (Table 4). Through this process, several recurring domains were identified across the literature. These included gender-related differences, with women more frequently reporting poor sleep quality; factors related to physiological functioning, such as frailty, physical decline, and body composition; psychological conditions, including depression, anxiety, stress, and loneliness; the presence of chronic health conditions, such as diabetes, cardiovascular disease, dysphagia, and multimorbidity; and social and environmental influences, including marital status, living arrangements, neighborhood accessibility, and social support. In addition, several studies highlighted lifestyle and protective factors, such as physical activity, nutrition, and social engagement, that were associated with better sleep quality. This thematic organization allowed for the identification of common patterns across studies and provided a framework for examining how diverse factors were reported in relation to sleep quality among older adults.

The synthesis revealed several recurring patterns across studies. Gender-related differences were frequently reported, with women more often experiencing poorer sleep quality than men, alongside variations in mood, cognitive status, and body composition. Factors related to physiological functioning, such as low muscle mass, frailty, reduced handgrip strength, decreased physical function, and differences in body composition, were commonly reported in association with poorer sleep quality. Reports of psychological distress, including depression, anxiety, stress, and aspiration risk, were also frequently observed in relation to adverse sleep outcomes. In addition, the presence of chronic health conditions, including multimorbidity, coronary heart disease, diabetes, dyslipidemia, osteoporosis, and dysphagia, was commonly associated with sleep disturbances. Social and environmental factors, such as loneliness, marital transitions, residential inaccessibility, and unfavorable living environments, were also reported in relation to poorer sleep quality, whereas lifestyle-related factors, including physical activity, nutritional status, social engagement, and nursing or supportive interventions, were more often reported in studies describing better sleep outcomes.

3.4. Multidimensional factors associated with sleep quality in older adults

Following the thematic summary presented in Table 4, this section provides a detailed narrative synthesis of the multidimensional factors associated with sleep quality in older adults, as reported across the included cross-sectional studies.

3.4.1. Sociodemographic factors: Gender-related differences

Among the 19 included studies, gender was consistently reported as a sociodemographic factor associated with sleep quality in older adults (August, 2022; Kohanmoo et al., 2024; Salis et

al., 2024). Most studies indicated a higher prevalence of poor sleep quality among older women compared with men. One study reported that 69.4% of women experienced sleep difficulties, compared with 52.2% of men, and higher rates of depressive symptoms were also observed among women (57.3% vs. 37.7%) (August, 2022). Another study reported that men were less likely than women to experience poor sleep quality (OR 0.48, 95% CI 0.27–0.86) (Salis et al., 2024). Furthermore, Kohanmoo et al. (2024) reported poorer sleep quality among older women, who had higher levels of body fat, whereas men had greater muscle mass, suggesting that differences in body composition may be related to sleep quality. Overall, these studies consistently highlight gender as an important factor associated with sleep quality in older adults.

Table 4. Thematic categorization of included studies based on primary factors influencing sleep quality in older adults

Main Determinants of Sleep Quality	Summary of Findings	Supporting Studies
Gender-related differences	Women were more likely to experience poor sleep than men; possible influences include mood, cognition, and body composition.	(August, 2022; Kohanmoo et al., 2024; Salis et al., 2024)
Physiological factors	Poor sleep quality was associated with low muscle mass, frailty, reduced grip strength, reduced physical function, and body composition differences.	(Kohanmoo et al., 2024; Papadopoulou et al., 2023; Shih et al., 2020; X. Xu et al., 2022; Zhang et al., 2024)
Psychological distress	Depression, anxiety, stress, and aspiration risk were consistently associated with poor sleep quality.	(Hu et al., 2022; Hwang et al., 2022; Matsuda et al., 2023; Salis et al., 2024; Sun et al., 2025)
Medical comorbidities	Sleep disturbances were more common among those with multimorbidity, CHD, diabetes, dyslipidemia, osteoporosis, or dysphagia.	(Hama et al., 2024; Lin et al., 2023; Nuermaimaiti et al., 2024; Wen et al., 2024; X.Xu et al., 2022)
Social and environmental factors	Loneliness, social isolation, marital transitions, residential inaccessibility, and poor living environments contributed to poor sleep.	(August, 2022; Jia & Yuan, 2020; Matsuda et al., 2023; Noguchi et al., 2021; Sun et al., 2025; Watanabe et al., 2020)
Lifestyle and protective factors	Regular physical activity, good nutrition, social engagement, and structured nursing interventions were linked to improved sleep outcomes.	(Hu et al., 2022; Lin et al., 2023; Papadopoulou et al., 2023; Santos-Orlandi et al., 2024)

3.4.2. Physiological factors

Aging is closely associated with a decline in physiological function, which significantly affects sleep quality in older adults. Several studies have highlighted that frailty and reduced physical capacity contribute to sleep disturbances (Shih et al., 2020; X. Xu et al., 2022; Zhang et al., 2024). Shih et al. (2020) examined appendicular skeletal muscle mass and frailty indicators such as grip strength and walking speed, and found that older adults with lower muscle mass and mobility were more likely to report poor sleep quality, with CPSQI scores above 5. The proportion of poor sleepers was notably higher in prefrail or frail individuals, reaching 65.25%, compared to 48.31% in those without frailty ($p < 0.001$). Another study by X. Xu et al. (2022) similarly reported that 79.2% of older participants experienced poor sleep quality, with contributing factors including limitations in activities of daily living and increased frailty. Consistent findings were also reported by Zhang et al. (2024), who demonstrated that frailty was significantly associated with poor sleep quality, with depression mediating this relationship.

Furthermore, physiological differences related to body composition were also relevant. Kohanmoo et al. (2024) reported that women had significantly higher body mass index (B = 1.21, 95% CI: 0.34–2.07), greater body fat percentage (B = 2.75, 95% CI: 1.06–4.45), and increased visceral fat (B = 7.80, 95% CI: 1.73–13.87), while having lower skeletal muscle and fat-free mass percentages compared to men. Better nutritional status was also associated with higher physical activity levels, improved quality of life, and more favorable sleep outcomes (Papadopoulou et al., 2023). Together, these findings indicate that body composition and nutritional status are closely linked to sleep quality among older adults.

3.4.3. Psychological distress

Psychological distress was consistently associated with poor sleep quality among older adults across the included studies. Symptoms of depression, anxiety, stress, and aspiration risk were frequently reported in relation to adverse sleep outcomes. Hwang et al. (2022) found that older adults experiencing anxiety, depressive symptoms, insomnia, or elevated stress were more likely to report disturbed sleep. Similarly, Hu et al. (2022), in a large population-based study, identified depression as a major contributor to sleep disturbances among older adults.

Additional evidence supports these findings across different contexts. Matsuda et al. (2023) reported that increased aspiration risk and depressive tendencies were associated with poorer sleep quality, while Salis et al. (2024) observed that mood and cognitive status influenced sleep quality, particularly among older women. Sun et al. (2025) further demonstrated that depression significantly predicted poor sleep quality and mediated the relationship between adverse living environments and sleep disturbances. Overall, these findings indicate that psychological distress commonly co-occurs with poor sleep quality in older adults across diverse populations.

3.4.4. Medical comorbidities

Chronic health conditions were also frequently identified as contributors to sleep disturbances. Sleep difficulties were more commonly reported in older adults with hypertension, diabetes, dyslipidemia, and coronary heart disease (Lin et al., 2023; Nuermaimaiti et al., 2024). In a large-scale study by Nuermaimaiti et al. (2024), involving 8,205 participants, older adults with multimorbidity had significantly higher odds of experiencing poor sleep quality (OR = 1.27, 95% CI: 1.14–1.41, $p < 0.001$) compared to those without multiple conditions. Osteoporosis was also associated with increased frailty and sleep fragmentation, as reported by X. Xu et al. (2022).

In addition to chronic illness, swallowing difficulties such as dysphagia have emerged as a relevant factor. Hama et al. (2024) observed that among older adults, 28.0% exhibited dysphagia risk and 19.1% reported poor sleep quality. In men, dysphagia was associated with sleep disturbances, while no significant relationship was found among women. Wen et al. (2024) supported this finding by showing that dysphagia was consistently associated with increased risk of poor sleep among older individuals.

3.4.5. Social and environmental factors

Beyond physiological and psychological influences, social and environmental factors were also strongly associated with sleep quality among older adults. Emotional and social conditions, such as loneliness, marital status transitions, employment status, and social support during illness, played an important role in sleep outcomes. Jia and Yuan (2020) found a significant association between loneliness and poor sleep quality, particularly in rural populations. Similarly, Noguchi et al. (2021) reported that older adults with limited social interaction and conversation were more likely to experience poorer sleep quality.

Marital status was also relevant. August (2022) showed that older adults who remained divorced or widowed tended to have better sleep than those who remained married, whereas individuals who entered a new marriage exhibited better sleep quality than those who stayed divorced or widowed. This pattern is also supported by Jia and Yuan (2020), who indicated that a more stable marital status was associated with better sleep quality than being single, divorced, or widowed.

The residential environment further influenced sleep quality. Watanabe et al. (2020) found that living in areas with fewer physical barriers, such as hills and stairs, was associated with better sleep quality, potentially due to improved mobility and increased social interaction. On the other hand, Sun et al. (2025) reported that the living environment negatively affected sleep quality, with depression acting as a significant mediator. Interpersonal communication was also important; studies by Noguchi et al. (2021) and Matsuda et al. (2023) reported that older adults with limited conversation and social interaction had higher PSQI scores, indicating poorer sleep, while frequent engagement was associated with better outcomes.

3.4.6. Lifestyle and protective factors affecting sleep quality

Lifestyle-related factors emerged as important protective elements across several studies. Regular physical activity was consistently associated with better sleep quality, either directly or through its role in reducing depressive symptoms and improving overall physical functioning (Hu

et al., 2022; Lin et al., 2023; Papadopoulou et al., 2023; Santos-Orlandi et al., 2024). Nutritional status was also relevant, with better nutrition linked to higher physical activity levels, improved quality of life, and more favorable sleep outcomes (Papadopoulou et al., 2023). In addition, Santos-Orlandi et al. (2024) reported that stress and polypharmacy increased the likelihood of poor sleep, whereas physical activity reduced this risk among older adults. These findings suggest that an active lifestyle, supported by adequate nutrition and social engagement, may play a protective role in sleep quality among older adults.

3.5. Assessment of the robustness of the synthesis

This review synthesized 19 cross-sectional studies exploring the multifaceted factors influencing sleep quality in older adults. Poor sleep was consistently associated with physiological decline, psychological distress, medical comorbidities, and social-environmental factors. Although the reliance on self-reported measures and cross-sectional designs limits causal conclusions, the consistency of findings across diverse contexts strengthens the credibility of the synthesis. In conclusion, sleep quality in older adults is shaped by interconnected physical, emotional, and social factors. Comprehensive, multidomain interventions are needed to improve sleep health, and future research should employ longitudinal and interventional designs to clarify causal pathways and inform effective policy and practice.

4. Discussion

This study was conducted to synthesize evidence on the determinants of sleep quality in older adults by examining a broad range of factors reported across existing cross-sectional research. The results indicated that sleep quality in this population is shaped by a complex and interconnected set of influences, including physiological changes related to aging and psychological conditions such as depression and anxiety. One of the most notable physiological changes is the age-related decline in melatonin production, a hormone critical for regulating the sleep–wake cycle. It has been demonstrated that diminished melatonin levels contribute to increased sleep fragmentation and difficulty maintaining restorative sleep (Nous et al., 2021; Pacheco et al., 2017; Tan & Hardeland, 2021; Z. Xie et al., 2017). These biological disruptions are further supported by the presence of chronic conditions such as pain, diabetes, and cardiovascular disease, through which sleep patterns are frequently interrupted, and sleep efficiency is reduced in older adults (Reiter et al., 2023; Serra et al., 2020).

Psychological distress has also been identified as a major contributor to sleep problems in this population. Depression, anxiety, and feelings of loneliness are commonly reported and are closely tied to insomnia or non-restorative sleep (Alsulami et al., 2019; Bella et al., 2023; Kamali Zarch & Sorbi, 2020; Mahyuvi et al., 2021). These emotional conditions are often found to coexist with chronic illness, leading to a cycle in which poor physical health is associated with worsening mental health, which in turn further degrades sleep quality. In this way, psychological burden and physiological vulnerability are understood to compound one another.

This review also showed that medical comorbidities and multimorbidity emerged as central factors influencing sleep quality among older adults. The findings indicated that sleep quality in this population is shaped by medical comorbidities and multimorbidity, which rarely lead to sleep problems through a single cause. Instead, sleep difficulties are understood to emerge from overlapping biopsychosocial processes that collectively affect sleep patterns and overall well-being. Chronic diseases such as diabetes, cardiovascular disease, chronic pain, dyslipidemia, osteoporosis, and dysphagia were frequently associated with disrupted sleep across the included studies. Medication use among the elderly was also shown to add another dimension to this problem. Common prescriptions such as diuretics and antidepressants have been reported to interfere with sleep architecture. Nocturia may be caused by diuretics, whereas some antidepressants have been observed to induce daytime sleepiness or disrupt natural circadian rhythms (Borentain et al., 2021; Carpenter et al., 2022; Di Nicola et al., 2023; Kwaśny et al., 2023). These pharmacological factors, although necessary for managing comorbid conditions, may inadvertently compromise sleep health. However, because the available evidence is derived from cross-sectional designs, the direction of these associations cannot be determined, and causal interpretations cannot be made.

Lifestyle-related factors have also been shown to mediate sleep outcomes among older adults. Regular physical activity has been associated with better circadian regulation and improved sleep

(Chin et al., 2022; Solis-Navarro et al., 2023; Tseng et al., 2020). In contrast, the performance of strenuous activity close to bedtime or the consumption of caffeine and heavy meals has been reported to delay sleep onset and reduce sleep quality (Gothe et al., 2020; Seol et al., 2021; Vanderlinden et al., 2020; Y. Xie et al., 2021). These behavioral aspects are considered modifiable and are therefore viewed as promising targets for strategies to improve sleep among older adults.

Environmental conditions, particularly lighting, temperature, and noise, have also been found to affect sleep outcomes. Bright light exposure, especially from screens, has been shown to suppress melatonin production and delay sleep timing (Najjar et al., 2023; Prayag et al., 2019). High noise levels and inappropriate room temperatures have likewise been reported to disturb sleep continuity, especially in urban or densely populated environments (Delaney et al., 2018; Delbari et al., 2024; Lan et al., 2019; Thichumpa et al., 2018).

Furthermore, social context has also been identified as playing a critical role in either buffering or exacerbating sleep problems. Social transitions such as retirement or spousal loss are frequently associated with loneliness and depression, through which poor sleep quality may be experienced (Grey et al., 2020; Griffin et al., 2020). Conversely, positive social engagement has been shown to provide emotional reassurance that promotes better sleep (Budiman et al., 2021). Social support networks have been reported to protect against loneliness and mental health decline, which in turn improves sleep (Kafková, 2023; Sya'diyah et al., 2020).

5. Implications and limitations

Taken together, the findings of this review indicate that sleep quality in older adults is shaped not by aging alone but by dynamic interactions across physiological, psychological, medical, lifestyle, social, and environmental domains. These associations suggest that sleep problems in later life are unlikely to arise from a single factor; rather, they reflect overlapping biopsychosocial processes. From a clinical perspective, these findings provide meaningful implications for geriatric nursing practice. The review highlights the importance of adopting a comprehensive, person-centered approach to managing sleep disturbances in older adults by acknowledging the interplay between medical conditions and social influences. Nurses play a vital role in assessing, monitoring, and addressing sleep-related challenges across various care settings. A deeper understanding of comorbidities, medication effects, psychological health, and social circumstances can inform more effective and individualized interventions. Integrating routine sleep assessments into clinical practice may facilitate early identification of risk factors and support the implementation of personalized strategies, such as optimizing medication schedules, encouraging relaxation techniques, and enhancing social support. In addition, creating sleep-conducive environments in healthcare and long-term care settings through noise reduction, appropriate lighting, and attention to physical comfort may substantially improve sleep quality among older adults.

Despite these important implications, several limitations should be acknowledged. First, the reliance on cross-sectional study designs restricts causal inference, and therefore, the observed relationships should be interpreted as associations rather than causal pathways. Second, most included studies relied on self-reported sleep instruments, predominantly the Pittsburgh Sleep Quality Index (PSQI), while objective measures such as actigraphy or polysomnography were largely absent, potentially introducing recall or reporting bias. Third, publication bias and database selection bias may have occurred, as only peer-reviewed articles published in English were included. Fourth, a substantial proportion of the included studies were conducted in Asian countries, which may limit geographical representativeness and generalizability to other regions. Fifth, many studies were conducted during or shortly after the COVID-19 pandemic, a period characterized by lifestyle disruption and heightened psychosocial stress, which may have influenced sleep patterns in ways that could not be fully disentangled from other determinants. Finally, considerable heterogeneity in study populations, settings, measurement tools, and analytical approaches limited comparability across studies and precluded quantitative synthesis.

6. Conclusion

This systematic review highlights the multifactorial nature of sleep quality among older adults, as reflected in the wide range of factors reported across cross-sectional studies. Sleep quality was associated with a combination of health-related conditions, functional characteristics, and social and environmental contexts, rather than being shaped by any single factor in isolation.

These factors often co-occur and interact within the broader context of aging, underscoring the complexity of sleep quality in later life. Given the cross-sectional design of the included studies, the observed relationships should be interpreted as associations rather than causal pathways. Future research would benefit from longitudinal and integrative approaches to further explore how multiple factors jointly relate to sleep quality and overall well-being among older adults.

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Author contribution

IPS: Conceptualization, screening, and analysis of the articles, manuscript preparation, data interpretation, visualization; TH: Supervision, analysis of articles; RL: Supervision, analysis of articles; RSD: Supervision, analysis of articles.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of use of AI in scientific writing

The authors declare that no generative artificial intelligence (AI) tools were used in the writing, analysis, or interpretation of this manuscript. All content, including the literature search, screening, data extraction, synthesis, and interpretation, was conducted solely by the authors without assistance from AI-based writing or language generation tools.

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Appendix

Table 2. Summary of characteristics of included studies

Authors	Country	Total Samples	Summary of Findings	Quality Score
(Shih et al., 2020)	Taiwan	828 older adults (50-65 years), 28.63% male and 71.37% female	Poor sleep quality was more common among participants with low muscle mass, slower gait speed, reduced handgrip strength, female sex, lower educational levels, and comorbidities such as hypertension and diabetes mellitus.	8
(Nuermaimaiti et al., 2024)	China	8,205 older adults with or without multimorbidity, 46.4% male and 53.4% female	Participants with multimorbidity had higher PSQI scores and a greater prevalence of poor sleep quality (50.6%) than those without multimorbidity.	8
(Hwang et al., 2022)	South Korea	217 older adults, 48.7% male and 51.3% female	Poor sleep quality was reported by 12.5% of older adults and was associated with conditions such as hypertension, insomnia, anxiety, and depression.	8
(Hama et al., 2024)	Japan	3,058 older adults, 53.42% male and 46.58% female	Among 3,058 adults aged ⩾60 years, 28.0% were at risk of dysphagia and 19.1% reported poor sleep quality; dysphagia was associated with poor and irregular sleep among men but not among women.	8
(X. Xu et al., 2022)	China	231 elderly osteoporosis patients, 37.7% male and 62.3% female	Poor sleep quality (PSQI >7) was observed in 79.2% of patients, with frailty associated with female sex, pain, polypharmacy, activities of daily living, and sleep quality, while sleep quality was linked to comorbidity, activities of daily living, and frailty.	8
(Hu et al., 2022)	United Kingdom	51,551 older adults, 49.55% male and 50.45% female	Poor sleep quality and duration were associated with worse health-related quality of life among older adults in the United Kingdom, while physical activity mitigated the impact of depression and sleep disorders.	8
(Zhang et al., 2024)	China	1,866 older adults, 33.2% male and 66.8% female	Frailty affected 4.1% of older adults, and 31.0% were pre-frail; frailty was associated with sleep quality and depression, with sleep quality significantly predicting frailty and depression mediating this relationship (60.4%).	8
(Salis et al., 2024)	Italy	226 older adults, 30.5% male and 69.5% female	Among 226 older adults (69.5% women), 64.2% reported poor sleep quality; men were less likely than women to experience poor sleep quality, with sex differences influenced by cognitive status and mood.	7
(Papadopoulou et al., 2023)	Greece	3,045 older adults, 51.4% male and 48.6% female	Better nutritional status was linked to higher physical activity, better quality of life, and improved sleep quality. There is a connection between good nutrition, quality sleep, an active lifestyle, and well-being.	8

Table 2. Continued

Authors	Country	Total Samples	Summary of Findings	Quality Score
(Kohanmoo et al., 2024)	Iran	305 older adults without major disease, 30.16% male and 69.84% female	Poor sleep quality and overweight/obesity were more prevalent among women than men, with women showing worse PSQI scores and higher adiposity, while men had greater skeletal muscle and fat-free mass, suggesting sex-related differences in sleep quality.	8
(Santos-Orlandi et al., 2024)	Brazil	59 older adults, 47.5% male and 52.5% female	Most participants were women, aged 60-74 years, and experienced poor sleep quality. Stress and polypharmacy increased the likelihood of poor sleep quality, while physical activity reduced this risk.	8
(Lin et al., 2023)	China	678 older adults with CHD	Coronary heart disease was associated with poorer sleep quality, while regular exercise and normal sleep onset latency were linked to better sleep quality and a lower CHD risk.	8
(Matsuda et al., 2023)	Japan	500 older adults, 50% male and 50% female	Poor sleep quality was associated with higher disease burden, greater aspiration risk, depressive tendency, and reduced social interaction, while age and illness type showed no significant differences between sleep quality groups.	8
(August, 2022)	United States	2,872 older adults, 36.29% male and 63.71 female	Sleep quality varied by marital status and sex, with poorer sleep among women and those in romantic relationships, while individuals who remained or became widowed reported better sleep quality, and those who became divorced experienced worse sleep quality.	8
(Noguchi et al., 2021)	Japan	300 older adults, 51% female	Social frailty was associated with poor sleep quality, particularly limited daily social interaction, highlighting the importance of strong social relationships for better sleep.	8
(Jia & Yuan, 2020)	China	1,658 older adults	Poor sleep quality was still associated with loneliness in the older rural population.	8
(Watanabe et al., 2020)	Japan	16,650 older adults, 48.65% male and 51.35% female	Better sleep quality was associated with accessible and welcoming environments, whereas poor sleep quality was linked to living alone, low income, and unemployment.	6
(Sun et al., 2025)	China	6,144 older adults, 45.5% male and 54.5% female	Poor living environments were associated with worse sleep quality, with depression positively predicting sleep problems and mediating the relationship between living environment and sleep quality.	8
(Wen et al., 2024)	China	3,356 older adults	Poor sleep quality affected 30.8% of participants and was more likely among older adults with dysphagia and loneliness, particularly when both were present.	7

Table 3. Quality of the included cross-sectional studies

Authors	Were the criteria for inclusion in the sample clearly defined?	Were the study subjects and the setting described in detail?	Was the exposure measured in a valid and reliable way?	Were objective, standard criteria used for measurement of the condition?	Were confounding factors identified?	Were strategies to deal with confounding factors stated?	Were the outcomes measured in a valid and reliable way?	Was an appropriate statistical analysis used?
(Shih et al., 2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Nuermaimaiti et al., 2024)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Hwang et al., 2022)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Hama et al., 2024)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Xu et al., 2022)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Hu et al., 2022)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Zhang et al., 2024)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Salis et al., 2024)	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes
(Papadopoulou et al., 2023)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Kohanmoo et al., 2024)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Santos-Orlandi et al., 2024)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Lin et al., 2023)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Matsuda et al., 2023)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(August, 2022)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Noguchi et al., 2021)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Jia & Yuan, 2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Watanabe et al., 2020)	Yes	Yes	Yes	Yes	No	No	Yes	Yes
(Sun et al., 2025)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Wen et al., 2024)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes