

ANALYSIS OF SLEEP QUALITY WITH BLOOD PRESSURE IN HYPERTENSION PATIENTS

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ABSTRACT

Hypertension remains a major public health problem and a leading cause of morbidity and mortality worldwide. Poor sleep quality is considered one of the factors contributing to uncontrolled blood pressure among hypertensive patients. This study aimed to analyze the relationship between sleep quality and blood pressure severity among hypertensive patients at the Sooko Community Health Center (UPTD Puskesmas Sooko). The study employed a quantitative correlational analytical design with a cross-sectional approach involving 52 respondents selected using purposive sampling. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), while blood pressure was classified according to the severity of hypertension. Data were analyzed using the chi-square test. The results showed a significant association between sleep quality and blood pressure levels ($p=0.018$; $p<0.05$). These findings indicate that poor sleep quality is associated with elevated blood pressure in hypertensive patients, which may be influenced by activation of the sympathetic nervous system and the absence of comorbidities in most respondents.

Kata Kunci: *Kualitas Tidur, Tekanan darah, Hipertensi, Lansia, PSQI*

INTRODUCTION

Hypertension is a chronic condition characterized by a persistent increase in arterial blood pressure of $\geq 140/90$ mmHg and is influenced by various factors, such as genetics, the environment, and lifestyle. Hypertension is often referred to as a “silent killer” because most patients do not exhibit symptoms until complications arise. In addition to hereditary factors, a high-sodium diet, lack of physical activity, and smoking, sleep quality is gaining attention as a contributing factor to elevated blood pressure in patients with hypertension (Simanjuntak *et al.*, 2025).

Sleep quality is not only related to the duration of sleep, but also encompasses an individual's satisfaction with their sleep experience, such as how easily they fall asleep, how often they wake up during the night, and how refreshed they feel upon waking. Poor sleep quality can disrupt the body's physiological state and increase the risk of hypertension due to impaired regulation of the cardiovascular system (Pramana & Harahap, 2021).

Lack of sleep can cause the body to become easily fatigued, lead to a decrease in daily activity, weaken the immune system, and raise blood pressure. Persistent sleep disturbances can increase the activity of the sympathetic nervous system, thereby contributing to elevated blood pressure in patients with hypertension (Rachman *et al.*, 2023).

According to the World Health Organization (WHO), in 2024 an estimated 1.4 billion people worldwide will be living with hypertension, yet only about 23% of those affected will have their blood pressure under control. This situation indicates that hypertension remains a global health issue requiring serious attention, as it is associated with an increased risk of complications and premature death (WHO, 2025).

In Indonesia, based on the 2023 Indonesian Health Survey, hypertension is one of the leading risk factors for death and disability due to noncommunicable diseases. In East

Java Province, the prevalence of hypertension among residents aged 18 years and older reached 36.3%, with the number of people affected estimated at around 11.6 million (Kemenkes, 2024).

Previous research has shown that patients with hypertension who have poor sleep quality tend to have higher blood pressure than patients with good sleep quality. These findings indicate that sleep quality is one of the factors contributing to elevated blood pressure in patients with hypertension (Nazmi *et al.*, (2024).

Other studies have also shown that sleep disturbances are associated with difficulty controlling blood pressure even when patients are undergoing treatment. This suggests that sleep quality should be a priority in the management of patients with hypertension (Widiyastuti *et al.*, (2024).

Persistent sleep disorders can lead to increased sympathetic nervous system activity, disrupt the nocturnal dipping process, and increase the risk of cardiovascular complications in patients with hypertension (Bock *et al.*, 2022).

Although several studies have shown a link between sleep quality and blood pressure in patients with hypertension, research specifically analyzing the relationship between sleep quality and blood pressure levels in hypertensive patients at primary health care facilities—particularly at the Sooko Community Health Center (UPTD Puskesmas Sooko) in Mojokerto Regency—remains limited. Therefore, this study aims to analyze the relationship between sleep quality and blood pressure levels in hypertensive patients at the Sooko Community Health Center (UPTD Puskesmas Sooko) in Mojokerto Regency (Widiyastuti *et al.*, 2024).

This study is expected to contribute to the development of nonpharmacological nursing interventions to improve sleep quality as a means of controlling blood pressure in patients with hypertension. The results of this study are expected to serve as a basis for healthcare professionals in developing promotive and preventive strategies through a sleep management approach (Marbun *et al.*, 2025).

METHOD

This study is a quantitative study with a correlational-analytic design using a cross sectional approach to analyze the relationship between sleep quality and blood pressure levels at the Sooko Community Health Center (UPTD Puskesmas Sooko). The study population consisted of all hypertensive patients participating in the Chronic Disease Management Program (Prolanis), totaling 64 respondents. The study was conducted at the Sooko Community Health Center (UPTD Puskesmas Sooko) in Mojokerto Regency in April 2026.

The study sample consisted of 52 respondents selected using purposive sampling in accordance with the study's inclusion and exclusion criteria. The independent variable in this study was sleep quality, while the dependent variable was blood pressure level.

Data on sleep quality were collected using the Pittsburgh Sleep Quality Index (PSQI), while blood pressure measurements were taken using a standard blood pressure monitor and subsequently classified as stage 1, stage 2, and stage 3 hypertension. Data analysis was performed using the chi-square test with a significance level of $\alpha = 0.05$.

This research has undergone an ethical review with an ethical clearance letter from the Research Ethics Committee of Bina Sehat University, PPNI Mojokerto, with the ethical

clearance letter number 40/KEP/UBS-PPNI/II/2026. This research applies ethical principles including confidentiality, anonymity, and non-maleficence.

FINDING AND DISCUSSION

RESEARCH RESULT

Table 1 Frequency Distribution of Respondents Based on General Data at the Sooko Community Health Center (UPTD Puskesmas) in April 2026

Respondent Characteristics	Category	f	%
Gender	Male	24	46,2
	Female	28	53,8
Age	30-44 years	13	25,0
	45-59 years	17	32,7
	60-74 years	11	21,2
	>75 years	11	21,2
Duration of Hypertension	<1 years	14	26,9
	1-5 years	24	46,2
	>5 years	14	26,9
Comorbidities	Present	19	36,5
	None	33	63,5
Jumlah		52	100

Source: Primary Data 2026

The characteristics of the respondents showed that the majority were female, totaling 28 people (53.8%). By age, the majority of respondents were in the 45–59 age group, totaling 17 people (32.7%). Based on the duration of hypertension, nearly half of the respondents—24 people (46.2%)—had been living with hypertension for 1–5 years. The majority of respondents—33 people (63.5%)—had no comorbidities.

Table 2 Frequency Distribution of Respondents Based on Sleep Quality Among Hypertensive Patients at the Sooko Community Health Center (UPTD Puskesmas) in April 2026

Respondent Characteristics	Category	f	%
Sleep Quality	Good sleep quality (scale ≤ 5)	18	34,6
	Poor sleep quality (scale > 5)	34	65,4
Total		52	100,0

Source : Primery Data 2026

The distribution of sleep quality shows that most respondents 34 people (65.4%) had poor sleep quality, while 18 respondents (34.6%) had good sleep quality.

Table 3 Frequency Distribution of Respondents Based on Blood Pressure of Hypertensive Patients at the Sooko Community Health Center (UPTD Puskesmas) in April 2026

Respondent Characteristics	Category	f	%
Blood Pressure	Stage 1 hypertension (140-159/90-99 mmHg)	24	46,2
	Stage 2 hypertension (160-179/100-109 mmHg)	25	48,1
	Stage 3 hypertension ($\geq 180/\geq 110$ mmHg)	3	5,8
Total		52	100,0

Source: Primary Data 2026

The blood pressure distribution shows that nearly half of the respondents had stage 2 hypertension (25 people, 48.1%), followed by stage 1 hypertension (24 people, 46.2%), and stage 3 hypertension (3 people, 5.8%).

Table 4 Results of the Data Analysis on the Relationship Between Sleep Quality and Blood Pressure in Hypertensive Patients at the Sooko Community Health Center (UPTD Puskesmas Sooko) in April 2026

Sleep Quality	Blood Pressure						Total	
	Grade 1		Grade 2		Grade 3			
	f	%	f	%	f	%	f	%
Okay	13	25	5	9,6	0	0	18	34,6
Poor	11	21,2	20	38,5	3	5,8	34	65,4
Total	24	46,2	25	48,1	3	5,8	52	100
Chi-Square Test Results: p-value = 0.018 (p < 0.05)								

Source: Primary Data 2026

The cross-tabulation results show that of the 34 respondents with poor sleep quality, 20 (38.5%) had stage 2 hypertension. Meanwhile, of the 18 respondents with good sleep quality, 13 (25%) had stage 1 hypertension. The results of the chi-square test showed a p value of 0.018 ($p < 0.05$), indicating a significant association between sleep quality and blood pressure stage in patients with hypertension.

DISCUSSION

The results of this study show that the majority of respondents had poor sleep quality (65.4%). Poor sleep quality in patients with hypertension can be influenced by various factors, such as physiological changes due to the aging process, health conditions, stress, and daily habits. Sleep disturbances can increase sympathetic nervous system activity, which leads to elevated blood pressure. These findings are consistent with a study by Nurhikmawati *et al.*, (2024) which states that poor sleep quality is one of the factors contributing to elevated blood pressure in patients with hypertension.

The study results also showed that nearly half of the respondents had stage 2 hypertension (48.1%). This finding indicates that blood pressure control in patients with hypertension remains a challenge in healthcare. According to Ambreen *et al.*, (2025) stage 2 hypertension is associated with an increased risk of cardiovascular complications and requires more intensive management.

Most of the respondents were in the late adult and elderly age groups. Aging causes changes in the structure and function of blood vessels, such as a decrease in arterial elasticity and an increase in vascular resistance, which contribute to elevated blood pressure. This is consistent with the study (F. Y. Chen *et al.*, 2025) which explains that the aging process is one of the key factors in the development of hypertension.

The results of the chi-square test indicate a significant association between sleep quality and blood pressure levels in patients with hypertension ($p=0.018$). These results suggest that the poorer a person's sleep quality, the higher the likelihood of an increase in the severity of hypertension. This finding is consistent with the study (J. Chen *et al.*, 2023) which states that sleep disturbances are associated with elevated blood pressure through changes in the regulation of the autonomic nervous system.

From a pathophysiological perspective, poor sleep quality can lead to overactivity of the sympathetic nervous system and increased secretion of stress hormones, such as cortisol and catecholamines, resulting in vasoconstriction and elevated blood pressure (Kim *et al.*, 2023) explains that chronic sleep disorders can disrupt cardiovascular homeostasis, thereby worsening blood pressure control in patients with hypertension.

In this study, several respondents with poor sleep quality were still classified as having stage 1 hypertension. This condition is thought to be influenced by the absence of comorbidities in the majority of respondents, which may act as a vascular protective factor. These findings are consistent with the study (Yeh *et al.*, 2023) which states that individuals without comorbidities have better vascular compensatory capacity than those with comorbidities.

In addition, most respondents had been living with hypertension for 1–5 years. A longer duration of hypertension can increase the risk of vascular damage and cardiovascular complications (Zheng *et al.*, 2022). states that the duration of hypertension is associated with increased arterial stiffness and the progression of cardiovascular disease.

CONCLUSION

Based on the research findings, it can be concluded that there is a significant association between sleep quality and blood pressure levels in hypertensive patients at the Sooko Community Health Center (UPTD Puskesmas Sooko), with a p-value of 0.018 ($p < 0.05$). Poor sleep quality is associated with an increase in the severity of hypertension. Pathophysiologically, poor sleep quality can trigger overactivity of the sympathetic nervous system and increased secretion of stress hormones, leading to vasoconstriction of blood vessels and elevated blood pressure. The clinical manifestations of hypertension severity in this study are also thought to be influenced by the absence of comorbidities in the majority of respondents, which may act as a vascular protective factor.

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