Postprint of a Scoping Review on Sleep Disorders in Community-Dwelling Older Adults

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Abstract

Background As population aging intensifies and life expectancy increases in China, sleep disorders among the oldest-old ($ $80 years) have garnered widespread attention. As a common problem, sleep disorders seriously impact the quality of life and physical and mental health of the oldest-old, and can exacerbate or induce diseases.

Objective To conduct a scoping review of studies on sleep disorders in community-dwelling oldest-old and provide guidance for early diagnosis and treatment of sleep disorders in this population in China.

Methods Following scoping review methodology, literature on sleep disorders in community-dwelling oldest-old was searched in PubMed, Embase, CINAHL, Web of Science, Cochrane Library, OpenGrey, SinoMed, CNKI, Wanfang Data Knowledge Service Platform, and VIP Database from database inception to March 15, 2023. Two researchers independently screened the literature and extracted basic characteristics (author, publication date, country, study type, sample size, assessment tool or method, prevalence, study findings).

Results Of 10,486 articles retrieved, 21 were included (14 English, 7 Chinese), comprising 16 cross-sectional studies, 2 quasi-experimental studies, and 3 longitudinal studies. Analysis revealed that sleep disorders are relatively common among community-dwelling oldest-old with serious adverse effects. Nine assessment tools or methods were used, including 3 structured scales; the most commonly used was the Pittsburgh Sleep Quality Index (PSQI). Influencing factors were categorized into sociodemographic factors, physical condition and disease-related factors, and psychological and behavioral characteristic factors. Interventions included music therapy and intervention groups combining therapy and interaction models, though prevention and intervention research remains limited.

Conclusion Sleep disorders are highly prevalent among community-dwelling oldest-old with serious adverse effects. Awareness is insufficient in China, assessment tools lack variety and specificity, influencing factors are complex and diverse, and prevention and intervention research is scarce.

Full Text

Sleep Disorders among Community-Dwelling Older Adults Aged 80 and Over: A Scoping Review

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Abstract

Background
With the deepening of population aging and increasing life expectancy in China, sleep disorders among older adults aged 80 and over have attracted widespread attention. As a common health problem, sleep disorders seriously affect the quality of life and physical and mental health of older adults, and can exacerbate or induce various diseases.

Objective
To conduct a scoping review of studies on sleep disorders in community-dwelling older adults aged 80 and over, and to provide guidance for early diagnosis and treatment of sleep disorders in this population in China.

Methods
Following scoping review methodology, we searched PubMed, Embase, CINAHL, Web of Science, Cochrane Library, OpenGrey, SinoMed, CNKI, Wanfang, and VIP databases for literature on sleep disorders in community-dwelling older adults aged 80 and over from inception to March 15, 2023. Two investigators independently screened the literature and extracted basic characteristics (authors, publication date, country, study type, sample size, assessment tools or methods, prevalence, and study findings).

Results
A total of 10,486 papers were identified, with 21 articles ultimately included (14 in English and 7 in Chinese). The studies comprised 16 cross-sectional studies, 2 quasi-experimental studies, and 3 longitudinal studies. The analysis revealed that sleep disorders are highly prevalent among community-dwelling older adults aged 80 and over and have serious adverse effects. Nine assessment tools or

methods were used, including three structured scales, with the Pittsburgh Sleep Quality Index (PSQI) being the most commonly employed. Influencing factors were categorized into sociodemographic factors, physical health and disease-related factors, and psychological and behavioral characteristics. Interventions such as music therapy and therapy-interaction mode groups showed promise, though prevention and intervention studies remain scarce.

Conclusion
Sleep disorders are highly prevalent among community-dwelling older adults aged 80 and over with serious adverse effects. In China, awareness of sleep disorders in this population is insufficient, assessment tools are limited and lack specificity, influencing factors are complex and diverse, and research on prevention and interventions is lacking.

Keywords: Sleep disorders; Aged, 80 and over; Community health services; Scoping review

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Introduction

According to China' s seventh national population census in 2020, the number of people aged 80 and over reached 35.8 million [1]. The China Center for Social Development predicts this figure will increase to 70.84 million by 2035 and 135 million by 2050, making China the country with the largest population of oldest-old adults in the world [2]. The severe aging trend and national policy guidance have made community-based home care the most important elderly care model in China at present [3]. Therefore, ensuring the health and improving the quality of life of community-dwelling older adults has become a critical component of public health efforts to address population aging.

The Healthy China Action Plan (2019–2030) explicitly emphasizes the importance of sleep health in older adults and includes sleep quality improvement as a key action indicator [4]. Sleep disorders are defined as abnormalities in sleep quantity or quality, or clinical symptoms including shortened sleep duration, reduced deep sleep, increased nighttime awakenings, difficulty falling back asleep after waking, and early morning awakening [5]. As one of the common diseases endangering older adults' health, sleep disorders can lead to reduced quality of life [6], cognitive decline [7], and increased risks of depression and mortality [8]. As a potential early manifestation of emotional or physical diseases, the prevalence of sleep disorders increases with age [9]. However, existing research has paid limited attention to sleep conditions in community-dwelling older adults, particularly the oldest-old, often analyzing all adults over 60 as a single group. Due to variations in study region, sample size, and assessment tools, research findings differ significantly between domestic and international studies, necessitating targeted research on sleep disorders in adults aged 80 and over.

A scoping review can present the scope and breadth of research, summarize findings, and identify gaps, offering higher evidence levels than traditional reviews [10]. Using the Joanna Briggs Institute (JBI) scoping review guidelines published in December 2019 as our methodological framework [11], this study describes and analyzes relevant literature to comprehensively understand the current state of research on sleep disorders among community-dwelling older adults, providing guidance for early detection, prevention, and improvement of sleep disorders in this population in China and promoting healthy aging.

Methods

2.1 Research Questions Based on the PCC principle [12], we established our research questions: Participants (P) were community-dwelling older adults aged $ $80 years; Concept (C) was original research on sleep disorders; and Context (C) was community residence. The main diagnostic criteria for sleep disorder classification are the *Diagnostic and Statistical Manual of Mental Disorders (5th Edition)* [13] and the *International Classification of Sleep Disorders (3rd Edition)* [14]. However, due to their complex diagnostic subtypes requiring specialized equipment, community epidemiological studies typically use clinical manifestations such as difficulty falling asleep (DFA), difficulty maintaining sleep (DMS), early morning awakening (EMA), non-restorative sleep (NRS), and excessive daytime sleepiness (EDS) as evaluation criteria [15-16]. Therefore, sleep disorders in this review refer to the commonly used definitions in community epidemiology, with judgment methods including self-assessment, sleep duration, and scales. After preliminary literature analysis and team discussion, we identified five research questions: (1) What is the prevalence of sleep disorders among community-dwelling older adults aged 80 and over? (2) What assessment tools or methods are currently used for this population? (3) What are the influencing factors of sleep disorders in this group? (4) What adverse effects do sleep disorders have on these older adults? (5) What prevention and intervention studies have been conducted?

2.2 Literature Search Strategy We searched five English databases (PubMed, Embase, CINAHL, Web of Science, Cochrane Library) and four Chinese databases (CNKI, Wanfang, VIP, SinoMed) using subject headings and free-text terms, supplemented by grey literature searches in OpenGrey. The search timeframe was from database inception to March 15, 2023, with no restrictions on publication type. English search terms included "Sleep," "Dyssomnia," "Chronic insomnia," "insomnia," *sleep dysfunction,*" *sleep disturbance,*" *sleep disorder,*" *sleep duration,*" *sleep patterns,*" *sleep problems,*" *parasomnias,*" *shorter sleep,*" " *sleep quality,*" *and* " *wakeful.*" Chinese search terms included "睡眠" (sleep), "睡眠问题" (sleep problems), "睡眠质量" (sleep quality), "失眠" (insomnia), "睡眠障碍" (sleep disorders), "社区" (community), "老年人" (older adults), "高龄老人" (oldest-old), "长寿老人" (long-lived elderly), and "80 岁及以上

老年人" (adults aged 80 and over). The search strategy for PubMed is shown in .

2.3 Inclusion and Exclusion Criteria **Inclusion criteria:** (1) Articles published in English or Chinese; (2) Study population: community-dwelling older adults aged $ $80 years; (3) Content related to sleep disorders in this population; (4) Original research with any study design.

Exclusion criteria: (1) Irrelevant to research questions; (2) Publication types including reviews, letters, conference abstracts, and news reports; (3) Duplicate publications or inaccessible full texts.

2.4 Literature Screening and Data Extraction We imported retrieved literature into Zotero for duplicate removal. Two researchers with evidence-based nursing training independently conducted initial screening by title and abstract, followed by full-text screening. Disagreements were resolved through discussion with a third researcher. Extracted data included authors, publication date, country, study type, sample size, assessment tools or methods, prevalence, and study findings.

Results

2.1 Literature Search Results The initial search yielded 10,486 articles. After duplicate removal, 6,305 articles remained. Following two rounds of independent screening, 21 articles were finally included [17-37]. The literature screening process is shown in [Figure 2: see original paper].

2.2 Characteristics of Included Studies The 21 included articles [17-37] comprised 14 English-language [17-19,22-26,27-28,31,33-36] and 7 Chinese-language studies [20-21,25,29-30,32,37], published between 2011 and 2022. Study designs were predominantly cross-sectional (n=16) [18-21,23-28,31,33-37], with 2 quasi-experimental studies [29-30] and 3 longitudinal studies [17,22,32]. Studies were conducted in China (n=12) [17-21,25,28-32,37], Japan (n=2) [23-24], Turkey (n=1) [33], United Kingdom (n=1) [22], South Korea (n=1) [34], United States (n=1) [27], Finland (n=1) [35], Brazil (n=1) [36], and Israel (n=1) [26].

2.3 Prevalence of Sleep Disorders Nineteen of the 21 included studies [17-28,31-37] reported prevalence rates. According to these 19 studies, the prevalence of sleep disorders among community-dwelling older adults aged 80 and over ranged from 10.0% to 60.3%, with 11 studies [18-24,28,31,34,37] reporting prevalence rates above 30%.

2.4 Assessment Tools and Methods The 21 studies used nine assessment tools or methods: Pittsburgh Sleep Quality Index (PSQI) [18-21,25,28-31,33,37],

Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS) [30], Medical Outcomes Study Sleep Scale (MOS-SS) combined with nighttime sleep duration [27], nighttime sleep duration [>8h [22,26], (<5h/>9h) [34], (<7h/>9h) [32,35]], self-rated overall sleep quality [17,36], and measured sleep parameters with night-time sleep duration (<6h/>8h) [23-24], where sleep parameters included total sleep time, sleep efficiency, and wake-time after sleep onset (WASO).

2.4.1 Pittsburgh Sleep Quality Index (PSQI) Developed by Buysse et al. [38] in 1989, the PSQI contains 23 items across 7 dimensions: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Using a 4-point Likert scale, total scores range from 0 to 21, with scores above 7 indicating poor sleep quality. The scale predominantly uses longer sleep duration as an indicator of better sleep quality. With good reliability and validity, it is a widely used generic scale for subjective sleep quality assessment. Liu et al. [39] translated and validated it for Chinese populations in 1996, reporting a Cronbach' s α coefficient of 0.84 and confirming its good adaptability for use in China.

2.4.2 Dysfunctional Beliefs and Attitudes about Sleep Scale (DBAS) Developed by Morin [40], the DBAS contains 16 items across 4 dimensions: unrealistic sleep expectations, worry about insomnia, exaggeration of insomnia consequences, and unreasonable beliefs about sleep aids. Using a 5-point Likert scale, lower scores indicate more dysfunctional sleep beliefs. Cronbach' s α coefficients are 0.80 in healthy populations and 0.81 in individuals with insomnia. This scale primarily identifies dysfunctional cognitions before sleep onset.

2.4.3 Medical Outcomes Study Sleep Scale (MOS-SS) Developed by Hays et al. [41], the MOS-SS contains 12 items across 6 dimensions: sleep disturbance, sleep adequacy, daytime somnolence, snoring, shortness of breath upon awakening, and sleep quantity. Item 2 is scored by sleep duration (hours), while other items are scored 1-6, with items 4 and 12 reverse-scored. Higher scores indicate better sleep quality. Dimension-specific Cronbach's α coefficients range from 0.64 to 0.84, with good validity. The scale is suitable for populations with different pain characteristics and allows comparison across clinical groups, though scoring is relatively complex and time-consuming.

2.5 Influencing Factors

2.5.1 Sociodemographic Factors Community-dwelling older adults with specific sociodemographic characteristics showed higher risks of sleep disorders, including: age (90-96.62 years [18], $ $90 years [20], 80.9-86.1 years [23], 80-85 years vs. >99 years [32]), female gender [23,37], low education level [32,34], low economic status [32], unmarried or widowed marital status [32,37], living alone [34], and recipients of South Korea' s Basic Livelihood Security System [34].

2.5.2 Physical Health and Disease-Related Factors Factors associated with increased sleep disorder risk included: cognitive impairment [18,27,32], dementia [18,31], benign prostatic hyperplasia [20], coronary heart disease [20], diabetes [20], slow walking speed [23], weak muscle strength [23], snoring or coughing [25], pain [25], low high-density lipoprotein cholesterol [25], poor memory and executive function [27], poor nutritional status [31,35], depression [31], hypertension [32,37], high body mass index (BMI) [32,37], physical disability [32], chronic diseases [32,37], poor physical fitness [33], history of stroke [37], and chronic obstructive pulmonary disease [37].

2.5.3 Psychological and Behavioral Characteristics Risk factors in this domain included: alcohol consumption [18,30], nighttime bathroom use [25], post-sleep awakening or early awakening [25], difficulty falling asleep [25], dysfunctional beliefs about sleep definition, effects, and environment [30], negative emotions [30], poor behavioral habits [30] (going to bed too early, attempting to immobilize the body to fall asleep faster, etc.), smoking [30], breathing difficulties [25], limited leisure activities [34], low vegetable/fish intake [34], and nightmares [25]. Jiang et al. [37] found that drinking milk before bedtime and regular outdoor activities were protective factors against sleep disorders.

2.6 Adverse Effects of Sleep Disorders Sleep disorders not only seriously impact physical health and quality of life but are also directly associated with morbidity and mortality. Qiu et al. [17] found that compared to older adults sleeping 8 hours, those with sleep duration $ $5h or $ $10h had 18-22% higher mortality risk, with more pronounced effects in men, and lower probability of good health status. Wu et al. [20] found that comorbid sleep disorders increased hypnotic drug use and worsened daytime functioning. Zhang et al. [21] found correlations between sleep disorders and cognitive impairment. Anderson et al. [22] reported increased incidence of depression, cognitive impairment, falls, overweight/obesity, arthritis, and mortality in older adults with sleep disorders (sleep disturbance and daytime sleepiness). Kim et al. [24] found poor sleep quality independently associated with increased obesity risk. Klein et al. [26] found increased risks of hypertension, myocardial infarction, stroke, and diabetes in older adults with sleep disorders. Wu et al. [28] found associations between sleep disorders and increased hypertension prevalence. Liu et al. [31] found sleep disorders caused appetite loss, dementia, depression, weight loss, and daytime dysfunction. Cao [32] found long sleep duration (>9 hours) associated with increased mortality risk. Freitas et al. [36] identified sleep quality and duration as major factors affecting health-related quality of life.

2.7 Prevention and Intervention Measures Two studies [29-30] examined interventions. Guo [29] conducted an 8-week music therapy intervention (listening to health-promoting music and music recall) with 32 older adults, finding music therapy effectively improved anxiety symptoms and sleep quality, particularly in sleep latency, sleep duration, and hypnotic drug use. Zhou [30] used

therapy-interaction mode group activities with seven 45-60 minute sessions, significantly improving participants' sleep quality, especially in sleep latency and sleep efficiency.

Discussion

3.1 Enhancing Awareness and Strengthening Organizational Management Sleep problems are important modifiable factors affecting population health. Given their impact on metabolic function and increased risk of various diseases and mortality [22,42], sleep disorders in the oldest-old should not be dismissed as normal aging. While the world is undergoing population aging, sleep problems remain an under-recognized public health issue in many countries, particularly among the oldest-old. The 21 included studies indicate high prevalence of sleep disorders in this population, while diagnosis and care emphasize a bio-psycho-social medical model with multidisciplinary approaches [43]. Healthcare institutions and community administrators should strengthen organizational guidance, promote integration between general practice and sleep medicine, and cultivate sleep medicine expertise among general practitioners. Guidelines, policies, and follow-up pathways for managing sleep disorders in primary care settings should be developed. Online training and short courses by sleep experts can enhance healthcare workers' knowledge and skills, improving their ability to recognize and comprehensively manage sleep disorders. Community healthcare workers play crucial roles in early identification and prevention due to their close relationships with older adults. They should conduct health education following the bio-psycho-social model through community lectures and home visits, helping older adults correct poor sleep hygiene habits and cognitions to improve health awareness and sleep quality.

3.2 Improving and Standardizing Assessment Methods Inconsistent operational definitions and assessment methods (sleep duration, self-rated sleep, and structured scales) contribute to varying prevalence rates across studies. While no studies have determined which method is most accurate, excessive daytime sleepiness appears to be a special manifestation of sleep disorders in the oldest-old [23,43]. However, the commonly used PSQI predominantly uses longer sleep duration as an indicator of better sleep quality [35], a standard not yet adjusted for this population. Comprehensive evaluation of both sleep duration and quality may provide different association information requiring further exploration. All three scales used are non-specific.

Therefore, assessment methods for community-dwelling oldest-old should be improved. Countries should develop culturally appropriate definitions of sleep disorders and, guided by the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) [44], comprehensively and objectively evaluate tool performance to develop balanced assessment instruments

that are convenient, comprehensive, and specific, facilitating early diagnosis and prevention.

3.3 Focusing on High-Risk Populations and Leveraging Community-Internet Platform Synergy The included studies identified various risk factors, with age, gender, cognitive impairment, chronic diseases, education level, marital status, nutritional status, and poor physical function being the eight most frequently reported. This finding significantly informs clinical practice. The age-related increase in prevalence may result from decreased melatonin secretion and declining physical function making sleep initiation and maintenance difficult [45]. Older women have poorer sleep quality than men, possibly due to declining estrogen levels affecting neurotransmitter receptors and sleep cycles [46], or greater worry about daily matters [47]. Unmarried or widowed older adults may experience insufficient family and social support and stronger feelings of loneliness [48]. Those with comorbidities, cognitive impairment, and poor nutritional/physical status experience functional decline, lower stress thresholds, and increased susceptibility to internal and external instability [49], leading to insomnia and light sleep. Lower education affects healthcare knowledge acquisition and understanding of sleep disorders.

Therefore, family doctors and nurses should provide home treatment, care, and long-term follow-up for older adults with sleep disorders and the above risk factors, implementing comprehensive, whole-cycle management. Communities should establish activity centers for the oldest-old, promoting physical exercise and leisure activities to prevent functional decline and reduce negative emotions [50]. Social support from children, friends, and neighbors should be strengthened to improve social participation. Additionally, internet-based community service platforms and sleep centers in higher-level hospitals can be integrated using telemedicine to form medical consortia and information-sharing networks, expanding remote home services and enabling comprehensive sleep health management through wearable devices.

3.4 Enriching Research Designs and Methods Most existing studies are cross-sectional with simple statistical descriptions, lacking causal determination and limited by subjective interpretations. Few studies explore longitudinal sleep patterns, and those use inconsistent tools and statistical methods, reducing comparability. Most research analyzes adults $ $60 years as a single group, lacking specific studies on the oldest-old [51]. Given the adverse effects of sleep disorders, prevention and intervention research is crucial.

Future research should enrich designs and methods, increasing specific studies on adults aged 80 and over. Combining interdisciplinary approaches, researchers should incorporate qualitative, case, and prospective studies. Investigations should explore underlying mechanisms, risk factors, and special groups (unmarried, widowed, disabled, childless) through qualitative interviews and scales to identify modifiable factors for intervention, expanding research breadth and

depth under theoretical guidance.

3.5 Limitations This scoping review followed the JBI methodology framework [12] but only summarized included literature without quality appraisal. Only Chinese and English literature was included, potentially affecting conclusions. Only one grey literature database was searched.

Conclusion

Sleep disorders are highly prevalent among community-dwelling older adults aged 80 and over with serious adverse effects. Awareness is insufficient in China, assessment tools are limited and non-specific, and influencing factors are complex. High-risk individuals require attention, and prevention/intervention research is scarce. Future research should consider individual, family, and sociocultural factors to deepen investigations into influencing factors, assessment tools, and study designs to improve quality of life and promote healthy aging.

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