

The Relationship Between Quality of Sleep with Hypertension Rate in the Elderly

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ABSTRACT

Background: The quality of sleep is a crucial determinant of overall health and well-being, particularly among the elderly population. A person who has reached the age of 60 is considered to be elderly. One of Indonesia's indices of human development is the increase in life expectancy. Several factors, including irregular sleep, a lack of exercise, and stress, contribute to the recurrence of hypertension in the elderly with elevated blood pressure symptoms. Hypertension is an increase in blood pressure in the arteries. Hyper means excessive pressure or tension. Hypertension is a blood pressure or heart rate that is higher than normal because of narrowing arteries or other disorders. The aim of this study was to examine the relationship between sleep quality and the recurrence rate of hypertension in the elderly. **Methods:** The research design is correlational, using cross-sectional methods. The study randomly selected 83 participants from the population of all hypertension patients in the working area of the Jampangkulon Health Centre in the Sukabumi Regency. The univariate and bivariate data analyses employed the chi-square test. **Results:** The results showed that the *P* value of 0.000, which means <0.05 , indicates a relationship between sleep quality and the recurrence rate of hypertension in the elderly in the working area of the Jampangkulon Health Centre, Sukabumi Regency. **Conclusion:** The study results indicate that there is a relationship between sleep quality and the rate of recurrence of hypertension in the elderly. The present study will help elderly individuals who experience recurrences of hypertension to maintain and improve their healthcare to achieve optimal health.

Keywords: Elderly; Hypertension; Sleep Quality

INTRODUCTION

The National Population and Family Planning Agency (BKKBN) explains that an older person reaches the age of 60 years (Wisnumurti, Darma & Suasih, 2018). Increased life expectancy is one of Indonesia's human development indicators. Life expectancy is one of the indicators used to assess public health status (Kristanto, Daerobi, & Samudro, 2019). Hypertension is the leading cause of cardiovascular disease and premature death worldwide. Due to the widespread use of antihypertensive medications, global mean blood pressure (BP) has remained constant or decreased slightly over the past four decades. By contrast, the prevalence of hypertension has increased, especially in low- and middle-income countries (LMICs). Estimates suggest that 31.1% of adults (1.39 billion) worldwide had hypertension in 2010. The prevalence of hypertension among adults was higher in LMICs (31.5%, 1.04 billion people) than in high-income countries (28.5%, 349 million people) (Valenzuela *et al.*, 2021).

Every year, there are more people who have hypertension. Estimates suggest that by 2025, hypertension will affect 1.5 billion people and cause 10.44 million deaths annually due to its complications. According to measurements taken from residents under the age of 18, the prevalence of hypertension was 34.1%, with South Kalimantan having the highest rate (44.1%) and Papua having the lowest (22.2%). In Indonesia, there are an estimated 63,309,620 instances of hypertension, and there are 427,218 fatalities from hypertension each year (Ministry of Health Republic of Indonesia., 2019). Already today, in almost two dozen countries around the world, 20% of the population is over 65 years old. According to the WHO, the world's 60+ age group already exceeds the number of children under 5 years of age. At the same time, by 2050, the number of 65+ will exceed the number of adolescents and young people aged 15–24 (Grinin, Grinin, & Korotayev, 2023).

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A rise in systolic blood pressure of more than 140 mmHg and/or a rise in diastolic blood pressure of more than 90 mmHg in two readings taken with a five-minute gap between them indicates the presence of hypertension (Safarina, Fuji, & Pragholapati, 2022; Abdurakhman *et al.*, 2022). Hypertension in the elderly occurs due to the thickening of the arterial walls, which causes hypertension in the elderly. This causes the muscular layer to accumulate collagen substances, causing the blood vessels to gradually enlarge and stiffen. Narrowing the circulatory system raises blood pressure above the normal range, namely systolic pressure ≥ 140 mmHg and diastolic pressure ≥ 90 mmHg (Firdausia, Hadiwiardjo, & Wahyuningsih, 2023).

Poor sleep quality can make it easier for people with hypertension to experience a recurrence of hypertension, as it can alter hormones, stress cortisol, and the sympathetic nervous system, leading to an increase in blood pressure. This is because poor sleep quality can lead to decreased blood pressure in the elderly, causing them to feel helpless or experience hypertension immediately, which can even lead to a recurrence (Rau *et al.*, 2024).

Sleep quality is defined as satisfaction with the sleep experience. The elderly's inability to fall or stay asleep, rising early in the morning, and excessive daytime sleepiness are all signs of sleep issues. The consequences of chronic sleep problems are dire. Sleep loss or the chronic use of sedatives can lead to falls or accidents. Interrupted breathing during sleep can seriously impact the cardiovascular, lung, and systemic nerve centers. Evidence supports a strong association between sleep apnea and hypertension (Wu *et al.*, 2019). Studies have identified associations of sleep irregularity with hypertension and increased risk of adverse cardiovascular outcomes (Sansom *et al.*, 2024). This study aims to examine the relationship between sleep quality and the recurrence rate of hypertension in the elderly.

METHODOLOGY

Study Design and Settings

This cross-sectional study was conducted from February 2022 to August 2022. The study focused on the elderly population in Bojongsari Village, in the working area of the Jampangkulon Health Centre, Sukabumi Regency, Indonesia.

Study Participants and Selection

The study's population consisted of 87 older individuals suffering from hypertension at Jampangkulon Health Centre, Sukabumi Regency. The study utilized a total sampling technique, resulting in a sample size of 83 respondents. The study's inclusion criteria include elderly people suffering from hypertension in Bojongsari village, Jampangkulon community health centre work area Sukabumi, while the exclusion criteria include those who have experienced senility or have complications from their disease.

Research Instruments

This study used a questionnaire, the Likert scale, to measure variables such as sleep quality and the recurrence of elderly hypertension. For this study, the participants completed questionnaires designed by the authors. The questionnaire contained information about participants' general situation and the Pittsburgh sleep quality index (PSQI). PSQI is an effective instrument for the seven components to measure sleep quality and patterns in adults. The assessment of answers is based on a Likert scale from 0-3, where a score of 3 describes something negative. The categorization of sleep quality is divided into two groups, namely, good sleep quality and bad sleep quality. The PSQI scores range from 0 to 21 among its seven components. If the total assessment score is less than 5, it is considered good sleep quality, and if it exceeds 5, it is considered bad sleep quality.

Researchers did not conduct a validity test in this study because they adapted the Pittsburgh Sleep Quality Index (PSQI), a standard questionnaire for sleep quality, whose Cronbach's alpha coefficient for all subjects was 0.77 (Moghaddam *et al.*, 2012).

Statistical Analysis

This study used univariate and bivariate data analysis approaches. The univariate analysis used frequency distribution tables and percentages that included age, education, gender, sleep quality, and recurrence of hypertension. The Chi-Square statistical test is used for bivariate distribution analysis.

Ethical Consideration

Ethical approval for this study was obtained from STIKES Sukabumi, Indonesia Research Ethical Committee with Approval Number: 000035 on 2nd May 2022.

RESULTS

Table 1: Characteristics of Respondents

Characteristics	Total	Percentage (%)
Age		
60-65 years	67	80.8 %
65-70 year	5	6.0 %
70-75 years	3	3.6 %
>75 years	8	9.6 %
Gender		
Man	38	45.8%
Woman	45	54.2%
Marital Status		
Doubt/Janda	14	16.9%
Get married	69	83.1%
Level of Education		
No School	6	7.2
SD	61	73.5
Junior High School	9	10.8
Senior High School	5	6.0
College	2	2.5
Profession		
Laborer	9	10.8 %
Farmer	28	33.7 %
Doesn't work	46	55.5%
Amount	83	100%

Table 1 reveals that the majority of the respondents, specifically 67 individuals (80.8%), were between the ages of 60 and 65, with 45 individuals (54.2%) being women. Additionally, 69 respondents (83.1%) were married. It was seen that 61 respondents (73.5%) had completed elementary school, and 46 respondents (55.5%) did not have a job.

Table 2: Frequency Distribution of Respondents Based on Hypertension Recurrence

Recurrence	Amount	Presents
Sometimes (≤ 5 Times)	47	56.6 %
Often (> 5 Times)	36	43.4 %
TOTAL	83	100 %

Based on table 2, most of the respondents experienced occasional recurrence (≤ 5 times), as many as 47 people (56.6%).

Table 3: Comparison of Frequency Distribution of Sleep Quality with the Hypertension Recurrence Rate

Sleep Quality	Hypertension Recurrence				Amount	%
	Often	%	Sometimes	%		
Well	6	13	40	87	46	100
Bad	30	81.1	7	18.9	37	100
Amount	36	43.4	47	56.6	83	100

According to Table 4, the majority of respondents who had good sleep quality occasionally (≤ 5 times) experienced recurrence of hypertension in as many as 40 people (87%), and a small number often (> 5 times) experienced recurrence of hypertension in as many as six people (13%). While those who had poor sleep quality most often (> 5 times) experienced a recurrence of hypertension in as many as 30 people (81.1%), a small proportion sometimes (≤ 5 times) experienced a recurrence of hypertension in as many as seven people (18.9%).

Table 4: Analysis of the Relationship of Sleep Quality with the Hypertension Recurrence Rate

Free Variables	Dependent Variable	P-value
Sleep Quality	Hypertension Recurrence	0.000

Based on Table 4, it can be seen that the P value = 0.000, which is significant as it is < 0.05 , indicates that there is a relationship between sleep quality and the recurrence rate of hypertension in the elderly.

DISCUSSION

Sleep quality is defined as an individual's ability to sleep normally in the REM and NREM stages. Sleep time decreases sharply after a person enters old age. People with hypertension experience a degenerative process that results in a decrease in adequate sleep time, leading to a lack of adequate sleep quality and a variety of sleep-related complaints. Additionally, they must adapt to physical, physiological, and psychological changes that are likely to worsen. If sleep issues are a factor in causing hypertension, interventions aimed at increasing sleep duration could help treat and prevent hypertension, thereby improving public health (Saha *et al.*, 2024). This aligns with the theory that nursing interventions for sleep needs in older people with hypertension include maintaining regular wake-up times, implementing environmental controls like minimizing noise, administering medication, monitoring physiological factors or disease, and considering psychological factors when using relaxation techniques (Crisp *et al.*, 2020; Rosdiana & Cahyati, 2021; de Aquino *et al.*, 2024). A study in China showed that maintaining a healthy sleep pattern, characterized by sufficient duration and quality, is essential for lowering hypertension risk among older adults in an aging society (Pu *et al.*, 2024). The recurrence of hypertension is interpreted as the appearance of symptoms of increased blood pressure of 140/90 mm/Hg. The study's distribution revealed that the majority of respondents had a high tendency for hypertension recurrence. Several factors influence the recurrence of hypertension, including the history of the disease and the healthy lifestyle of hypertensive patients (Wahyudi, 2020).

People with hypertension often experience recurrences, which can cause difficulty sleeping, affect sleep concentration and alertness, increase health risks, and impair immune system functions. Lack of sleep in people with hypertension has an impact on physical and cognitive abilities, as well as quality of life. The results revealed a P value of 0.00, or less than 0.05, suggesting a significant correlation between the quality of sleep and the recurrence rate of hypertension in the elderly population. Nemeth *et al.* (2019) demonstrated a strong correlation between the disease's recurrence and the patients' dietary and sleeping habits, with a p -value of $0.283 > 0.05$ for gender, a p -value of $0.005 > 0.05$ for dietary habits, and a p -value of $0.005 > 0.05$ for sleeping habits. A study showed that improved supervision of sleep quality and depression in elderly hypertensive patients can help maintain cognitive function by mediating the relationship between hypertension and cognitive decline (Chen *et al.*, 2023).

The study's results showed a relationship between the recurrence rate and the incidence of insomnia in older people with hypertension aged > 46 years. The results of Liu *et al.* (2022) support this statement by suggesting a potential bidirectional association between hypertension and insomnia. Patients with hypertension require early detection and prevention of insomnia, and vice versa. Among the 24 respondents who experienced a recurrence of hypertension, only six individuals, or 13%, reported having good-quality sleep. The elderly can potentially experience increased blood pressure due to poor sleep quality. However, routine blood pressure checks, regular treatment, and a healthy lifestyle that avoids high salt intake and exercise can help prevent ongoing sleep disturbances (Yang *et al.*, 2021). Uchmanowicz *et al.* (2019) research, on the other hand, found no correlation between hypertension and sleep quality in the elderly. However, Liu *et al.* (2022) said that recurrence resulted in poor sleep quality in the elderly. Yang *et al.* (2021) reinforced this, stating that the recurrence of hypertension in life is one of the precipitating factors that cause sleep disturbances in the elderly, such as insomnia.

Limitations

It was a cross-sectional study and could not establish a causal relationship between hypertension and sleep quality. Based on this study, a more in-depth cohort study will further verify the present findings after follow-up with the included patients. Another limitation is that this study did not include an external control group, which would be useful for comparing the results obtained. Furthermore, the sleep quality study did not use objective tools such as respiratory polygraphy or polysomnography to diagnose sleep-disordered breathing. Thus, this should be considered in future research.

CONCLUSION

The result of the statistical test showed a significant p -value of 0.000, which means <0.05 , indicating that there is a relationship between sleep quality and the recurrence rate of hypertension in the elderly. Poor sleep quality affects the blood pressure of the elderly with hypertension. Therefore, the elderly must routinely control their blood pressure and meet their sleep needs by avoiding things that can cause sleep disorders.

Thus, improving sleep quality in the elderly can potentially reduce the recurrence rate of hypertension, highlighting the importance of sleep management in hypertension care. This finding suggests that healthcare providers should incorporate sleep quality assessments and interventions into routine care for elderly hypertension patients. Future research could investigate the effectiveness of specific sleep improvement strategies for hypertension control, as well as similar relationships in diverse populations and settings.

Conflict of Interest

The authors declare that they have no competing interests.

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