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CORRELATION ANALYSIS BETWEEN SLEEP QUALITY AND BLOOD PRESSURE FLUCTUATIONS IN ELDERLY WOMEN WITH A HISTORY OF HYPERTENSION

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Abstract

The elderly population is particularly vulnerable to various health issues, including sleep disturbances and hypertension. Poor sleep quality can lead to increased blood pressure by stimulating the sympathetic nervous system and elevating stress hormones. This study explored the relationship between sleep quality and blood pressure among elderly women with hypertension. This study uses a quantitative method with an analytical descriptive design with a cross-sectional approach. The sampling technique in this study used purposive sampling with a sample of 67 elderly women with hypertension. The instruments used were the Pittsburgh Sleep Quality Index (PSQI) questionnaire to measure sleep quality and a digital sphygmomanometer to measure blood pressure. The data analysis in this study used the Chi-Square test. Most of the elderly had poor sleep quality as many as 50 elderly (74.6%) and degree II hypertension as many as 44 elderly people (65.7%). The results of statistical tests showed a significant relationship between sleep quality and blood pressure in elderly women with hypertension, as evidenced by obtaining a p-value of 0.000 (<0.05).Poor sleep quality in people with hypertension can lead to memory impairment, cognitive abilities, and decreased health. It is hoped that the role of the family and the community health center will be to carry out monitoring and evaluation and motivate the elderly to control blood pressure and sleep regularly.

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INTRODUCTION

Law Number 13 of 1998 states that the elderly are someone over 60 years old. According to WHO, in 2025 the number of elderly people in the world will reach 1.2 billion and this number will increase to 2 billion by 2050[1]. Based on the 2023 Indonesian Population Census, nearly 12% or around 29 million Indonesians are already classified as elderly. The Central Statistics Agency projects that Jakarta will have 1.2 million elderly people by 2025. The largest elderly population in DKI Jakarta is East Jakarta with a population of 250.6 thousand elderly people in 2022[2].

As they age, the elderly will experience various health problems, one of which is sleep disorders. The efficiency of sleep time in the elderly is decreasing so that it does not achieve adequate sleep quality and will cause various kinds of sleep complaints. At night, these elderly people often wake up and usually wake up too early, causing the elderly to experience poor sleep quality[3]. Several factors can affect sleep quality, such as age, activities performed, diseases suffered[4].

In 2020, WHO reports that approximately 18% of the global population experiences insomnia and this number continues to rise to one-third of the population. In Indonesia, around 67% of the elderly aged 65 years and older are estimated to also experience insomnia[5]. (Sakti et al., 2024). Poor sleep quality can increase hormones that affect stress, namely the hormone cortisol and brain

activity, especially in the sympathetic nervous system, making people with hypertension more susceptible to relapse of high blood pressure[6].

Epidemiological surveillance by the DKI Jakarta Provincial Health Office, it shows that the majority of hypertension patients in DKI Jakarta province in 2024 will be women, namely 66.9% compared to 33.1% men. The prevalence of hypertension at the Cakung Health Center in April-May 2025 reached 1,164 and most of them were women as many as 729 people, this is because elderly women experience a menopausal phase which causes a decrease in estrogen hormones which can affect psychological conditions such as unstable emotions and anxiety, this is what makes elderly women more susceptible to suffering from hypertension than men[7].

It was shown that most of the elderly in the elderly posyandu in Cipaku village had poor sleep quality as many as 96 respondents (85.0%) and stage 1 hypertension as many as 59 people (52.2%) so that poor sleep quality is linked to an increased risk of developing high blood pressure with pvalue 0.000 (<0.05)[8]. Poor sleep quality in people with hypertension can lead to memory impairment, cognitive abilities, and decreased health. This, if it occurs over a long period of time, will have an impact on an increase in high blood pressure that can cause to heart attacks, strokes, and psychological problems such as depression and other emotional disorders[9].

METHOD

This study used quantitative methods. The research design was descriptive analytical with a cross-sectional approach. This research was conducted in April-May 2025 at the Cakung District Health Center, East Jakarta. The sample in this study amounted to 67 elderly hypertension patients who were selected using *purposive sampling* techniques. Data collection in this study was conducted using primary data through the Pittsburgh Sleep Quality Index (PSQI) questionnaire. The PSQI questionnaire has been used in research to measure a person's sleep quality. The questionnaire consists of 18 questions across seven components: sleep duration, sleep latency, sleep disturbances, sleep efficiency, use of sleeping medication, subjective sleep quality, daytime dysfunction and using a digital sphygmomanometer to measure blood pressure.

The research began by identifying respondents according to the inclusion criteria. The researcher then explained the purpose and objectives of the study, after which if the respondents agree, they will sign *an informed consent*. Data analysis used the chi-square test to analyze the correlation between variables. This research has ethical approval from Poltekkes Jakarta III with number DP.04.03/F.XIX.13/3476/2025.

RESULTS AND DISCUSSION

Table 1. Distribution of Elderly Characteristics (n=67)

Characteristics of the Elderly	n	%
Age		
60 – 69 Years Old	55	82.1
≥70 Years	12	17.9
Education Level		
Poor (Elementary, Junior High)	42	62.7
High (Senior High, University)	25	37.3
Work Status		
Not working	60	89.6
Working	7	10.4
History of Hypertension in Family		
Yes	38	56.7
No	29	42.3

It shows that the majority of respondents are 60 – 69 years old, namely 55 (82.1%), this is in line with the research that the majority of respondents aged 60 – 70 years are a total of 92 (81.4%)[8]. As we age, the body undergoes physiological changes that affect the function of the heart, blood vessels, and hormones. In the elderly, the walls of the arteries thicken due to the accumulation of collagen substances so that blood vessels narrow and

elasticity decreases. This can increase the risk of hypertension[10].

The majority of respondents in this study had a low level of education, 42 (62.7%) and the same with the result that the majority of respondents have the last elementary education of 47 (54.7%). Low education can affect awareness and knowledge about health[4]. A person with a low level of education generally has a limited understanding of blood pressure management, so the elderly with low education are more at risk of developing hypertension.

Most of the respondents are not working, which is as much as 60 (89.6%). Parents who don't work tend to have a sedentary lifestyle, which can affect sleep quality and blood pressure. In addition, a person who is not working may have more time to rest, but may also experience stress or loneliness that can affect sleep quality.

Table 2. Distribution of Frequency Based on Sleep Quality (n=67)

Variable	n	%
Sleep Quality		
Good	17	25.4
Bad	50	74.6

It was shown that most respondents had poor sleep quality, which was as much as 50 (74.6%), The same as previous research, the results showed that the majority of respondents were in the poor sleep quality category, which was as much as 53 (82.8%). As we age, the efficiency of sleep time decreases so that it does not achieve adequate sleep quality and will cause sleep complaints[11]. The elderly experience poor sleep quality because they often wake up at night and wake up too early. Poor sleep quality can increase the hormone cortisol and sympathetic nervous system activity so that it can cause hypertension[6].

Table 3. Distribution of Frequency Based on Blood Pressure in Elderly Women with Hypertension (n=67)

Variable	n	%
Blood Pressure		
Hypertension Grade I (140-159/90-99 mmHg)	23	34.3
Hypertension Grade II (≥160/100mmHg)	44	65.7

The results of the study showed that most respondents had 44 (65.7%) degree II hypertension, this is the same with the research that most respondents have 26 (70.3%) hypertension 26 (70.3%). There are several factors that can cause hypertension in the elderly, such as age, health conditions, and lifestyle[12]. In this study, it was found that several elderly people with hypertension admitted that they were stressed thinking about their illness and said they lacked sleep because they often woke up at night.

Table 4. The Relationship between Sleep Quality and Blood Pressure in Elderly Women with Hypertension (n=67)

Sleep Quality	Blood Pressure						P *Value*	OR (95% CI)
	Degree I		Degree II		Total			
	n	%	n	%	N	%		
Good	12	70.6	5	29.4	17	100	0,000	8.509 (2.464-29.387)
Poor	11	22.0	39	78.0	50	100		
Total	23	34.3	44	65.7	67	100		

Table 4 shows that there is a significant connection between sleep quality and changes in blood pressure in elderly women who have high blood pressure ($p<0.05$). People who have poor sleep quality are 8.5 times more likely to develop grade II hypertension than older adults who have good sleep quality. The results of interviews using the PSQI questionnaire showed that most elderly people had poor sleep quality due to poor sleep duration,

complained of stress, did not feel sleepy, often woke up to the bathroom and felt pain[13]

This study's findings match those of previous research, which shows a clear link between sleep quality and changes in blood pressure among older adults who have high blood pressure, as shown by the p value of 0.045 ($p<0.05$)[12]. Sleep is one of the body's ways to rest, relax muscles, and calm the mind. When a person sleeps, the heart beats more slowly, blood pressure decreases and blood vessels dilate, on the other hand, if in sleep, there is a risk of an increase in hypertension. Poor sleep quality can lead to an increase in blood pressure to hypertension[4]. The quality of sleep is considered to be how satisfied a person is with their sleep experience and how refreshed they are when they wake up. Short sleep duration over a long period of time can lead to hypertension. There are several factors that can affect sleep quality such as age, activity, and illness.

Researchers assume that most elderly people have poor sleep quality with grade II hypertension. Poor sleep quality can affect the stress hormone cortisol, interfere with blood pressure regulation, and worsen the work of the heart and blood vessels, making blood pressure unstable and difficult to control. In the elderly, the sleep duration needed is 6 to 8 hours per day, if this sleep need is not met, there will be an increase hypertension in the elderly.

CONCLUSION

Most of the people in this study were aged 60 to 69 and had a family history of high blood pressure. Many of them also had poor sleep quality. There is a strong connection between how well they sleep and their blood pressure levels, especially in older women who already have high blood pressure.

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