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ANXIETY AND INSOMNIA AMONG OLDER ADULTS IN INDONESIA: EVIDENCE FROM THE 2023 NATIONAL HEALTH SURVEY

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ABSTRACT

Introduction: Insomnia is a common sleep disorder in the elderly and is frequently associated with psychological issues such as anxiety. In Indonesia, where the aging population is growing rapidly, population-level data on this association are limited. This study examined the prevalence of insomnia among older adults in Indonesia and its association with anxiety and other sociodemographic and behavioral factors. A cross-sectional analysis was conducted using data from the 2023 Indonesia Health Survey (Survei Kesehatan Indonesia/SKI). **Methods:** The sample included 95,552 individuals aged ≥ 60 years. The variables included age, gender, marital status, education, employment, residence, physical activity, and anxiety. Bivariate analyses were performed using chi-square tests, and the data were adjusted for complex survey design using IBM SPSS Statistics 27.0.1. **Results:** The prevalence of insomnia was 6.1%. Insomnia was significantly more common among those with anxiety (1.7%) than among those without (10.6%) ($p < 0.001$). Other factors associated with higher insomnia rates included female gender (7.1%), age 60–69 years (8.0%), married status (7.8%), lower education, employment, urban residence, and higher physical activity. **Conclusion:** Anxiety is strongly associated with insomnia among older Indonesian adults. Integrating mental health screening with sleep health interventions in geriatric care may help improve the quality of life in this population. Anxiety is strongly associated with insomnia among Indonesian older adults. Future research should incorporate multivariate models and longitudinal designs to clarify mechanisms.

Keywords: anxiety, insomnia, mental health, sleep, elderly, Indonesia Health Survey.

KECEMASAN DAN INSOMNIA PADA LANSIA DI INDONESIA: BUKTI DARI SURVEI KESEHATAN INDONESIA TAHUN 2023

ABSTRAK

Pendahuluan: *Insomnia merupakan gangguan tidur yang umum terjadi pada lansia dan sering dikaitkan dengan masalah psikologis seperti kecemasan. Di Indonesia, dengan populasi lansia yang terus meningkat, data tingkat populasi mengenai hubungan tersebut masih terbatas. Penelitian ini bertujuan untuk menganalisis prevalensi insomnia pada lansia di Indonesia serta hubungannya dengan kecemasan dan faktor sosiodemografi serta perilaku lainnya. Analisis cross-sectional dilakukan menggunakan data Survei Kesehatan Indonesia (SKI) tahun 2023.* ***Metode:*** *Sampel penelitian mencakup 95.552 individu berusia ≥60 tahun. Variabel yang dianalisis meliputi usia, jenis kelamin, status perkawinan, pendidikan, pekerjaan, tempat tinggal, aktivitas fisik, dan kecemasan. Analisis bivariat dilakukan menggunakan uji chi-square, dan data disesuaikan dengan desain survei kompleks*

menggunakan IBM SPSS Statistics versi 27.0.1. ***Hasil:*** *Prevalensi insomnia sebesar 6,1%. Insomnia secara signifikan lebih sering ditemukan pada responden dengan kecemasan dibandingkan responden tanpa kecemasan (p < 0,001). Faktor lain yang berhubungan dengan tingginya angka insomnia meliputi jenis kelamin perempuan, usia 60–69 tahun, status menikah, tingkat pendidikan rendah, status pekerjaan, tempat tinggal perkotaan, dan aktivitas fisik yang lebih tinggi.* ***Kesimpulan:*** *Kecemasan berhubungan kuat dengan insomnia pada lansia di Indonesia. Integrasi skrining kesehatan mental dengan intervensi kesehatan tidur dalam pelayanan geriatri dapat membantu meningkatkan kualitas hidup populasi ini. Penelitian selanjutnya perlu menggunakan model multivariat dan desain longitudinal untuk memperjelas mekanisme hubungan tersebut.*

Kata Kunci: *insomnia, kecemasan, kesehatan mental, lansia, Survei Kesehatan Indonesia, tidur.*

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INTRODUCTION

Insomnia is one of the most prevalent sleep disorders worldwide, especially among the elderly. It is characterized by difficulties in initiating or maintaining sleep, or waking up too early and not being able to return to sleep, often resulting in daytime dysfunction (Patel, Steinberg and Patel, 2018; Honarvar et al., 2019; Supplement Prevalence of Insomnia, 2025). According to the International Classification of Sleep Disorders (ICSD-3), chronic insomnia is diagnosed when these symptoms occur at least three times per week for three months or longer (Esmail Qashqary et al., no date; Mohan, no date; de Entrambasaguas et al., 2023).

Indonesia, like many countries worldwide, is experiencing a significant demographic shift due to increased life expectancy and declining fertility rates. The proportion of individuals aged ≥ 60 years is rapidly growing. As this aging trend accelerates, age-related health issues, particularly sleep disturbances, are becoming more prevalent and require targeted public health responses (Anggi Hanafiah Syanif, Joni Haryanto and Elida Ulfiana, 2022; Kudrna, Le and Piggott, 2022; Budiman et al., 2024). The 2023 Indonesia Health Survey (Survei Kesehatan Indonesia/SKI) provides the most recent and comprehensive data on various health indicators, including sleep quality, mental health, and lifestyle factors, for the elderly population in Indonesia. Existing international studies have consistently shown that insomnia in older adults is

multifactorial and is associated with both biological aging processes and psychosocial factors.

A recent study in Taiwan by Peng et al. (2021) reported that female gender, depression, physical inactivity, and sleep-related conditions significantly increased the risk of insomnia among elderly outpatients. A meta-analysis by Wen et al. (2023) confirmed that insomnia significantly correlates with frailty, further emphasizing the clinical importance of addressing this condition in older adults. While the global literature highlights these risk factors, local studies from Indonesia are limited, particularly those using nationally representative samples of older adults. Furthermore, the interaction between mental health conditions, especially anxiety, and sleep disturbances among older Indonesian adults remains underexplored. Anxiety is a well-documented psychological factor that can exacerbate sleep problems through mechanisms involving heightened physiological arousal, rumination, and disrupted circadian regulation (Alfian et al., 2024; Wu et al., 2024; Nyaaba et al., 2025).

Given the growing burden of mental health issues among the elderly in Indonesia and the lack of large-scale evidence linking anxiety to insomnia in this population, this study is timely and essential. Leveraging the 2023 Indonesia Health Survey data allows for an accurate and nationally representative analysis. Understanding the sociodemographic, psychological, and lifestyle factors associated with insomnia can aid in developing effective public health interventions tailored for older Indonesians. This study aimed to examine the prevalence and correlates of insomnia among older adults in Indonesia, with a particular focus on its association with anxiety.

METHODS

Data Source and Study Design

This cross-sectional analysis used secondary data from the 2023 Indonesia Health Survey (Survei Kesehatan Indonesia/SKI) conducted by the Ministry of Health of the Republic of Indonesia. The SKI is a nationally representative survey designed to collect health-related information from all provinces of Indonesia. A stratified, multistage, probability-cluster sampling design was employed to ensure representativeness of urban and rural populations. Data were collected through structured interviews conducted by trained personnel using standardized instruments.

Study Population

The population included in this study comprised Indonesian adults aged ≥ 60 years. From the SKI dataset, 95,552

respondents met the criteria and were included in the final analysis.

Inclusion and Exclusion Criteria

Inclusion Criteria: Individuals aged ≥ 60 years. Complete responses were obtained for key variables, including insomnia, anxiety, and physical activity. Exclusion Criteria: Respondents aged < 60 years. Missing or incomplete data on primary or secondary variables. Individuals with cognitive or communication impairments, as indicated in the dataset, which could compromise the reliability of responses

Variables and Measurements

The dependent variable in this study was insomnia, which was derived from participants' self-reports of difficulty initiating or maintaining sleep. Respondents were asked whether they had experienced insomnia-related symptoms. Responses were recorded as binary outcomes: Yes = participant reports insomnia No = participant does not report insomnia Several socio-demographic and behavioral variables were analyzed as independent variables: Age: Categorized into: 60–69 years, 70–79 years, and 80–89 years. Gender: Male or Female. Marital Status: Classified as: Single, Married, Divorced. Educational Level: Categorized into: No formal education, Elementary, Junior High School, Senior High School, and College. Employment Status: Grouped as: Working or Not Working. Place of Residence: Urban or Rural, based on geographic classification. Anxiety: Measured based on respondents' self-reported experiences of anxiety-related symptoms. The results were categorized as yes (with anxiety) or no (without anxiety). Physical Activity: Based on the frequency and intensity of self-reported physical activity. The light intensity was classified into three groups: minimal movement and low exertion. Moderate intensity: consistent movement and mild exertion. Heavy intensity: high-energy activities or labor-intensive work.

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics (version 27.0.1). Descriptive statistics were used to describe the frequency and percentage distribution of the study variables. Bivariate analysis was conducted using chi-square tests to examine the association between insomnia and independent variables. To account for the complex sampling design of the SKI survey, In order to account for the intricate survey design, which included stratification, clustering, and unequal likelihood of selection, sampling weights from the dataset were applied, guaranteeing more precise and representative values. Statistical significance was set at $p < 0.05$ for all analyses.

Ethics Approval

This study was conducted in accordance with the ethical standards for secondary data analysis. Data access was granted through an official request and governed by a confidentiality agreement (No. FRM/SMKI-PUSDATIN/70/0108/2024) and approved via ticket number 240675B7CC9C4327. All procedures adhered to the national guidelines for data security, privacy, and ethical research practices. The dataset used in this study is publicly accessible through the Ministry of Health's official portal at: https://www.badankebijakan.kemkes.go.id/data-mikro-ski.

RESULTS

Table 1 displays the sociodemographic and health-related characteristics of the 95,552 Indonesian adults aged ≥ 60 years who were included in the 2023 Indonesia Health Survey. most were 60–69 years (68.8%; n=65,774), with fewer aged 70–79 (24.8%; n=23,659) and 80–89 (6.4%; n=6,119). Women slightly outnumbered men (51.0% vs. 49.0%). Most participants were married (68.7%; n=65,631), while 30.1% (n=28,759) were divorced, and 1.2% (n=1,162) single. Educational attainment was generally low: 26.5% (n=25,299) had no formal education, 42.1% (n=40,203) completed only elementary school, 10.8% (n=10,290) had junior high, 13.6% (n=12,993) senior high, and 7.1% (n=6,767) had college. Despite older age, 68.3% (n=65,262) reported over half of the participants resided in urban areas (54.0%; n=51,613).

Tabel 1. Frecuency distribution of characteristic Association between anxiety and insomnia (n=95.552)

Variables	Frequency (n)	Percent
Age (Year)		
60 – 69	65.774	68,8%
70 – 79	23.659	24,8%
80 – 89	6.119	6,4%
Gender		
Male	46.817	49,0%
Female	48.735	51,0%
Marital Status		
Single	1.162	1,2%
Married	65.631	68,7%
Divorced	28.759	30,1%
Educational Level		
None	25.299	26,5%
Elementary	40.203	42,1%
Junior High	10.290	10,8%
School	12.993	13,6%
Senior High School	6.767	7,1%
College		
Job		
Doesn't Work	30.290	31,7%
Work	65.262	68,3%
Residence		
Urban	51.613	54,0%
Rural	43.939	46,0%
Insomnia		
Yes	5.837	6,1%
No	89.715	93,9
Anxiety		
Yes	2.661	2,8%
No	92.891	97,2%
Physical activity		
Light Intensity	3.337	15,5%
Moderate Intensity	9.132	42,5%
Heavy Intensity	9.032	42,0%

Sleep and mental health indicators showed that 6.1% (n=5,837) of the participants reported insomnia and 2.8% (n=2,661) reported anxiety. Regarding activity, most engaged in moderate (42.5%; n=9,132) or heavy (42.0%; n=9,032)

intensity activity, with 15.5% (n=3,337) reporting light activity levels. Collectively, these distributions depict a predominantly "younger-old," urban, and still-working population with low formal education—factors that may shape health literacy, service access, and the observed prevalence of insomnia and anxiety, which will be eexplored in subsequent analyses.

Tabel 2. Chi-square analysis (n=95.552)

Variables	Insomnia				
	Yes		No		
	n (5.837)	%	n (89.715)	%	p-value
Demograpic Characteristic					
Age (Year)					
60 – 69	7.605	8,0	58.169	60,9	
70 – 79	3.251	3,4	20.408	21,4	0,001
80 – 89	922	1,0	5.197	5,4	
Gender					
Male	4.986	5,2	41.831	43,8	0,001
Female	6.792	7,1	41.943	43,9	
Marital Status					
Single	165	0,2	997	1,0	
Married	7.436	7,8	58.195	60,9	0,001
Divorced	4.177	4,4	24.582	25,7	
Educational Level					
None	3.467	3,6	21.832	22,8	
Elementary	5.082	5,3	35.121	36,8	
Junior High School	1.276	1,3	9.014	9,4	0,001
Senior HighSchool	1.323	1,4	11.670	12,2	
College	630	0,7	6.137	6,4	
Job					
Doesn't Work	4.457	4,7	25.815	27,0	0,001
Work	7.303	7,6	57.959	60,7	
Residence					
Urban	5.907	6,2	45.706	47,8	0,001
Rural	5.871	6,1	38.068	39,8	
Anxiety					
Yes	1.632	1,7	1.029	1,1	0.000
No	10.146	10,6	82.745	86,6	
physical activity					
Light Intensity	401	1,9	2.936	13,7	
Moderate Intensity	1.031	4,8	8.101	37,7	0,001
Heavy Intensity	876	4,1	8.156	37,9	

***p<0.05**

Table 2 summarizes the bivariate (χ^2) associations between insomnia and key correlates among Indonesians aged ≥60 years. All variables were significantly associated with insomnia ($p<0.05$). Prevalence was highest in the "younger-old" (60–69 years: 8.0%), declining in the 70–79 (3.4%) and 80–89 (1.0%; $p<0.001$). Women reported more insomnia than men (7.1% vs. 5.2%; $p=0.001$). Married participants had a higher prevalence (7.8%) than divorced (4.4%) or single participants (0.2 %; $p = 0.001$). Lower education was associated with greater insomnia

(elementary 5.3%, none 3.6%), whereas college-educated respondents reported the lowest prevalence (0.7%; p=0.001). Working older adults had more insomnia than those not working (7.6% vs. 4.7%; p=0.001). Urban residence was marginally but significantly higher than rural residence (6.2% vs. 6.1%; p=0.001). Anxiety showed the strongest gradient: 1.7% with anxiety vs. 10.6% without (p<0.001). By activity level, moderate (4.8%) and heavy (4.1%) intensity were linked to more insomnia than light activity (1.9%; p=0.001). Collectively, these patterns suggest that psychosocial stressors, socioeconomic resources, and behavioral factors shape sleep problems in later life; however, these bivariate cross-sectional findings do not imply causality and warrant confirmation in multivariable models.

DISCUSSION

This study aimed to explore the association between anxiety and insomnia in the elderly population using data from the 2023 Indonesian Health Survey. The findings revealed a significant association between anxiety and insomnia, with additional demographic and behavioral factors contributing to insomnia prevalence.

Our analysis showed that anxiety had association with insomnia in older adults. Respondents with anxiety were almost to report insomnia than those without anxiety. This aligns with previous studies, such as that of, who identified anxiety as a key psychological comorbidity associated with insomnia among elderly patients in the U.S. primary care setting. The bidirectional relationship between anxiety and sleep disturbances suggests that interventions addressing anxiety may also alleviate insomnia (Cohen *et al.*, 2022; de Entrambasaguas *et al.*, 2023; Webb, 2023; Priasmoro and Asri, 2024; Palagini *et al.*, 2024).

Gender differences were also significant, with women reporting higher rates of insomnia than men (Zeng *et al.*, 2020; Tsou, 2022; Asri *et al.*, 2024). This finding is consistent with research by Peng *et al.* (2021), who noted that women exhibited a higher prevalence of insomnia and were more sensitive to sleep disruptions and emotional factors. This gender disparity may be attributed to hormonal changes, psychosocial stressors, and gender-specific roles that contribute to the vulnerability to sleep disorders.

Age was another contributing factor, with the youngest cohort (60–69 years) showing the highest prevalence of insomnia (Muhammad, Gharge and Meher, 2022). This may reflect the “young-old” subgroup still dealing with work, caregiving responsibilities, and early aging transition. Similar trends were noted in

research conducted by (Kim *et al.*, 2017), who highlighted that age alone does not predict insomnia—rather, the stage of aging combined with psychosocial pressures is more relevant.

Educational attainment and employment status also play important roles. Elderly individuals with lower education levels and those still working were more likely to experience insomnia, echoing findings, which suggest that stress, job-related demands, and limited health literacy are contributors to poor sleep quality (Kalimo, Ei-Batawi and Cooper, no date; Palmer *et al.*, 2017).

The results regarding physical activity were somewhat unexpected. Moderate and heavy physical activity were more prevalent among those with insomnia, which may indicate reverse causality, where individuals with insomnia engage in higher activity levels to improve sleep. Prior studies have suggested that the timing and intensity of exercise may influence sleep quality differently, particularly in older adults (Vanderlinden, Boen and Van Uffelen, 2020; Kim, Roberts and Moon, 2021; Alnawwar *et al.*, 2023; Lakshmi Narayana, Kumar and Yaswanthi, 2023).

The relationship between residence and insomnia was also significant. While the difference between urban and rural dwellers was slight, those in urban settings had marginally higher rates of insomnia, likely due to environmental noise, light pollution, and greater exposure to stressful living conditions factors commonly cited in urban health studies (Zheng *et al.*, 2018; Functional *et al.*, 2024).

This study had several limitations. First, the cross-sectional design limits the ability to infer causality between variables such as anxiety and insomnia. Self-reported measures of insomnia and anxiety may be subject to recall and social desirability biases. Second, the analyses relied solely on bivariate chi-square tests; multivariate logistic regression could not be conducted due to constraints in variable availability and dataset structure. Consequently, the observed associations are unadjusted and may be influenced by uncontrolled confounders. Some potentially important covariates (e.g., comorbid medical conditions, medication use, and sleep environment factors) were not included in the dataset. The analysis did not differentiate between acute and chronic insomnia, which may have distinct effects on sleep. The assessment of physical activity intensity did not account for the timing, duration, or type of activity, which may influence sleep outcomes differently.

This study has several implications for research, policy, and clinical practice. Routine anxiety screening should be incorporated into geriatric assessments as a strategy for identifying individuals at risk

of insomnia. Tailored interventions, gender- and age-specific sleep hygiene education, and cognitive behavioral therapy (CBT-I) programs may help mitigate insomnia. Public health programming and educational campaigns promoting awareness of the relationship between mental health and sleep are crucial, especially in urban and aging populations. Policy development, Efforts to integrate sleep health into national aging policies and geriatric health services should be prioritized (Lim *et al.*, 2023).

CONCLUSION

In a nationally representative sample of Indonesians aged ≥60 years, anxiety was found to have the strongest association with insomnia. Risk was also patterned by sociodemographics, being higher among women, the younger-old (60–69), those with lower education, urban residents, and those still working. Unexpectedly, moderate–heavy physical activity correlated with more insomnia, suggesting complex behavioral pathways and possible reverse causality. These findings support the integration of anxiety screening and management with sleep hygiene education and context-appropriate activity guidance in the geriatric care. Given the cross-sectional, self-reported design, longitudinal and interventional studies are needed to clarify these mechanisms. Tackling anxiety and sleep problems could improve the health and quality of life of Indonesia's growing older population.

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DATA AVAILABILITY STATEMENT

The dataset utilized in this research can be accessed by requesting it from the Ministry of Health of the Republic of Indonesia through this link: https://www.badankebijakan.kemkes.go.id/data-mikro-ski/

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