ORIGINAL RESEARCH

SLEEP QUALITY AND BLOOD PRESSURE IN HYPERTENSION PATIENTS UNDERGOING HEMODIALYSIS

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Abstract

Background: *Hypertension or increased blood pressure is a silent killer disease whose main cause is currently unknown. High blood pressure is the highest case with an incidence reaching 22% of the world's population, or around two-thirds of hypertension sufferers coming from countries with lower-middle incomes. One of the factors causing hypertension or increased blood pressure is poor sleep quality.*

Purpose*: The objective of this was to identify the relationship between sleep quality and blood pressure in hypertensive patients undergoing hemodialysis*

Methods: *The study was a quantitative survey with a cross-sectional approach in a population of End State Renal Disease patients with hypertension underwent hemodialysis at RSUP. H. Adam Malik, Medan. A total of 57 individuals were sampled using a purposive sampling technique. The measuring instrument uses a questionnaire and a digital tensiometer. Univariate and bivariate data were obtained from statistical analysis using a computer.*

Results: *Statistical tests used Spearman rank. The outcomes of the study showed the average score of respondents' sleep quality was 13.16, meaning poor sleep quality, and the average systolic blood pressure was 147.26 mmHg, meaning grade 1 (mild) hypertension, and diastolic blood pressure was 93.81 mmHg, meaning grade 1 (mild) hypertension. Statistical tests showed a significant value of p-value = 0.000 (α <0.05), This means there are relationship between sleep quality and blood pressure in hypertensive patients undergoing hemodialysis.*

Conclusion: *It is recommended that health workers improve the quality of their services by providing education to have good sleep quality and controlled blood pressure.*

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1. Introduction

Hypertension is a term used to describe a condition of high blood pressure that can lead to various health complications. Hypertension is also a highly prevalent medical condition, with global cases estimated at 22% of the world's population, or approximately two-thirds of hypertension sufferers coming from low- and middle-income countries. Hypertension is called the silent killer. It can suddenly kill someone without any prior symptoms [1]. The cause of hypertension is not yet known for certain, but there are several risk factors that trigger hypertension, including stress, obesity, smoking, high salt intake, sensitivity to angiotensin, hypercholesterolemia, lack of exercise, genetics, obesity, atherosclerosis, kidney disorders, lifestyle and poor sleep quality [2] .

In addition, the World Health Organization [3] states that as many as 46% of adults with high blood pressure are unaware that they have the condition, and less than half of adults (42%) receive a diagnosis and treatment. Only one in five adults, or 21%, is able to control their blood pressure. The WHO has set a 33% reduction in hypertension prevalence between 2010 and 2030 as a global target for non-communicable diseases. [4] stated that more than 63 million Indonesians suffer from hypertension. Based on the North Sumatra Provincial Health Service (2018), 50,162 people were diagnosed with hypertension. The data recorded that the highest number of women suffering from hypertension were women aged 55 and over, with a total of 22,618 [5].

Symptoms of hypertension can disrupt sleep, which can impact sleep quality. Thus, complaints of sleep problems that affect sleep quality in people with hypertension can have serious consequences, such as affecting blood pressure, worsening the development of hypertension, and interfering with blood pressure control, which can increase the risk of stroke and heart complications [6]. Sleep functions as a homeostatic agent, rejuvenating the body. Furthermore, sleep plays a crucial role in storing energy for the body. Good sleep quality is essential for every individual, as it can also affect heart rate [7]. [8], sleep quality is defined as a state of satisfaction with sleep, avoiding feelings such as fatigue, anxiety, lethargy, apathy, dark circles around the eyes, swollen eyelids, red conjunctiva, sore eyes, distracted attention, headaches, and frequent yawning or drowsiness. [9] states that adults aged 18-64 years need 7-9 hours of sleep daily, with 35.2% of all adults in the United States reporting less than 7 hours of sleep per day. A person who has poor sleep has a 4.1 times greater risk of suffering from high blood pressure than someone who has regular sleep. Heart disease and decreased heart rate variability (HRV), as well as increased heart rate, are caused by poor sleep quality. Besides improving sleep quality, sleep quantity and timing are also crucial. Adults need 8 hours of sleep every day, but lack of sleep causes the cardiovascular system to work harder [10].

Based on a preliminary survey conducted at H. Adam Malik General Hospital in Medan, in 2023, 376 people with chronic kidney failure underwent hemodialysis, increasing to 428 in the past six months. Data also showed that 91 patients with hypertension and End-Stage Renal Disease underwent regular hemodialysis. The results of the patient interview said that when he wanted to sleep, the patient often felt neck pain so that the patient felt disturbed when he wanted to rest and often woke up, apart from that, other patients said they had difficulty sleeping so that they slept less than 8 hours, the patient said he felt not fresh and fit when he woke up in the morning and the patient also often woke up and immediately fell asleep again. The purpose of this study was to analyze the relationship between sleep quality and blood pressure in hypertensive patients undergoing hemodialysis.

2. Methods

This research is a quantitative study with a correlation analytic design with a cross-sectional approach. The population in this study were hypertension patients who received hemodialysis therapy in the hemodialysis unit of RSUP. H. Adam Malik in Medan. The sampling technique was purposive sampling so that a sample of 74 people was obtained.

The measuring instruments used were the PSQI (The Pittsburgh Sleep Quality Index) questionnaire and a digital tensiometer. Data analysis used univariate data in the form of characteristic data using frequency distribution and percentage as well as average values (means) and standard deviations. Data were first tested for normality using the Kolmogorov Smirnov test and bivariate data statistical tests used the Spearman rank test.

3. Results

Univariate Analysis

Table 1. Frequency Distribution Based on Respondent Characteristics (n=74)

Characteristics	F	%
Gender:		
Male	44	59,5
Female	30	40,5
Age :		
45-54	43	58,1
55-65	25	33,8
66-74	6	8,1
Occupation :	32	43,2
Farmer	5	6,8
Civil Servant	21	28,4
Housewife	15	20,3
Entrepreneur	1	1,4
Retiredource		

According to table 1, the dominant respondents are 45-54 years, as many as 43 people (58.1%), the majority are male, as many as 44 people (59.5%), and the majority work as farmers, as many as 32 people (43.2%).

Table 2. Mean Sleep Quality in Hypertensive Patients Undergoing Hemodialysis (n=74)

Variable	Median	Mean	SD	Min-Max
Sleep Quality	12	13,8	3,07	9-21

Referring to table 2. shows that the average sleep quality score of respondents is 13.8, which means that the sleep quality of hemodialysis patients is poor.

Table 3. Mean Blood Pressure of Patients Undergoing Hemodialysis (n=74)

Variabel	Median	Mean	SD	Min-Max
Systolic Blood Pressure	142	147,26	8,96	140-170
Diastolic Blood Pressure	90	93,81	5,80	90-115

According to table 3, it is highlighted that systolic blood pressure of respondents undergoing hemodialysis is 147.26 mmHg with a minimum systolic blood pressure of 140 and a maximum of 170 and an average diastolic blood pressure of 93.81 mmHg where the minimum blood pressure is 90 and the maximum is 115.

Bivariate Analysis

Before conducting bivariate analysis, a normality test was first carried out using the Kolmogorov-Smirnov test. This test was used because the sample used in this study was 74 people.

Table 4. Normality Test of Sleep Quality Data on Systolic Blood Pressure and Diastolic Blood Pressure

Parameter	Variable	P-*Value*
Kolmogorov Smirnov	Sleep Quality	0,000
	Systolic Blood Pressure	0,000
	Diastolic Blood Pressure	0,000

According to table 4, the normality test for all variables states p-value = 0.000 (<0.05), which means the data is not normally distributed. Therefore, it can be concluded that the data is not normally distributed, so the next bivariate statistic used in this study uses the alternative Spearman rank test.

Table 5. Statistical Test of the Sleep Quality and Blood Pressure and their relationship in patients undergoing hemodialysis (n=74)

Variable	Mean	SD	P-*Value*
Sleep Quality	13,8	3,07	
Systolic Blood Pressure	147,26	8,96	0,000
Sleep Quality	13,8	3,07	
Diastolic Blood Pressure	93,81	5,80	

Based on table 5, using the Spearman rank statistical test. This proves that the quality of sleep of patients with blood pressure is related with a value of p = 0.000 and there is a relationship between the quality of sleep of patients with systolic blood pressure with a p-value = 0.000, meaning that the quality of patient sleep has a relationship with the blood pressure of hypertensive patients.

4. Discussion

Sleep Quality in Hypertensive Patients Undergoing Hemodialysis

Table 2 shows that the average sleep quality score for patients undergoing hemodialysis was 13.8. This indicates that patients undergoing hemodialysis at H. Adam Malik General Hospital, Medan, experienced poor sleep quality. This study found that the majority of respondents had poor sleep quality, with a score of 13.8, and this was most prevalent among those aged 45-55. This is supported by research conducted by Duana, Murtiwi and Prima [11] which stated that patients with poor sleep quality were mostly aged 46-55 years.

Based on the results of the questionnaire distributed to 74 respondents, on average, hypertension patients sleep at night after 12 o'clock and wake up in the morning at 4 o'clock and cannot fall asleep for 30 minutes after lying down, so that the patient's sleep time is less than 8 hours. Patients also feel their sleep is disturbed because they wake up to go to the bathroom, cough while sleeping and patients often wake up in the middle of the night or early morning so that patients have difficulty getting back to sleep. From the analysis described above, It can be concluded that the worse the patient's sleep quality, the worse the condition of their hypertension will be. Conversely, the better the patient's sleep quality, the more controlled their blood pressure will be. Patients who experience poor sleep quality can experience depression, which can affect their self-concept (Pardede, Safitra & Simanjuntak, 2021).

This is consistent with research conducted by [12]. Based on the results of the questionnaire distributed, the average hypertensive patient slept past 12:00 PM and woke up at 4:00 AM. They were unable to fall asleep within 30 minutes of lying down, resulting in less than 8 hours of sleep. Patients also experienced disturbed sleep due to waking up to use the bathroom, during sleep, and frequently waking up in the middle of the night or early morning, making it difficult to fall back asleep. The analysis described above shows that the worse the patient's sleep, the higher their hypertension will be. Conversely, the better the patient's sleep quality, the more controlled their blood pressure will be. This is in line with research by Mahdalena (2023) which shows that the better the quality of sleep, the better the blood pressure value, conversely, the worse the quality of sleep, the higher the blood pressure value.

Blood Pressure in Hypertensive Patients Undergoing Hemodialysis

Based on table 3, it shows that the average systolic blood pressure value of patients undergoing hemodialysis at H. Adam Malik Medan General Hospital was 147.26 mmHg, including grade 1 (mild) hypertension blood pressure. In old age, changes will occur, especially physiological changes, because as age increases, the function of body organs will decrease. One of them is changes in the elasticity of blood vessels which can lead to increased blood pressure. These changes in blood pressure are influenced by many factors. Age is one of the factors that causes increased blood pressure.

The results of this study align with [10] study on sleep quality and blood pressure, which showed that the average systolic blood pressure in patients was 147.98 mmHg, categorizing them as grade 1 hypertension, with a standard deviation of 6.039, a minimum score of 142 mmHg, and a maximum score of 220 mmHg. The average diastolic pressure score of 77.57 is included in grade 1 hypertension blood pressure with a standard deviation of 4.288, a minimum score of 70 mmHg and a maximum of 120 mmHg. This is in line with Ferdi's research (2016) which showed that systolic blood pressure was 155.90 and diastolic blood pressure was 81.28. Meanwhile, in a study conducted by [13], the study stated that the average blood pressure in hypertensive patients was systolic and diastolic 119.2 / 78.9 mmHg which is normal blood pressure, the median systolic and diastolic blood pressure values was 120.0 / 80.0 mmHg, the highest systolic blood pressure value was 140/90 and the lowest diastolic blood pressure value was 90 / 60 mmHg. From the research results, it can be concluded that systolic and diastolic blood pressure in hypertensive patients shows an average blood pressure in the normal category.

The Relationship Between Sleep Quality and Blood Pressure at H. Adam Malik General Hospital

Based on the findings of this study, relationship between sleep quality and blood pressure in patients undergoing hemodialysis at RSUP. H. Adam Malik in Medan, with a P value of $0.000 < 0.05$. This means there is a significant relationship between sleep quality and blood pressure at H. Adam Malik General Hospital.

The output of this research is in line with research conducted by Kusumaningrum, Kuncoro, Sulistyowati & Arigiyati [14] which found that high blood pressure is more common in young adults and the elderly. This is because this age group begins to experience a decline in immunity, physical function, and nerve function, resulting in a less than optimal metabolism. This study presents results with a p-value of 0.040. This is in line with research by Rachman and Machelia [7], which states that someone who experiences poor sleep can have an effect on the imbalance of the hormone cortisol and the work of the sympathetic nervous system. An imbalance in the cortisol hormone will cause an imbalance in the hormones produced by the adrenal glands, one of which is the catecholamine hormone which consists of the epinephrine and norepinephrine hormones which work on the sympathetic nerves and if these hormones are not balanced it will cause vascular vasoconstriction. The

vascular vasoconstriction that occurs will increase peripheral pressure and can cause an increase in blood pressure. The results of this survey are that sleep quality and blood pressure are related with a probability value of 0.029.

5. Conclusion

Based on this research, it can be concluded that the majority of respondents were aged 45-54 years, namely 43 people (58.1%), male gender, namely 44 people (59.5%), and occupation as farmers, namely 32 people (43.2%). The average sleep quality score of patients undergoing hemodialysis is 13.8, which means the patient's sleep quality is poor. The average systolic blood pressure of respondents undergoing hemodialysis at RSUP. H. Adam Malik in Medan, was 147.26, indicating grade 1 (mild) hypertension, and the diastolic blood pressure of patients undergoing hemodialysis was 93.81, indicating grade 1 (mild) hypertension.

Spearman's rank statistical test concluded that the relationship between sleep quality and blood pressure in patients undergoing hemodialysis with a probability value of 0.000 (<0.05), meaning that there is a significant relationship between sleep quality and blood pressure in patients undergoing hemodialysis.

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