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Geriatric Insomnia

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ABSTRACT

Insomnia is one of the most prevalent sleep disorders among the geriatric population and is considered a major geriatric syndrome with significant impacts on physical, cognitive, and psychosocial health. Age-related changes in sleep architecture and circadian rhythms, combined with a higher burden of chronic diseases and psychosocial stressors, contribute to its high prevalence. This study aimed to synthesize current evidence regarding the epidemiology, risk factors, pathophysiology, diagnosis, and management of insomnia in older adults. A systematic literature review was conducted following PRISMA guidelines using PubMed, ScienceDirect, SpringerLink, and Google Scholar. A total of 10 eligible studies were included in the qualitative synthesis. The findings indicate that insomnia in older adults is multifactorial, influenced by biological, psychological, and social factors, as well as comorbidities and polypharmacy. Diagnosis is primarily based on clinical assessment supported by validated tools such as the Insomnia Severity Index (ISI) and Pittsburgh Sleep Quality Index (PSQI). Nonpharmacological interventions, particularly Cognitive Behavioral Therapy for Insomnia (CBT-I), are consistently recommended as first-line therapy due to their effectiveness and safety profile. Pharmacological treatments should be used cautiously due to increased risks of adverse effects in older adults. In conclusion, insomnia in the geriatric population requires comprehensive assessment and prioritization of nonpharmacological management to achieve optimal outcomes.

Introduction

Aging is an inevitable process characterized by progressive physiological decline and increased susceptibility to diseases. Even in the absence of comorbidities, older adults remain vulnerable to functional deterioration, which may worsen clinical outcomes (DeLisa et al., 2020; Cifu et al., 2021). With the rapid global increase in life expectancy, understanding factors contributing to functional decline in older populations has become increasingly important. Despite extensive research on aging and chronic diseases, limited attention has been given to the interaction between physiological aging and geriatric syndromes, particularly insomnia. Sleep disturbances are highly prevalent in older adults and may exacerbate physical, cognitive, and psychological decline. However, the interplay between aging, functional impairment, and insomnia remains insufficiently explored, highlighting a critical gap in current literature.

The global older adult population has increased significantly in parallel with rising life expectancy and declining birth rates. The World Health Organization (WHO) estimates that the number of individuals aged 60 years and older will reach 2 billion by 2050, increasing from 900 million in 2015. Recent data indicate that the global population aged 65 years and above reached approximately 727 million in 2020. Eurostat reported that 20.3%, or about 90 million people, of the European population were aged 65 years and older in 2019. The United Nations

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Economic and Social Commission for Asia and the Pacific (UNESCAP) projects that more than one in four individuals in the Asia-Pacific region will be aged 60 years or older by 2050 (WHO, 2018; United Nations, 2020).

The proportion of older adults in the Association of Southeast Asian Nations (ASEAN) varies across countries. ASEAN reports estimate that the proportion of individuals aged 65 years and older in the region will increase from 7.7%, or approximately 50 million people, in 2015 to 17.5%, or around 137 million people, by 2050. In Indonesia, Statistics Indonesia (Badan Pusat Statistik/BPS) reported that the older adult population reached 26.82 million people, accounting for 9.92% of the total population in 2020. One of the major changes commonly associated with the aging process is disruption of the circadian sleep–wake cycle. Studies indicate that approximately 50% of older adults report significant sleep-related complaints (Association of Southesast Asian Nations, 2020; Badan Pusat Statistik, 2020); Patel et al., 2018).

Sleep is a vital physiological process essential for restoring bodily functions and supporting optimal daytime performance. However, in older adults, both the quantity and quality of sleep tend to decline with aging, leading to common problems such as difficulty initiating or maintaining sleep. These disturbances are not trivial, as insufficient sleep has been associated with neurocognitive impairment, organ dysfunction, chronic diseases, and increased mortality, ultimately reducing quality of life (Patel et al., 2023). Despite the high prevalence and significant impact of sleep disturbances, management of sleep problems in older adults has often relied on general approaches, particularly pharmacological therapies, which present notable limitations such as increased risk of adverse effects, dependency, and cognitive impairment in this population.

Insomnia, as one of the most common geriatric syndromes, further illustrates this challenge. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), insomnia is defined as dissatisfaction with sleep quantity or quality associated with difficulty initiating or maintaining sleep, or early-morning awakening, leading to significant clinical distress or functional impairment, occurring at least three times per week for a minimum of three months (Patel et al., 2023; Li et al., 2022). Given the limitations of conventional management, there is a growing need for more comprehensive and targeted approaches that address the multifactorial nature of insomnia in older adults, integrating both clinical assessment and nonpharmacological interventions to achieve safer and more effective outcomes.

The prevalence of insomnia worldwide is high, affecting approximately 10%–30% of the general population, with a substantially higher prevalence of 50%–60% among older adults. Gehrman et al. (2018) reported that approximately 14% of older adults experience moderate insomnia, while 2.7% suffer from severe insomnia. Studies assessing insomnia symptoms have reported prevalence rates ranging from 8.2% to 74%. Most older adults are at risk of insomnia due to various factors, including retirement, bereavement, loss of close friends, and chronic illness. In Indonesia, approximately 60% of older adults experience insomnia. A study by Hasanul et al. (2021) conducted at the Tresna Werdha ABDI Nursing Home in Binjai found that the prevalence of insomnia was 7.4% among individuals aged 45–59 years, 77.7% among those aged 60–74 years, and 14.8% among those aged 75–90 years (Molnar et al., 2021; Gehrman et al., 2018); Hasanul et al., 2021).

Assessment and management of geriatric patients require an integrated multidisciplinary team approach. According to the Regulation of the Minister of Health of the Republic of Indonesia No. 79 of 2014 concerning the provision of geriatric services in hospitals, this team is led by a consultant geriatrician (internal medicine specialist) for comprehensive geriatric care,

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or by an internal medicine specialist for basic, intermediate, and advanced services. The team consists of other medical specialists as needed, rehabilitation medicine specialists, psychiatrists, nurses, pharmacists, nutritionists, physiotherapists, and psychologists (Patel et al., 2018).

Comprehensive assessment and management of geriatric patients are conducted using the Comprehensive Geriatric Assessment (CGA), which was first implemented in the United Kingdom in the late 1930s. CGA is a systematic, multidisciplinary procedure that addresses the physical, psychological, functional, and social conditions of older adults to develop individualized care and treatment plans. CGA has been proven beneficial for hospitalized older patients and provides detailed information on sociodemographic, behavioral, clinical, functional, and cognitive aspects. Liu et al. (2021) identified three factors—female sex, depression, and chronic pain—as being significantly associated with insomnia.

Insomnia is associated with significant morbidity if not properly managed. The strongest evidence links insomnia with mental health disorders. Older adults with insomnia have a 23% increased risk of developing depressive symptoms, and several studies have documented an elevated risk of depression among those with persistent insomnia. Insomnia and mental disorders, such as depression and anxiety, exhibit a bidirectional relationship. Additionally, insomnia is associated with an increased risk of suicidal ideation. A meta-analysis examining insomnia symptoms and their association with cardiovascular disease, after adjustment for age and other cardiovascular risk factors, found that the relative risk of heart disease ranged from 1.47 to 3.9. A study by Lawson et al., (2024) demonstrated that insomnia is significantly associated with higher mortality among older adults. Patients with insomnia also have an increased risk of nonfatal cardiovascular events.

Insomnia is also associated with hypertension, myocardial infarction, and stroke. According to the Sleep Heart Health Study, older adults who reported sleeping five hours or less per night were 2.5 times more likely to develop diabetes compared with those who slept seven to eight hours per night. Other studies have shown that individuals with insomnia are at a higher risk of developing metabolic syndrome (Liu et al. 2021).

Sleep disorders in the older adult population are often underdiagnosed and inadequately treated, leading to significant negative impacts on quality of life, including fatigue, cognitive impairment, mood disturbances, daytime sleepiness, behavioral problems, decreased motivation, increased judgment errors, and heightened anxiety related to sleep. Given the wide-ranging consequences of insomnia, accurate diagnosis and appropriate management are essential in geriatric care. Despite the growing body of literature on insomnia in older adults, several important gaps remain. First, most existing studies primarily focus on the clinical characteristics and general management of insomnia without adequately integrating the complex interaction between physiological aging, functional decline, and geriatric syndromes within a comprehensive framework. Second, although nonpharmacological interventions such as Cognitive Behavioral Therapy for Insomnia (CBT-I) are widely recommended, there is still limited synthesis of evidence regarding their applicability and effectiveness across diverse geriatric populations, particularly in low- and middle-income countries. Third, current literature is largely dominated by studies conducted in Western populations, resulting in a lack of context-specific evidence, especially in Indonesia and other Southeast Asian settings where sociocultural, environmental, and healthcare system factors may influence both the manifestation and management of insomnia. Additionally, inconsistencies in diagnostic approaches and outcome measurements across studies further limit the comparability of findings. Therefore, a comprehensive synthesis of recent evidence is needed to bridge these gaps and provide a more integrated understanding of insomnia in the geriatric population, with

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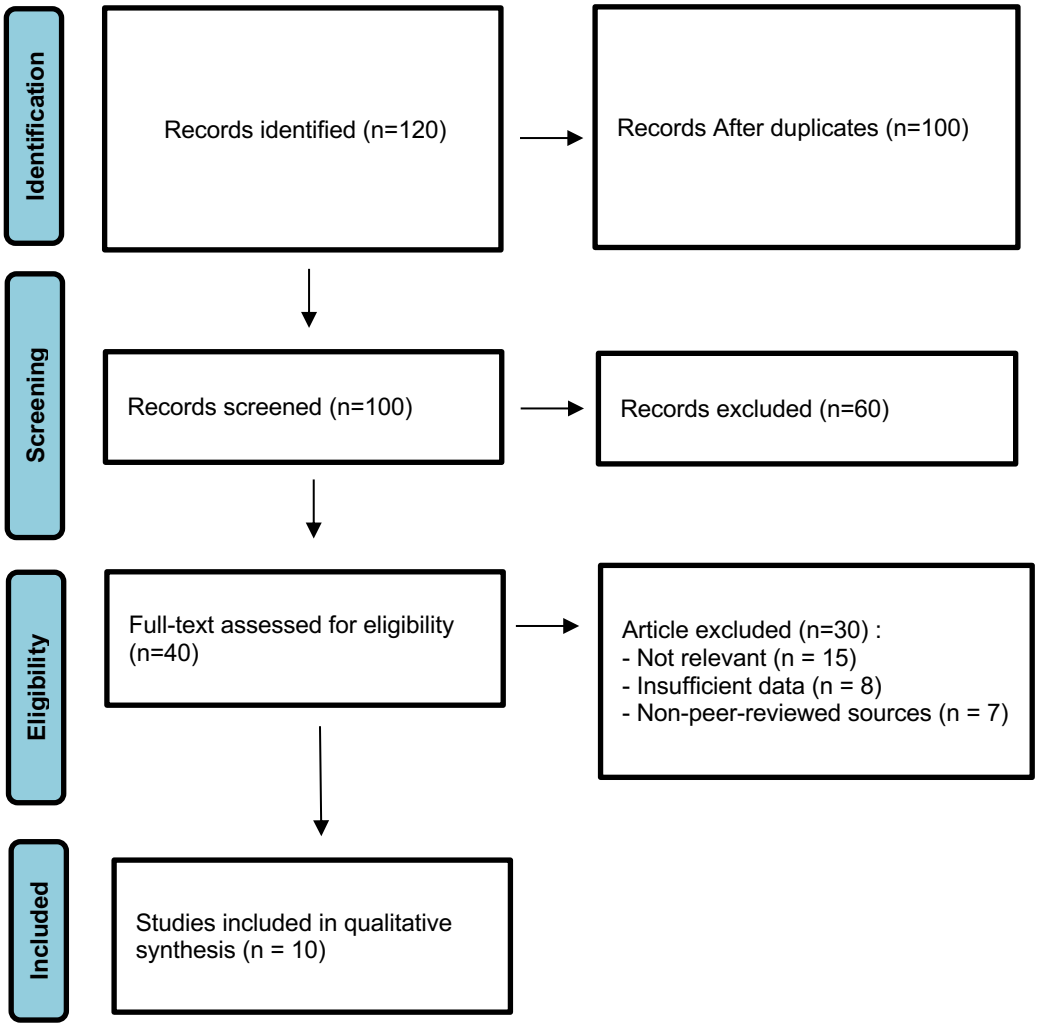
particular emphasis on multifactorial risk factors, standardized assessment, and evidence-based management strategies.

Therefore, the authors are interested to research about comprehensively review and synthesize current evidence on insomnia in the geriatric population, including its epidemiology, risk factors, pathophysiology, clinical impact, diagnostic approaches, and management strategies, in order to provide an evidence-based foundation for improving clinical practice and patient outcomes.

Methods



This study employed a systematic literature review design following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure methodological rigor and transparency. Relevant literature was identified through electronic databases, including PubMed, ScienceDirect, SpringerLink, and Google Scholar. The inclusion criteria comprised peer-reviewed journal articles and clinical practice guidelines published within the last 10–15 years, focusing on insomnia in older adults. Studies with unclear sources, duplicates, non-scientific opinions, or irrelevant topics were excluded. Data were collected

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through a systematic literature search using predefined keywords combined with Boolean operators, such as ("insomnia" OR "sleep disorder") AND ("geriatric" OR "elderly" OR "older adults") AND ("management" OR "treatment" OR "diagnosis"). Additional articles were identified through manual screening of reference lists. The study selection process followed the PRISMA flow, including identification, screening, eligibility, and inclusion stages. A total of 120 records were identified, of which 100 remained after duplicate removal. Following screening and eligibility assessment, 10 studies were included in the final qualitative synthesis. Data extraction included study characteristics (author, year, study design), methodology, and key findings related to epidemiology, risk factors, diagnosis, and management. The quality of included studies was assessed using a standardized critical appraisal tool. Data were analyzed using thematic synthesis, allowing findings to be categorized into key domains, including epidemiology, risk factors, pathophysiology, diagnosis, and treatment strategies.

Result

1. Clinical History (Anamnesis)

A total of 10 studies were included in this systematic review following the PRISMA-guided selection process. The included studies consisted of both narrative reviews and clinical studies focusing on the diagnosis, assessment, and management of insomnia in the geriatric population. The characteristics of the included studies are summarized in Table 1. Overall, the studies involved older adults aged ≥60 years, including both community-dwelling and institutionalized populations. The majority of studies explored clinical features, risk factors, diagnostic approaches, and treatment strategies, with several clinical studies specifically evaluating the effectiveness of nonpharmacological interventions. Across the included literature, insomnia in older adults was consistently described as a multifactorial condition. Several studies (Patel et al., 2018; Taddei-Allen, 2020) reported that insomnia is frequently associated with chronic medical conditions, including cardiovascular disease, chronic pain, chronic obstructive pulmonary disease (COPD), and gastroesophageal reflux disease (GERD). In addition, psychiatric disorders, particularly depression and anxiety, were found to have a strong bidirectional relationship with insomnia. Medication use, environmental disturbances, and age-related changes in sleep architecture were also identified as contributing factors. In terms of clinical assessment, all studies emphasized the importance of comprehensive anamnesis. Roach et al. (2021) highlighted that diagnosis should be based on sleep complaints (difficulty initiating or maintaining sleep, early awakening), duration, frequency (≥3 times per week), and associated daytime impairment.

Furthermore, validated instruments such as the Insomnia Severity Index (ISI) and the Pittsburgh Sleep Quality Index (PSQI) were consistently reported as reliable tools for assessing insomnia severity and overall sleep quality (Markun & Sampat, 2020). While objective tools such as polysomnography (PSG) and actigraphy were discussed, their use was generally limited to specific indications, particularly when other sleep disorders were suspected (Rosenberg et al., 2022). A comparative analysis of treatment approaches revealed a strong consensus across studies that nonpharmacological interventions are the first-line management for insomnia in older adults. Multiple clinical studies (Tanaka et al., 2019; Cheng et al., 2019; Hinrichsen et al., 2021; Kyle et al., 2020) demonstrated that Cognitive Behavioral Therapy for Insomnia (CBT-I)

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significantly improves sleep quality, reduces insomnia severity, and enhances psychological and cognitive outcomes. In addition, bright light therapy was shown to be effective in improving circadian rhythm disturbances, particularly among institutionalized elderly populations (Lan et al., 2021).

Although pharmacological therapy was discussed in several studies, there was general agreement that its use should be limited and carefully considered due to the increased risk of adverse effects in older adults, including falls, cognitive impairment, and drug interactions. Therefore, most studies recommended prioritizing behavioral and environmental interventions before initiating medication. Overall, the synthesis of the included studies demonstrates a consistent pattern of findings, highlighting that insomnia in the geriatric population is a complex and multifactorial condition requiring a comprehensive diagnostic approach and a strong emphasis on nonpharmacological management strategies.

Table 1. Characteristics of Included Studies

Theme	Author (Year)	Design	Key Outcomes	Managerial Implication
Clinical History (Anamnesis)	Roach et al. (2021); Taddei-Allen (2020); Markun & Sampat (2020)	Review	Sleep complaints, duration, frequency, daytime impairment, habits, environment, comorbidities, medications	Comprehensive assessment; identify contributing factors; follow DSM-5 criteria
Insomnia Severity Index (ISI)	Markun & Sampat (2020)	Review	7-item scale, score 0–28, assesses severity over 2 weeks	Screening and monitoring tool; combine with clinical interview
Pittsburgh Sleep Quality Index (PSQI)	Markun & Sampat (2020)	Review	7 components of sleep quality, score >5 = poor sleep	Comprehensive sleep evaluation and outcome monitoring
Polysomnography (PSG)	Rosenberg et al. (2022)	Review	Gold standard but not routine for insomnia	Use if suspect other sleep disorders (OSA, PLMD, parasomnia)
Actigraphy	Rosenberg et al. (2022)	Review	Wearable device measuring sleep-wake cycle	Useful for circadian rhythm disorders and monitoring
Laboratory Examination	Rosenberg et al. (2022)	Review	Detects metabolic and deficiency-related causes	Identify and treat underlying medical conditions
Nonpharmacological Management	Flaxer et al. (2021)	Review	Sleep hygiene, routines, exercise, environment	First-line treatment in elderly
CBT-I	Sari et al. (2019); Tanaka et al.	Review & Studies	Behavioral therapy improving sleep	First-line for chronic insomnia

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	(2019); Hinrichsen et al. (2021)		and cognition	
Bright Light Therapy	Lan (2019); Lan et al. (2021)	Clinical Study	Improves circadian rhythm and sleep quality	Useful in elderly, especially institutionalized

Discussion

This systematic review synthesized findings from 10 selected studies to provide a comprehensive understanding of insomnia in the geriatric population. Overall, the results indicate that insomnia in older adults is a multifactorial condition influenced by the interaction of biological aging, comorbid medical and psychiatric conditions, and psychosocial factors. Across the included studies, there is consistent evidence that insomnia is highly prevalent among older adults and is associated with adverse outcomes such as cognitive decline, depression, cardiovascular disease, and reduced quality of life. Furthermore, the findings demonstrate a strong consensus that nonpharmacological interventions, particularly Cognitive Behavioral Therapy for Insomnia (CBT-I), represent the most effective and safest first-line treatment.

When compared across studies, several similarities and differences emerge. Most studies (e.g., Patel et al., 2018; Taddei-Allen, 2020; Liu et al., 2021) consistently identify chronic disease, depression, and medication use as major risk factors for insomnia. However, variations are observed in the relative contribution of these factors. For instance, Liu et al. (2021) emphasize depression and chronic pain as dominant predictors, whereas other studies highlight environmental and behavioral factors such as sleep hygiene and lifestyle. Similarly, while all studies support the effectiveness of CBT-I, the magnitude of its impact varies. Clinical trials (Tanaka et al., 2019; Cheng et al., 2019) report significant improvements in sleep quality and depressive symptoms, whereas some studies suggest reduced effectiveness in patients with severe cognitive impairment or complex comorbidities. In contrast, pharmacological interventions are consistently reported to provide short-term benefits but are associated with higher risks, including falls, dependency, and cognitive side effects, leading to general agreement that their use should be limited.

These inconsistencies may be explained by differences in study design, population characteristics, and assessment methods. For example, heterogeneity in diagnostic criteria (clinical assessment vs. standardized instruments such as ISI and PSQI) may influence reported prevalence and severity of insomnia. In addition, variations in study settings—such as community-dwelling versus institutionalized older adults—may account for differences in treatment outcomes, particularly for interventions like bright light therapy, which appears more effective in controlled environments (Lan et al., 2021). Cultural and healthcare system differences may also contribute to variability, as most included studies were conducted in Western populations, potentially limiting generalizability to Southeast Asian contexts.

From a theoretical perspective, the findings of this review support the biopsychosocial model, which conceptualizes insomnia in older adults as the result of complex interactions between physiological, psychological, and environmental factors. Age-related changes in circadian rhythm and sleep architecture may predispose older adults to sleep disturbances, while comorbidities and psychosocial stressors act as precipitating and perpetuating factors. In the authors' view, this integrated framework is essential for understanding why single-modality treatments, particularly pharmacological approaches, are often insufficient in addressing insomnia in this population.

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Clinically, these findings have important implications. The consistent evidence supporting CBT-I highlights the need to prioritize nonpharmacological interventions in geriatric care. Healthcare providers should adopt a comprehensive assessment approach, such as the Comprehensive Geriatric Assessment (CGA), to identify contributing factors and tailor individualized treatment plans. Additionally, the underutilization of behavioral therapies in clinical practice suggests a gap between evidence and implementation. Expanding access to CBT-I, including digital and community-based programs, may improve treatment outcomes, particularly in resource-limited settings. At the same time, cautious use of pharmacological therapy remains necessary, especially for short-term management or severe cases.

Several limitations of this review should be acknowledged. First, the number of included studies is relatively small, and their heterogeneity in design, population, and outcome measures limits direct comparability. Second, the majority of studies were conducted in non-Indonesian settings, which may reduce the applicability of findings to local populations. Third, the lack of standardized reporting across studies may introduce bias in the synthesis process. From the authors' perspective, these limitations highlight the need for more rigorous and standardized research in this field.

Future research should focus on longitudinal and large-scale studies to better understand the long-term effectiveness of both pharmacological and nonpharmacological interventions in diverse geriatric populations. There is also a need for more context-specific research in Southeast Asia, particularly Indonesia, to account for sociocultural and healthcare system differences. Additionally, future studies should explore integrated treatment models that combine behavioral, environmental, and medical approaches, as well as the potential role of digital health interventions in improving access to insomnia management.

Conclusion

Insomnia is one of the most prevalent sleep disorders in the geriatric population and has a substantial impact on physical health, psychological well-being, cognitive function, and overall quality of life in older adults. Age-related physiological changes, reduced sleep efficiency, circadian rhythm disturbances, and the high prevalence of comorbidities and medication use render older adults particularly vulnerable to insomnia. The studies reviewed indicate that insomnia in geriatric patients should not be regarded merely as an isolated sleep complaint, but rather as a condition closely associated with an increased risk of depression, anxiety, cardiovascular disease, metabolic disorders, cognitive decline, falls, and even increased mortality.

The diagnosis of insomnia in the geriatric population requires a comprehensive approach, including a thorough clinical history, the use of validated assessment tools such as the Insomnia Severity Index and the Pittsburgh Sleep Quality Index, and selective diagnostic evaluations to exclude other sleep disorders and secondary causes. Management strategies for insomnia in older adults emphasize nonpharmacological interventions as first-line therapy, particularly Cognitive Behavioral Therapy for Insomnia (CBT-I), which has been shown to be both effective and safe in improving sleep quality and sleep efficiency. Pharmacological treatment may be considered selectively and with caution, given the heightened risks of adverse effects, polypharmacy, and age-related changes in pharmacokinetics and pharmacodynamics.

With the growing aging population, insomnia in geriatric patients represents an increasingly relevant health concern that warrants serious attention in clinical practice. A multidisciplinary approach through Comprehensive Geriatric Assessment is essential to ensure accurate diagnosis and individualized, safe, and effective management. Optimal treatment of

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insomnia is expected to enhance quality of life, functional independence, and long-term health outcomes in the geriatric population.

Further research is needed to evaluate the long-term effectiveness of nonpharmacological interventions, particularly community-based and digital CBT-I, in geriatric populations with diverse social backgrounds and comorbid conditions. In addition, more evidence is required regarding the safety and efficacy of newer insomnia medications, such as orexin receptor antagonists, in older adults. National-level studies, especially in Indonesia, should be expanded to comprehensively characterize insomnia in the geriatric population, thereby providing a robust foundation for the development of clinical guidelines and health policy strategies tailored to the needs of older adults.

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