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REVIEW ARTICLE

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The existing state of knowledge about sleep health in community-dwelling older persons – a scoping review

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ABSTRACT

Objectives: It is widely known that sleep disorders are a common problem among older persons. Few reviews have described current knowledge about the holistic concept of sleep health of community-dwelling older people.

Aim: This study aimed to describe the current state of knowledge and identify research gaps concerning sleep health among community-dwelling older persons.

Method: We conducted a scoping review. Searches were conducted in three databases (Medline, CINAHL, and PsycINFO) to identify scientific articles including outcomes with all five sleep health dimensions (sleep duration, sleep continuity, timing, wakefulness/daytime sleepiness, and sleep quality) among community-dwelling older persons aged ≥65 years. Eight articles were included from a total of 1826 hits, with sample sizes between 1413 and 6485.

Results: The sleep health outcomes of community-dwelling older adults differed between the sexes. Older persons with at least two or more poor sleep health dimensions might have increased risk for depression, higher healthcare costs and mortality, while self-reported better sleep health might be associated with lower odds of frailty.

Conclusion: Future research is needed to confirm the findings by investigating the multidimensional concept of sleep health in a general older population. The identified knowledge gaps are how persons ≥80 years' experience their sleep health, and how sleep medicine is prescribed to treat sleep problems in persons ≥80 years in different care contexts.

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Introduction

About half of the people in Sweden over the age of 65 report having trouble sleeping, and eight percent report severe sleep problems [1]. Common sleep disorders among older adults are insomnia, sleep apnea, and other forms of circadian rhythm disturbances, but insomnia is the most common sleep disorder among older people [2]. Older adults often have age-related chronic diseases (cardiovascular disease, cancer, pain, diabetes, obstructive pulmonary disease, and kidney disease), and concomitant sleep disorders can increase the risk of disease deterioration and the need for frequent healthcare visits [3]. Sleep disorders can also increase the risk of impaired cognitive function and development of dementia [4]. Previous research on older persons' sleep situations often focuses on the outcomes of a specific sleep disorder (i.e. insomnia or sleep apnea) or a single sleep characteristic (i.e. sleep efficacy, total sleep time, or daytime impairments) in relation to a specific health issue [5, 6]. However, sleep needs to be investigated using a holistic approach, considering the 24-h sleep/wake cycle. This approach is possible using the concept of sleep health, which is a multidimensional pattern (physical, mental, and neuropsychological) of sleep and wakefulness adapted to

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individual, social, and environmental requirements to promote physical and mental well-being [7]. Sleep health is based on five measurable dimensions: *Sleep duration* (the total amount of sleep over 24 h), *sleep continuity* (sustained sleep), *timing* (time of sleep), *wakefulness/daytime sleepiness* (attention/wakefulness during daytime), and *sleep quality* (the experience of good or bad sleep) [7]. Sleep health also makes it possible to focus on health promotion and preventive activities (healthy diet, participation in physical activity, avoidance of nicotine, healthy sleep, healthy weight, and healthy levels of blood lipids, glucose, and pressure) [8]. Therefore, when investigating sleep among older persons, the multidimensional patterns of the sleep health concept can offer a more holistic and individualized sleep measure. The use of the sleep health concept also makes it possible to provide a deeper understanding of the relationship between good or poor sleep and specific health outcome variables. However, there are few or no reviews describing the current knowledge about the concept of sleep health in community-dwelling older persons. Therefore, the aim of this review is to describe the current state of knowledge about sleep health in older people, identify possible research gaps, and reveal future research needs on the topic of older persons' sleep health.

Method

Design

This study followed the principles of a scoping review described by [9]. Scoping reviews are used to identify and map the available evidence of a particular field of research and can also be used to identify research gaps, summarize, and spread research findings on a specific research topic [9].

Search strategy

The database search strategies were thoroughly planned by a librarian from Jönköping University with extensive knowledge of the area. After several test searches, a final search was performed in November 2022 using databases Medline, CINAHL, and PsycINFO (Table 1). A proximity operator (N3, N/3 or NEAR) was used for 'sleep' and 'health' to find article titles that limit the number of words between them. Boolean search terms (AND, OR) and truncation symbols were used (Table 1). Keywords were selected to be mentioned in the title (TI) or abstract (AB).

Table 1. Example of the search combination made in the database Medline.

Combinations	Search keywords
#1	TI sleep N3 health
#2	AB sleep N3 health
#3	S1 OR S2
#4	TI elderly or older or ag#ing or aged or 'older men' or 'older women'
#5	AB elderly or older or ag#ing or aged or 'older men' or 'older women'
#6	3 OR 4
#7	6 AND 3

Study selection

The inclusion criteria were studies that included all five sleep health dimension outcomes (i.e. sleep duration, sleep continuity, timing, wakefulness/daytime sleepiness, and sleep quality), with qualitative, quantitative, mixed, or multimethod designs. There were no limitations to the publication time. The publication forms were English or Swedish language and abstracts with full text. The participants included in the studies were community-dwelling older persons aged 65 years or older with or without specific diagnoses. The exclusion criteria were intervention studies, conference abstracts, editorials, letters to the editor, home care facilities or hospital environment, and individual sleep characteristic outcomes. The study selection results from the databases were exported to the review website Rayyan, which helps researchers organize, share, manage, and preserve systematic reviews [10]. The study selection process is illustrated in Figure 1. In the first step, the first author (SÖ) removed all duplicates, and then the first and second authors (CS) conducted a blinded review of the remaining titles and abstracts. In the second step, the two authors discussed the results of the blinded review to agree on studies that had been assessed differently. Articles that met the inclusion criteria were read in full text, and additional studies were excluded (i.e. wrong outcome, wrong population, wrong study design, and/or foreign language). A manual search was performed to identify articles that were missing in the database search by examining the reference lists of the included articles. In addition, a hand search was made in the database web of science, using the names of leading sleep health researchers. A manual search did not lead to any additional studies.

Analysis

The study selection process ended in May 2023, resulting in eight articles that matched the inclusion criteria for sleep health in community-dwelling persons aged >65 years. The origin of the articles, as well as their aim, method, population, instrument, and a brief summary

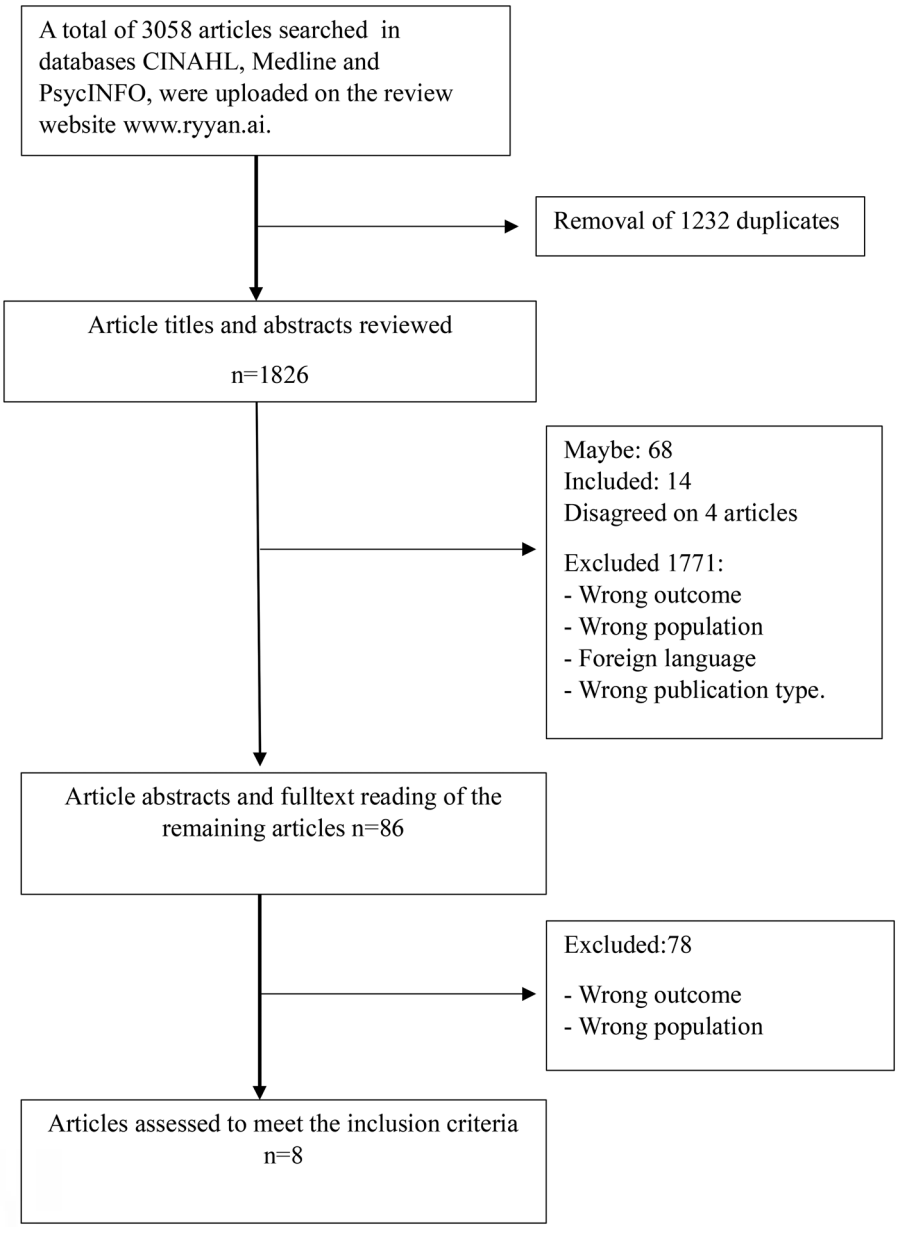

Figure 1. Flowchart of the study selection process.

of the results, were charted to provide an overview of the study results, which formed the basis of the data analysis (Table 2). After repeated reading of the articles, the most relevant data in line with the study aim were extracted and charted to find similarities and differences to create a synthesized report of sleep health status in community-dwelling older adults.

Results

The eight included articles originated in Taiwan and the USA (Table 2). Seven studies were retrospective and were extracted from a female and/or male osteoporosis registry from 1998 to 2004 [12–18]. The study population in the eight studies ranged from 1413 to 6485 community-dwelling older adults, and the mean age was between 76 and 83.6 years. One study measured sleep health dimensions using the Sleep Health Questionnaire SATED. Seven of the studies [12–18] measured sleep health using a combination of self-reported or objective sleep instruments to match the sleep health dimension outcome: the Epworth sleepiness scale, self-reported questions following the sleep health dimensions, SOF sleep questionnaires, Pittsburgh Sleep Quality Index (PSQI), or wristwatch actigraphy (Table 2). The outcome for good or poor sleep health was determined in one study as a composite score between 0 and 5, where higher scores

Table 2. Charted overview of the included scientific articles.

Nr	Authors and title	Aim	Method	Sample	Instrument	Findings
1	Chen., T-Y., Lee, S., Buxton, M. [11] Sleep health Multidimensional sleep health is associated with physical frailty in a national sample of Taiwanese community-dwelling older adults: sex matters	To investigate the association of a multidimensional measure of sleep health with frailty both across and within sex groups	Quantitative Secondary data (2011) from the Longitudinal study on aging (TLSA)	2015 Community-dwelling older adults >65 years of age, mean age was not presented.	Self-reported surveys – *Frailty* – (weight loss, exhaustion, low physical activity, slowness, weakness). *Sleep health* survey – SATED (sleep satisfaction, daytime alertness, sleep timing, sleep efficiency and sleep duration)	Better sleep health was significantly associated with lower odds of frailty, adjusted for sociodemographic characteristics and health risk factors. Daytime alertness was significantly associated with frailty in the whole sample and older women, but not older men after adjustment for socio demographics and health characteristics.
2	Schousboe J.T, Allyson M. Kats, Katie L. Stone, Lisa Langsetmo, Tien N Vo, Terri L Blackwell, Daniel J Buysse, Sonia Ancoli-Israel, Kristine E Ensrud [12] *Sleep* Self-reported poor sleep on multiple dimensions is associated with higher total health care costs in older men	To estimate the association of impaired multidimensional sleep health with subsequent health care costs and utilization in community-dwelling older men	Quantitative analytic cohort study osteoporotic fractures in men study enrolled in outcomes of sleep disorder (MrOS Sleep)	1413 Community-dwelling male participants >65 years participated in the MrOS study between 2002 – 2003 mean age 76.5 years of age.	Self-reported sleep health questions – sleep duration, sleep duration satisfaction, sleep time regularity (going to bed and awake time), the time for sleep latency. Epworth sleepiness scale (daytime sleepiness). Lifestyle and health demographics. 3 years healthcare costs (hospital stays, nursing facilities, rehabilitation, outpatient and home healthcare.	Poor sleep satisfaction and excessive daytime sleepiness had the strongest association with higher healthcare costs, followed by short or long sleep duration and longer sleep latency. When men who died during the three years were excluded, the association of poor sleep health and health care costs were no longer significant.
3	Kristine E Ensrud, Allyson M. Kats, John T Schousboe, Lisa Langsetmo, Tien N. Vo, Terri L. Blackwell, Daniel J. Buysse, Sonia Ancoli-Israel, Katie L. Stone [13] *Sleep* Multidimensional sleep health and subsequent health-care costs and utilization in older women	Determine the association of poor multidimensional sleep health with health-care costs and utilization	Prospective cohort study from patients enrolled in study of osteoporotic fractures (SOF)	1459 Community-dwelling older women >65 years of age participated in the SOF study between 2002 and 2004. Mean age 83.6 years of age.	Questions following the sleep health dimensions (sleep duration, sleep duration satisfaction, sleep latency, time for bed and time arises) Epworth sleepiness Scale (daytime sleepiness). Mid-time sleep. Healthcare costs of 36 months. Acute hospital stays, inpatient rehab, outpatient care, home health care. Lifestyle and diagnosis demographics as well as IADL status	Total healthcare costs were higher among women with three to five SH impairments (15,332 dollars) compared to women without SH impairment (10,745 dollars). 14.8% of those with three to five SH impairments had healthcare costs over 30,000 dollars for 36 months. Poor SH is not independently a predictor of hospitalization.
4	Lee, Soomi; Stone, Katie L; Engeland, Christopher G; Lane, Nancy E; Buxton, Orfeu M [14], USA *Arthritis care and research* Arthritis, sleep health and systemic inflammation in older men	To examine the associations of prevalent arthritis with systemic inflammation in older men and to test whether sleep health mediates the associations	Quantitative cross-sectional study using data from MrOS study	2,562 Community-dwelling older men, >65 years of age, with osteoarthritis or rheumatoid arthritis, recruited for the MrOS study between 2000 and 2002. Mean age 76 years.	Questionnaire providing sociodemographic, chronic diseases, lifestyle, medication. Blood samples of inflammatory markers (CRP, IL-6). Sleep health measures – Actigraphy for at least 5 consecutive 24-hour periods, PSQI, ESS.	Participants with OA were more likely to have diagnosed sleep disorders, take antidepressants, benzodiazepines, sleep medications, NSAID, and corticosteroids and have comorbidities compared those with no OA. Poor sleep health had significant indirect associations of OA with higher risks of elevated CRP and IL_6 levels.

(*Continued*)

Table 2. Continued.

Nr	Authors and title	Aim	Method	Sample	Instrument	Findings
5	Furihata, Ryuji; Hall, Martica H; Stone, Katie L; Ancoli-Israel, Sonia; Smagula, Stephen F; Cauley, Jane A; Kaneita, Yoshitaka; Uchiyama, Makoto; Buysse, Daniel J [15], USA *Sleep* An aggregate measure of sleep health is associated with prevalent and incident clinically significant depression among community-dwelling older women.	Whether an aggregate measure of sleep health was associated with prevalent and incident clinically significant depression symptoms in a cohort of older women.	Prospective cohort study. Study of osteoporotic fractures (SOF) sleep study	6485 Community-dwelling older women, >65 years, mean age 80.1 years. Data from SOF 1997 to 1998 (baseline), 2002 – 2004 (follow-up, 49.6% of baseline participants)	SOF sleep questionnaire, 12 items including all sleep characteristics and sleep medication use. Sleep health dimension measures by 3. Depression (GDS), Sociodemographic info, cognitive function (MMSE), BMI, Health status, physical activity, lifestyle, medical history, medical conditions.	Participants reporting several poor sleep health dimensions were older, less educated, had less alcohol use, less caffeine consumption and poorer health status. The greater number of poor sleep health dimensions the higher cross-sectional and longitudinal risk for clinically significant depression symptoms.
6	Wallace, M L; Lee, S; Hall, M H; Stone, K L; Langsetmo, L; Redline, S; Schousboe, J T; Ensrud, K; LeBlanc, E S; Buysse, D J, [16], USA *Sleep health* Heightened sleep propensity: a novel and high-risk sleep health phenotype in older adults	To reveal sleep health phenotypes in older adults and examine their associations with time to 5-year all-cause and cardiovascular mortality	Prospective longitudinal cohorts. SOF- and MrOS sleep study.	1722 Community-dwelling older men and women, >65 years, median age 82. Data collection, 2002 from SOF and 2005 from MrOS	Sleep health characteristics – satisfaction – PSQI item of sleep quality. Alertness – ESS, timing – sleep midpoint (time for bed and waking up). Efficiency – sleep efficiency in the past month. Duration – total sleep time. Sociodemographic, health behaviors, depression, physical health and cognition. Longitudinal outcome – all cause mortality – death certificates (primary outcome), time to cardiovascular mortality (secondary outcome), 5-year mortality	Three phenotypes were found, HSP (heightened sleep propensity), AS (Average sleep) and ISS (Insomnia with short sleep). Men were more likely to report poor sleep quality, high daytime sleepiness, early midpoint, high sleep efficiency and long total sleep time (TST), frequent snoring, stopping breathing during sleep and more difficulty staying asleep.
7	Wallace, Meredith L; Lee, Soomi; Stone, Katie L; Hall, Martica H; Smagula, Stephen F; Redline, Susan; Ensrud, Kristine; Ancoli-Israel, Sonia; Buysse, Daniel J; [17] USA *Sleep* Actigraphy-derived sleep health profiles and mortality in older men and women	To identify sleep health profiles in older men and women, to determine whether profile predicts mortality	Flexibal clustering approach	MrOS ($n = 2640$) and SOF ($n = 2430$) sleep study 2002 and 2005. Comparable matching sample of 1722 men and women >65 years. Women mean age 83, men mean age 76.	Sleep watch-O actigraphy for at least four consecutive 24 hours periods. All-cause mortality (first outcome) and cardiovascular mortality (secondary outcome)	Women had worse physical functioning, higher depressive symptoms, more chronic diseases and lower education. Three sleep profiles: High sleep propensity (HSP), Adequate sleep (AS) and Inadequate sleep (IS). Among the HSP group napping/ inactivity was 70% higher in women than in men. HSP profile was protective against all-cause and cardiovascular mortality in both men and women. However, high napping/inactivity increased risk for mortality relative to low napping/ Inactivity.

(*Continued*)

Table 2. Continued.

Nr	Authors and title	Aim	Method	Sample	Instrument	Findings
8	Wallace, Meredith L; Stone, Katie; Smagula, Stephen F; Hall, Martica H; Simsek, Burcin; Kado, Deborah M; Redline, Susan; Vo, Tien N; Buysse, Daniel J [18] USA *Sleep* Which sleep health characteristics predict all-cause mortality in older men? An application of flexible multivariable approaches	To determine which sleep characteristics, increase mortality risk in the osteoporotic fractures in men sleep study	Retrospective data from MrOS sleep study	2887 Men >65 years. Mean age 76.3 years	All-cause mortality. Seven proposed sleep characteristic domains (duration, continuity, timing, sleepiness/ alertness, quality, regularity and rhythmicity) examined with correlations. Actigraphy-assessed TST and wake after sleep onset (WASO). ESS, PSQI, Wake time (regularity). *Extreme sleep characteristics* (outliers of above sleep measures, low or high). Demographics and health characteristics, physical activity, mental status (depressed mood) lifestyle behavior, somatic diseases, medications	Lower sleep–wake rhythmicity (lower PsF) and lower continuity (higher WASO) were significantly associated with increased mortality risk and had the largest HRs. Sleepiness/alertness was not associated with mortality, and earlier and later timing (midpoint) were associated with greater mortality risk. Having several 3 or more extreme sleep characteristics was significantly associated with increased mortality risk.

represented better sleep health, in another study, higher scores represented poorer sleep health [14]. Sleep health scores were also calculated by the number of poor or good sleep health dimensions and then classified from 0 to 3 or more, up to 5 [12, 13, 15]. Another approach was to use single-item instrument scores and/or actigraphy results to create sleep health profiles (e.g. high sleep propensity, adequate sleep, and inadequate sleep) [16–18].

Sleep health in community-dwelling older women

In a study of 1,459 community-dwelling older women with a mean age of 83.6 years, poorer sleep health was reported with a higher probability in women with lower education, multimorbidity, impaired physical and cognitive ability, and depressive symptoms [13]. Approximately 23% of community-dwelling older women reported two or more domains of poor sleep health (e.g. sleep satisfaction, daytime sleepiness, timing, sleep latency, and sleep duration) [17] showed that naps/inactivity was 70% more common in women than in men, and among inadequate sleepers with poorer sleep health across multiple domains, women tended to take longer naps (64 min) than men (17 min). A higher tendency toward napping/inactivity was shown to increase the risk of mortality. Moreover, daytime sleepiness among women, combined with several poorer sleep health domains (i.e. sleep satisfaction, daytime sleepiness, mid-sleep time, and sleep onset latency), was associated with ongoing depression and the risk of developing clinical depression symptoms over time [15]. Frailty is a geriatric syndrome characterized by weakness, exhaustion, weight loss, inactivity, and slowness [19]. The study by [20] showed an association between better self-reported sleep health and lower odds of frailty in a sample of both men and women, even after adjusting for sociodemographic characteristics and health disparities. However, when examining the differences in sex, sleep health associations with frailty were only statistically significant in women. Moreover, being an inadequate sleeper increased the risk of all-cause and cardiovascular mortality among women relative to adequate sleepers or those with high sleep propensity (i.e. high sleep maintenance, long naps, and longer sleep duration). Total healthcare costs were higher among women with three or more impaired sleep health domains ($15,332) compared to women without impaired sleep health ($10,745). Nearly 15% of older women with three or more impaired sleep health domains had healthcare costs in excess of $30,000 over 36 months. However, poor sleep health in older women was not an independent predictor of hospitalization [13].

Sleep health in community-dwelling older men

Lower sleep-wake rhythmicity and sleep continuity (i.e. fragmented sleep) among older men were significantly associated with an increased risk of mortality. Older men with earlier or later sleep timing (midpoint)* or with three or more extreme sleep health characteristics

had a significantly elevated mortality risk. Having extreme sleep health characteristics at ≤72 years of age was associated with an increased risk of mortality. In men aged 72–79 years, lower sleep continuity was associated with an increased risk of mortality, and for men older than 83 years, the risk of mortality was even higher [18]. Regarding sex differences, men were more likely than women to report poorer sleep quality, higher rates of daytime sleepiness, earlier midpoints, higher sleep efficiency, and longer total sleep time. Additionally, men reported more snoring and pausing in breathing during sleep and more frequently had trouble staying asleep than women [16]. Wallace et al. [16] identified a sample of older men and women with particular sleep characteristics (i.e. heightened sleep propensity, average sleepers, and insomnia with short sleep). The category of 'heightened sleep propensity' (i.e. long sleep time, high sleep efficiency, and high sleepiness) showed that both older men and women had good sleep quality/efficiency and long total sleep time; however, only men in that category showed daytime sleepiness [16]. One study by Lee et al. [14] reported an association between sleep health and osteoarthritis (OA) or rheumatoid arthritis (RA) among 2,562 community-dwelling older men. The study showed that participants with OA (not RA) had significantly poorer sleep health than those without OA, even after correcting for age, health issues, and medication covariates. Moreover, poorer sleep health is significantly associated with a higher risk of elevated C-reactive protein (16% risk) and interleukin 6 levels (12% risk), which are associated with inflammation [14]. Sleep health among older men, in relation to healthcare costs, showed that men with two to four self-reported poor sleep health domains, had increased healthcare costs ($4,416 to $5,819) over a three-year period, compared to men without impaired sleep health ($3,716). Several self-reported dimensions of poor sleep health (i.e., sleep satisfaction, excessive daytime sleepiness, long sleep onset latency, and short or long sleep duration) were associated with higher healthcare costs. However, this association was no longer significant when deceased study participants were excluded during the three-year follow up period [12].

*The midpoint of a person's total sleep time, which should be between the hours of 2:00 and 4:00 am Earlier or later midpoint than between specified times is considered an outlier.

Discussion

This is the first scoping review to describe the current state of knowledge regarding the holistic concept of sleep health in community-dwelling older persons. These results suggest that community-dwelling older persons with poor sleep health have an increased risk of depression, higher healthcare costs, and mortality. However, better sleep health, was in one study, suggested to lower the odds of frailty among older persons. The scoping review results are similar to those of previous studies focusing on health risks associated with specific sleep disorders [20], however more research is needed to confirm the relationship between multidimensional sleep health and health outcomes among community-dwelling older adults.

The current review also showed that sleep health outcomes differ between men and women. Longer naps/inactivity in the daytime was more common among older women than among older men and was associated with increased mortality risk. Furthermore, the health risk of longer naps was shown in a longitudinal study by Li et al. [21], which showed that participants who napped more than one hour per day had a significantly increased risk of developing Alzheimer's dementia compared to those who napped less than one hour per day. Additionally, the duration and frequency of naps increase with age [21]. In contrast, short daytime naps (<30 min) have been shown to reduce the risk of cognitive decline in community-dwelling older adults [22]. The underlying causes of long daytime naps and the risk of cognitive decline have not been fully investigated. However, long daytime naps are suggested to be caused by excessive daytime sleepiness (EDS) generated by sleep deprivation and/or disturbed circadian rhythms [23]. Moreover, EDS with daytime napping has been associated with poor cognitive performance among older people with low healthy lifestyle engagement (i.e. cognitive activity, physical exercise, and social activities) [24]. In addition, a healthy lifestyle has been shown to reduce the rate of memory decline in cognitively normal older adults [25]. Future research should investigate the association between multidimensional sleep health and cognitive performance in community-dwelling older adults.

The current review revealed that men reported poor sleep continuity and deviant sleep timing, which led to an increased risk of mortality. One explanation for poor sleep continuity among older persons could be nocturia, with approximately 60% reporting at least 2 voids at night [26]. In men, nocturia can be caused by poor bladder capacity and/or benign prostatic hypertrophy, which forces the person to urinate frequently [27, 28]. The prevalence of insomnia symptoms among women (i.e. trouble falling asleep, frequent wakenings, and early morning wakening) increases during

menopausal transition and is also related to anxiety and depression [29].

The review also identified that good subjective sleep health was associated with lower odds of frailty, especially among older women, even after adjusting for sociodemographic characteristics and health disparities. According to Collard et al. [30], the prevalence of frailty among community-dwelling older persons was 10%, and was shown to be more common among women than among men. Frailty is associated with old age, female sex, single households, inactivity, smoking, polypharmacy, increased alcohol consumption, and poor nutritional status [31]. Moreover, poor sleep is one comorbidity shown to increase the risk for frailty among older people [30]; other risk factors are having diabetes, hearing dysfunction, cognitive impairment, fall history, pain and depression [32]. Thus, the cause of frailty among older people includes several health risk factors, which complicates health-promoting measures to prevent frailty. To have good sleep health might be an effective preventive measure, however, more research is needed to confirm if good sleep health has the potential to prevent frailty among older people.

Seven of the eight articles included in the review had outcomes from retrospective data extracted from women's and men's osteoporosis registries. Much has changed in the last 20 years (i.e. use of the Internet, digital technologies, media habits, and the effect of the Covid outbreak) that potentially had an impact on sleep health outcomes among older persons. For instance, long-term isolation during the Covid outbreak produced physical (e.g. less physical activity) and mental health consequences (e.g. anxiety, depression, loneliness, and poorer sleep quality) among community-dwelling older persons [33].

Another aim of this review was to identify knowledge gaps. One gap was the lack of information on the holistic concept of sleep health among persons aged >80 years with specific healthcare needs, such as in-home care or nursing homes. Second, the review identified a lack of knowledge in people aged ≥80 years and their experience with situations that facilitate or hinder their sleep health. Third, future research should investigate current sleep medicine treatments for persons aged ≥80 years in different healthcare contexts (in-home care, nursing homes, and hospital care).

The strength of the review was that the first step of study selection was blinded to the two first authors. The inclusion criteria were set to include studies using sleep measures following the sleep health dimensions defined by Buysse [7], which limited the possibility of including studies measuring sleep using less than the five sleep characteristics. However, it was a deliberate decision to use only the multidimensional concept of sleep health as an inclusion criteria, to have the possibility to investigate the older population in a holistic sleep measuring approach. The authors consider the few included articles to represent the limited number of studies using the multidimensional sleep health concept as a sleep measure among community-dwelling older adults. Moreover, the results of the database search were comprehensive as a result of using several databases, which strengthens the reliability of the scoping review results. One limitation was that seven of the eight included articles were based on retrospective data extracted from American female (SOF study, 1986–2009) and male (MrOS study, started in 2000) osteoporosis registries, with similarities as a selected sample. Moreover, the SOF study exceeded the MrOS study sample in terms of age, group size, and osteoporosis prevalence, which limited comparison across the two registries. Another issue was the inconsistency in sleep health measures and scoring in the articles, probably due to the use of retrospective data. Validated, existing sleep health instruments would be preferable for use in new population-based research to ensure generalizable scores for poor or good sleep health.

Conclusion

This first scoping review on the holistic concept of sleep health among community-dwelling older adults, shows that sleep health among older persons differs across sex, and that poor sleep health might be associated with an increased risk of depression, higher healthcare costs, and mortality, while better sleep health might be associated with lower odds of frailty. Moreover, the results also highlight the need for further research to confirm these findings by investigating older persons' multidimensional sleep health in the general older population. Little is known about how people, 80 years and over, experience their sleep health, what sleep medication is prescribed, and how often medications are prescribed for sleep problems to persons over 80 years of age receiving home care.

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Author contributions

SÖ and CS planned and designed the study, collected, analyzed, and interpreted the patient data with support fromBW, DF and LJ. SÖ created the initial draft of the manuscript and BW, DF and LJ contributed with constructive criticism during the process and approved the final version of the manuscript.

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Data availability statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

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