

THE RELATIONSHIP BETWEEN SLEEP QUALITY AND FALL RISK IN THE OLDER ADULTS

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ABSTRAK

Proses penuaan mengakibatkan penurunan fungsi berbagai sistem tubuh pada orang dewasa yang lebih tua. Kualitas tidur yang buruk berdampak buruk pada keseimbangan tubuh, sehingga meningkatkan risiko jatuh pada populasi ini. Penelitian ini bertujuan untuk mendefinisikan dengan jelas hubungan antara kualitas tidur dan risiko jatuh pada orang lanjut usia. Penelitian ini menggunakan desain cross-sectional dan melibatkan 68 orang lanjut usia dari Pusat Pelayanan Sosial Griya Lansia Ciparay, Jawa Barat. Peserta dipilih melalui purposive sampling. Kualitas tidur diukur menggunakan kuesioner Pittsburgh Sleep Quality Index (PSQI), sedangkan risiko jatuh dinilai dengan Morse Fall Scale (MFS). Analisis mengungkapkan bahwa kualitas tidur rata-rata di antara peserta buruk, sedangkan risiko jatuh dikategorikan rendah. Analisis korelasi bivariat menunjukkan hubungan yang signifikan antara kualitas tidur dan risiko jatuh pada orang lanjut usia, dengan nilai $p = 0,002$ ($p < 0,05$). Temuan menunjukkan hubungan yang signifikan antara kualitas tidur dan risiko jatuh pada populasi orang lanjut usia. Bagi Responden diharapkan agar menjaga kualitas tidur yang baik dan perlu mendapatkan edukasi tentang pencegahan jatuh untuk mengantisipasi jatuh pada lansia.

Kata kunci: Kualitas tidur, risiko jatuh, lansia

ABSTRACT

The aging process results in a marked decline in the functioning of various body systems in older adults. Poor sleep quality has a detrimental effect on body balance, thereby increasing the risk of falls within this population. This study aims to clearly define the relationship between sleep quality and fall risk among the elderly. This study utilized a cross-sectional design and included 68 elderly individuals from the Ciparay Social Service Center, West Java. Participants were selected through purposive sampling. Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) questionnaire, while the risk of falling was assessed with the Morse Fall Scale (MFS). Analysis revealed that the average sleep quality among participants was poor, while the risk of falling was categorized as low. Bivariate correlation analysis indicated a significant relationship between sleep quality and fall risk in the elderly, with a p -value of 0.002 ($p < 0.05$). The findings indicate a significant relationship between sleep quality and the risk of falls in the elderly population. For Respondents expected to maintain good quality sleep is necessary to get education on the prevention of falls to anticipate falls in the elderly.

Keywords: Sleep quality, risk of falls, elderly

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INTRODUCTION

Life expectancy in Indonesia has increased, with the life expectancy for men averaging 69.93 years and for women around 73.83 years (BPS, 2022). This figure has risen significantly year after year. The increase in life expectancy indicates a decline in mortality rates and improved health levels, driven by better living standards and health services. This, in turn, has contributed to a growing elderly population in Indonesia.

According to the World Health Organization (WHO), an elderly person is defined as someone aged 60 years or older. The elderly are at an advanced stage of life, characterized by a decline in the body's ability to adapt to environmental stress. According to the Central Statistics Agency of Indonesia, the percentage of the elderly population increased from 7.57% in 2012 to 10.48% in 2022 (Astuti, 2023). In West Java, the elderly population (aged 60 and above) represents 9.78% of the total population (BPS, 2022).

High life expectancy is expected to result in increased health problems among this group. One of the fundamental issues associated with aging is poor sleep quality, which includes difficulties with both sleep initiation and maintenance, as well as dissatisfaction with sleep quantity and quality over extended periods. A number of physiological, hormonal, and lifestyle changes associated with aging might result in decreased sleep quality. Deep sleep is less common in older persons. Age-related changes in the body's internal clock also result in earlier bedtimes and wake-up times (late sleep phase syndrome), which can make it harder to fall asleep through the night and cause premature awakenings. The hormone that controls sleep, melatonin, likewise declines with age. Elderly people who have trouble controlling their bladder or who have prostate issues also have trouble sleeping since they have to use the restroom more frequently. These problems can have serious consequences when the sleep needs of the elderly are not adequately met. Common sleep-related issues among the elderly include difficulty falling asleep (sleep onset problems), trouble maintaining deep sleep (sleep maintenance problems), and waking up too early (early morning awakening or EMA) (Sunarti & Helena, 2018).

Sleep quality is defined as a person's satisfaction with all aspects of their sleep experience. Good sleep quality has positive effects, such as feeling refreshed, having normal reflexes, and maintaining positive social relationships. In contrast, poor sleep quality can lead to negative effects, including fatigue, low energy, stress, irritability, difficulty concentrating, slowed physical and mental responses, and an increased intake of caffeine or alcohol (Nelson, Kathy., Davis, Jean., & Corbett, Cynthia, 2022).

Older adults who experience sleep problems and poor sleep quality, such as frequent nighttime awakenings and short sleep durations, tend to feel more drowsy during the day and face a higher risk of falls (Ghobadimehr et al., 2022). These factors can contribute to cognitive limitations, difficulty concentrating, anxiety, depression, and reduced physical abilities, all of which increase the risk of falls, fractures, and injuries among older adults.

According to the WHO global report, the incidence of falls among the elderly is expected to increase, and if not addressed, can lead to death. In individuals aged 65 years and older, the frequency of falls ranges from 28-35%, occurring 2-4 times per year. This rate increases with age, reaching 32-42% for those aged 70 and older, with falls occurring 5-7 times per year (Sari, Prisca & Pranata, 2019). The prevalence of fall risk in the elderly also increases with age: among those over 65, the risk of falling is 30%, and for those over 80, the risk rises to 50% annually (BKKBN, 2020). Differences in the prevalence of fall risk between elderly individuals living in communities versus institutions have been observed

in Indonesia, particularly in three provinces: DKI Jakarta, Bandung, and Yogyakarta. The prevalence of fall risk is 50.5% in institutions and 40.4% in the community (Susilowati, 2020). Elderly people living in nursing homes experience falls more frequently than those living at home, with fall rates reaching 30-50% annually, and 40% of them experience recurrent falls (Sari et al., 2019). This study aims to determine the relationship between sleep quality and the risk of falling in the elderly.

RESEARCH METHOD

Research design involves quantitative methods utilizing correlational approaches and a cross-sectional design. The population for this study consisted of elderly individuals at the Griya Lansia Ciparay Social Service Center, totaling 150 peoples. A sample of 68 respondents was selected using G-Power Software Version 3.1.9.4. The sampling technique employed was purposive sampling, based on specific inclusion criteria, which included individuals aged 60 to 90 years, able to communicate effectively, and without hearing or vision impairments.

The instruments used in this research include the Pittsburgh Sleep Quality Index (PSQI) questionnaire to measure sleep quality. The PSQI comprises 19 questions across 7 components, which have been tested for validity and reliability, with a validity result of $r = 0.361$ and a reliability score of Cronbach's Alpha = 0.766. Additionally, the Morse Fall Scale (MFS) was used to assess fall risk, consisting of 6 questions. This instrument underwent validity testing, yielding a result of 0.499, while the reliability score was 0.402. These instruments valid and reliable for the Indonesian version.

Data analysis in this research included both univariate and bivariate analyses. Univariate analysis was conducted to describe the characteristics of each variable, while bivariate analysis aimed to determine the relationship between sleep quality and fall risk among the elderly. Prior to conducting the relationship test, a normality test was performed using the Kolmogorov-Smirnov method. The results indicated that the data were not normally distributed ($p < 0.05$), leading to the application of the non-parametric Spearman Rank statistical test. This study has received ethical approval following review by the research ethics board at Universitas Jenderal Achmad Yani Cimahi, Jawa Barat, as indicated by reference number 015/KEPK/FITKes-Unjani/III/2024.

RESULTS AND DISCUSSIONS

The results of the respondent characteristics for the study, which included a total of 68 individuals, revealed that the majority were aged between 60-74 years, with 52 respondents (76.5%) falling within this age range. In terms of gender, 35 respondents (51.5%) were female. A notable 16 respondents (19.0%) reported a history of hypertension. Regarding marital status, a significant portion, 54 individuals (79.4%), identified as widowed or widower. Lastly, the level of education showed that 27 respondents (39.7%) had completed only their elementary education (Table 1).

Table 1. Respondent's Characteristics

	Category	n (%)
Sex	Female	35 (51.5)
	Male	33 (48.5)
Age	75-90	52 (76.5)
	60-74	16 (23.5)
Marital Status	Not married	1 (1.5)
	Married	13 (19.1)
	Widow/Widower	54 (79.4)
Education	No School	13 (19.1)

Medical History	Elementary school	27 (39.7)
	Junior high school	8 (11.8)
	Senior high school	14 (20.6)
	College	6 (8.8)
	Hypertension	16 (19.0)
	Stroke	9 (10.7)
	Diabetes mellitus	2 (2.4)
	Rheumatism	3 (3.6)
	Osteoarthritis	9 (10.7)
	Asthma	4 (4.8)
	Gout	9 (10.7)
	Gastritis	7 (8.3)

Based on table 2, it can be seen that the respondents who had good sleep quality numbered 25 people (36.8%) and 43 people (63.2%) have poor sleep quality.

Table 2. Frequency Distribution Based on Sleep Quality Characteristics (n=68)

Category	f	%
Good	25	36.8
Poor	43	63.2

Based on table 3. shows that respondents who were not at risk of falling numbered 28 people (41.2%), respondents who had a low risk of falling were 31 people (45.6%), and respondents who had a high falls amounted to 9 people (13.2%) .

Table 3. Frequency Distribution Based on Fall Risk Characteristics (n=68)

Category	f	%
No risk	28	41.2
Low risk	31	45.6
High risk	9	13.2

Based on table 4, it shows that the respondents' sleep quality is mostly in the poor category with a low risk of falling scale of 24 respondents (50.0%). Correlation test results *Spearman's Rho* obtained the correlation coefficient value is 0.376 with mark significant of $0.002 < 0.05$ indicates that the direction of the relationship is positive with a fairly strong range of relationship strength. This means that there is a relationship between sleep quality and the risk of falling in the elderly.

Table 4. The Relationship Between Sleep Quality and Fall Risk

Sleep Quality	No risk		Low Risk		High Risk	
	f	%	f	%	f	%
Good	15	75.0	5	25.0	0	0.0
Poor	15	31.3	24	50.0	9	18.8
Total	30	44.1	29	42.6	9	13.2

R= 0,376 P = 0.002

The study indicates that there is a significant relationship between sleep quality and the risk of falling among the elderly, particularly observed at the Griya Lansia Ciparay Social Service Center. The findings suggest that as sleep quality deteriorates, the risk of falling increases correspondingly, showing a positive relationship that is relatively strong. This conclusion is supported by Takada et al. (2018), who researched individuals aged 40 to 80 years and found a clear link between poor sleep quality and increased fall risk. Similarly, Mashudi's research in 2020 reinforces this connection by highlighting the significant impact of sleep quality on fall risks in the elderly. Furthermore, the study by Ghobadimehr, Pasha, Hosseini, & Bijani (2022) also confirmed a significant association between sleep quality and fall risk among the elderly in Amirkola, Iran.

Based on the results of the study, it was found that a significant number of elderly individuals experience poor sleep quality while having a low risk of falling. As noted by Contreras et al. (2018), impaired sleep quality can interfere with postural control, correlating with an elevated risk of falls. Elderly individuals suffering from poor sleep quality—exemplified by frequent nighttime awakenings and shortened sleep duration—are often sleepier during the day, which may elevate their risk of falling. Such conditions can lead to cognitive limitations, difficulty concentrating, anxiety, depression, and reduced physical capabilities, ultimately increasing the likelihood of falls, fractures, and injuries among older adults. Sleep quality reflects an individual's satisfaction with their sleep experience and involves several crucial elements, including sleep initiation, maintenance, duration, and wakefulness. Quality sleep is vital as it supports all bodily systems, particularly benefiting the neurological, cardiovascular, immune, and endocrine systems (Dewa et al., 2020). Disrupted sleep can lead to challenges in physical functioning and balance control. Moreover, limited sleep duration may induce a pro-inflammatory state by raising levels of inflammatory cytokines, such as tumor necrosis factor-alpha (TNF- α) and interleukins. Chronic inflammation can diminish muscle mass and strength, as well as walking speed. This indicates that sleep disturbances might exacerbate inflammation in the body, which could be tied to the risk of falls and other health issues (Lee et al., 2021).

Elderly women are indeed more susceptible to falls compared to elderly men, primarily due to the decrease in estrogen hormone production that occurs after menopause. This hormonal change adversely affects cartilage density, leading to brittle and easily fractured bones. Additionally, the deterioration of joint cartilage hampers movement speed, resulting in mobility restrictions that can further increase the risk of falls (Widowati et al., 2022). The loss of bone mass associated with menopause significantly heightens the likelihood of fractures from falls, along with other related health issues (Contreras et al., 2018). Moreover, poor sleep quality has been linked to various health risks, including hypertension. The relationship between sleep quality and hypertension is believed to stem from heightened sympathetic nervous activity affecting blood vessels during REM sleep (Ulum, Cahyaningrum & Murniati, 2022). Joint pain, commonly due to osteoarthritis in the elderly, can also contribute to emotional distress such as anxiety and depression, as well as physical discomfort, all of which may disrupt sleep. Additionally, waking up in the morning has been correlated with white matter lesions in the brain of the elderly, potentially impacting cognitive functions like posture control and balance (Fu et al., 2019). Research conducted at the Griya Lansia Ciparay Social Service Center highlights the significant relationship between sleep quality and fall risk among the elderly. Those with poor sleep quality tend to have a higher risk of falling, whereas individuals who enjoy good sleep quality generally face lower fall risks.

CONCLUSION

Based on the results of research that has been conducted show that The majority of elderly people have poor sleep quality and the majority have a low risk of falling. The results of the analysis of the relationship between sleep quality and the risk of falling in the elderly at the Griya Lansia Ciparay Social Service Center said that there was a positive relationship between sleep quality and the risk of falling in the elderly with a fairly strong relationship strength. For Respondents expected to maintain good quality sleep is necessary to get education on the prevention of falls to anticipate falls in the elderly.

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