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OVERVIEW OF SLEEP QUALITY ON THE INCIDENCE OF HYPERTENSION STUDY: SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

This study investigates the impact of poor sleep quality on the incidence and severity of hypertension, drawing from a systematic review of scientific articles published between 2019 and 2024. The review synthesizes findings from various studies sourced from PubMed and Google Scholar using the keywords "Hypertension and Sleep Quality." The results indicate a strong relationship between poor sleep quality and increased blood pressure, particularly in individuals with pre-existing hypertension. Data from 12 core articles highlight that disrupted sleep patterns, including inadequate sleep duration and sleep disturbances, exacerbate hypertension by impairing autonomic nervous system function and increasing cortisol levels. The findings emphasize the need for improving sleep quality as part of hypertension management. This research calls for healthcare systems to integrate sleep quality interventions into hypertension treatment plans to improve outcomes. Future research should focus on exploring the physiological mechanisms linking poor sleep quality with hypertension and the effectiveness of combined interventions, including sleep hygiene education and pharmacological treatments. The study also suggests that targeted interventions considering demographic factors like age and comorbidities may offer more personalized approaches to managing hypertension.

KEY-WORDS *Hypertension, Sleep Quality, Hypertension, and Sleep Quality*

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INTRODUCTION

Hypertension commonly referred to as high blood pressure is one of the biggest causes of morbidity in the world which is often referred to as a silent killer. Hypertension has been the focus of significant research over the last century which is one of the leading causes in the development of stroke, myocardial infarction, heart failure, and kidney failure. The definition and categories of hypertension have evolved, but there is agreement that blood pressure is persistent at 140/90 mm Hg

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or should be treated with the usual therapeutic target of 130/80 mm Hg or less. (Istyanto, Rahmi Aulia, et al., 2024). Sufferers of hypertension usually do not realize that they have hypertension before. Therefore, conducting a blood pressure check at a healthcare facility is very important so that the severity does not continue. Hypertension can cause heart attacks, heart failure, and strokes and can even have an impact on the occurrence of chronic kidney failure if not treated immediately. (Novian, 2013). Hypertension is one of the world's most major non-communicable diseases (NCDs) and can significantly contribute to the burden of cardiovascular disease, stroke, kidney failure, disability, and premature death. (Istyanto, 2023). This can hurt the economy such as a reduced household income if a person is experiencing pain or disability.

The prevalence of hypertension in the world according to WHO (2018) is 26.4% or 972 million people affected by hypertension. At this figure, there was an increase in 2021 of 29.2%. WHO (2018) estimates that 9.4 million people will die every year as a result of hypertension complications. Meanwhile, hypertension cases found in developed countries are 333 million out of 972 million hypertension sufferers and another 639 million are found in developing countries, including Indonesia. One of the goals of the Indonesian nation in the fifth Nawacita is to improve the quality of life of Indonesian people. (Kemenkes RI, 2015).

The prevalence of hypertension from a global perspective, in low- and middle-income countries has increased, while the prevalence of hypertension in high-income countries has decreased (NCD Risk Factor Collaboration (NCD-RisC), 2017). The increased prevalence of hypertension is also associated with mortality rates associated with hypertension (Forouzanfar et al., 2017a). The direct and indirect costs related to the prevention and treatment of hypertension are the cause of a huge economic burden worldwide (Mills et al., 2020). Hypertension correlates with poor sleep quality (Yang et al., 2021; Yuan et al., 2021). There is a difference in the prevalence of poor sleep quality among hypertensive patients around the world. Among hypertensive patients in Turkey, the prevalence of poor sleep quality is 63.3% (GBD 2017 Risk Factor Collaborators, 2018). Di Ethiopia 35,5% (Birhanu et al., 2021), and in China, 52.5% (GBD 2017 Risk Factor Collaborators, 2018). Some studies have found that in hypertensive patients, poor sleep quality can cause the function of the heart's autonomic nervous system to become abnormal, and cause blood pressure to increase and promote the development of hypertension (Oliveira-Silva et al., 2020).

Based on the results of Riskesdas (2018), shows that the prevalence rate of hypertension in the population aged > 18 years in Indonesia is 34.1%. This prevalence is obtained by taking blood pressure measurements. The prevalence rate is higher than in 2013 of 25.8%. South Kalimantan Province has the highest figure of 44.13%, followed by West Java Province at 39.6% and East Kalimantan at 39.3%. Based on the health profile of West Java Province in 2019 was 41.6% while the result of Riskesdas 2018 was 39.6%, this was an increase compared to the result of Riskesdas 2013 which was 29.4%.

One of the ways to improve the quality of human life in Indonesia is to improve the health and welfare of people with various age groups which makes it one of the investments and the main form of success in the development of a nation's health. The development of the nation is faster, with the quality of healthy and prosperous human resources and by the expectations of one of the age groups that need to be maintained in their health is the elderly. (Primahadi, 2017).

Sleep has an important role in everyone's life and even sleep allows people to relax and refresh one's bodies, minds, and emotions and improve general health. (Ohlmann & O'Sullivan, 2009). Overall, sleep is just as important as nutrition or exercise in maintaining overall health. (Rocha & Behlau, 2018). Globally, the prevalence of poor sleep quality among hypertensive patients varies widely from 14.9% to 85.7% (Li et al., 2020)

This systematic review article is very important to review to make it easier for the public to understand the importance of maintaining sleep quality that affects blood pressure and other congenital diseases. This is very important to prevent diseases in the community from becoming severe the existence of this systematic review article is expected to be understood by all circles of society.

Hypertension, commonly referred to as high blood pressure, has become a major global health concern due to its role in the development of cardiovascular diseases, strokes, and kidney failure. Despite the high prevalence of hypertension, many patients remain unaware of their condition until significant damage has occurred. One of the key factors contributing to the worsening of hypertension is poor sleep quality, which has been linked to increased blood pressure and the exacerbation of hypertension symptoms. However, the understanding of how sleep quality impacts hypertension, especially in the context of patients with pre-existing conditions, is still limited. The effects of poor sleep quality on hypertension are especially concerning in developing countries, where healthcare access and hypertension awareness may be lower. Thus, it is crucial to explore the relationship between sleep quality and hypertension to inform better prevention and treatment strategies.

Moreover, the prevalence of poor sleep quality among hypertensive patients is a significant issue globally, with variations in sleep patterns across different regions. These variations suggest that factors such as lifestyle, occupation, and socioeconomic status play a role in determining sleep quality. There is also a need for further exploration of how sleep quality specifically interacts with hypertension in different demographic groups. By addressing this gap, this research aims to provide a clearer understanding of how improving sleep quality can potentially reduce the severity of hypertension and its associated health risks.

The urgency of this research lies in the growing global burden of hypertension and the significant impact it has on public health. With millions of people suffering from hypertension and many unaware of their condition, it is critical to investigate the factors that contribute to its progression, particularly poor sleep quality. Hypertension is one of the leading causes of death worldwide, and addressing modifiable risk factors like sleep quality can help reduce its prevalence and the incidence of related diseases. This research is especially urgent in light of the increasing number of individuals with hypertension in both developed and developing countries, making it essential to develop effective prevention and treatment strategies that incorporate sleep quality improvement as a key component.

Previous studies have demonstrated a clear link between poor sleep quality and the development of hypertension. Research by Cappuccio et al. (2011) and Yang et al. (2021) has shown that individuals with insufficient sleep are more likely to develop high blood pressure and experience greater difficulties in controlling it. These studies highlight the role of sleep duration and quality in regulating blood pressure, with insufficient sleep acting as a risk factor for hypertension. Additionally, research by Li et al. (2020) found that individuals with hypertension who also

experienced poor sleep had a higher likelihood of complications, such as heart disease and stroke. These findings reinforce the notion that improving sleep quality could be a potential intervention to prevent or manage hypertension more effectively.

Further research by Phan et al. (2023) and Kanki et al. (2023) suggests that sleep quality plays an even more significant role in individuals with comorbidities, including hypertension. They found that sleep disturbances, particularly those caused by work schedules or underlying health conditions, exacerbate the severity of hypertension. This points to the need for a multifaceted approach to managing hypertension, which includes addressing lifestyle factors such as sleep hygiene. However, there is still a lack of consensus on how best to incorporate sleep quality interventions into the overall treatment plans for hypertensive patients.

Additionally, studies such as those conducted by Birhanu et al. (2021) and Oliveira-Silva et al. (2020) highlight the importance of identifying specific demographic groups that may be more vulnerable to the effects of poor sleep on hypertension. These studies emphasize the need for tailored interventions based on factors like age, gender, and underlying health conditions. While these studies provide valuable insights into the relationship between sleep quality and hypertension, they also underscore the need for further research to establish more effective interventions that can be universally applied to reduce the health risks associated with hypertension.

While previous studies have identified a clear connection between sleep quality and hypertension, there remains a gap in understanding the specific mechanisms through which poor sleep quality exacerbates hypertension. Most studies have focused on correlational data, but fewer have explored how specific interventions aimed at improving sleep quality can lead to measurable improvements in hypertension management. Additionally, the role of sociodemographic factors and their influence on sleep quality among hypertensive patients is still under-explored. This research aims to fill these gaps by providing a comprehensive analysis of the impact of sleep quality on hypertension and evaluating how improving sleep can mitigate the severity of hypertension, particularly in specific populations such as the elderly or those with other comorbidities.

This research brings a novel approach by combining systematic reviews of existing literature with new insights into how sleep quality impacts hypertension in various demographic groups. Unlike previous studies, which primarily focused on either sleep quality or hypertension alone, this research evaluates how improving sleep quality can directly influence hypertension control and prevention. It also considers sociodemographic factors that could influence both sleep quality and hypertension, providing a more holistic understanding of the issue. The research will offer new recommendations on how healthcare systems can integrate sleep quality improvements into hypertension management plans, making it a valuable contribution to both the medical and public health fields.

The objective of this research is to systematically review the impact of poor sleep quality on hypertension and examine how improving sleep quality can mitigate the severity of hypertension. The study aims to assess how sociodemographic factors influence sleep quality and hypertension, and to determine whether interventions to improve sleep can help reduce the incidence and progression of hypertension. By focusing on these relationships, the research seeks to provide actionable

insights that can be used by healthcare professionals to improve hypertension management strategies.

The findings of this study will benefit both healthcare providers and patients by providing a better understanding of how sleep quality affects hypertension. Healthcare professionals can use these insights to incorporate sleep quality improvement into their treatment plans for hypertensive patients, potentially leading to better outcomes. For patients, the research highlights the importance of sleep hygiene and provides practical recommendations for managing hypertension. Additionally, the research contributes to the growing body of knowledge on non-pharmacological interventions for hypertension, offering valuable guidance for future studies and interventions aimed at reducing the global burden of hypertension.

RESEARCH METHOD

The method used in this study is a systematic review approach, which involves collecting and analyzing data from existing scientific articles to assess the relationship between sleep quality and hypertension. This method is appropriate for synthesizing existing research findings on a specific topic, in this case, the impact of sleep quality on individuals suffering from hypertension. The systematic review follows predefined inclusion and exclusion criteria, focusing on articles published between 2019 and 2024 that are written in the United Kingdom or Indonesian languages. Data was gathered from reputable academic databases such as PubMed and Google Scholar using the keywords "Hypertension and Sleep Quality."

The inclusion and exclusion benchmarks ensure that only relevant studies are considered, with a focus on original research articles that specifically address sleep quality in people with hypertension. Articles that do not align with these criteria, such as those published before 2019 or those unrelated to hypertension or sleep quality, are excluded. This approach enables a comprehensive synthesis of recent data-driven studies, providing insights into the current state of research on this topic. By focusing on studies from the past few years, the research aims to provide up-to-date findings and an evidence-based understanding of the relationship between hypertension and sleep quality.

RESULT AND DISCUSSION

Table 1. Research Results of Literature Research

No	Researchers	Type of Research	Location	Research Results
1.	(de Havenon et al., 2024)	Cross-sectional	French	Poor sleep quality results in an increase in blood pressure
2.	(Chen et al., 2021)	Cross-sectional	China	Hypertensive patients are known to have a health-related quality of life that shows a perception of physical and mental health. There is a link between poor sleep quality in people with hypertension, which is in line with previous research that sleep is an important health determinant and

No	Researchers	Type of Research	Location	Research Results
				is closely related to mortality and morbidity.
3.	(Yao et al., 2023)	Cross-sectional	China	Most who report a normal sleep duration (7-9 hours) and have better sleep are less likely to develop hypertension and do not take antihypertensive and cardiovascular medications. Patients with shorter sleep durations are more likely to develop hypertension and become antihypertensive drug takers.
4.	(Oseni et al., 2024)	Cross-sectional	Southern Nigeria	Healthy sleep was characterized by a sleep duration of 7-9 hours in this study that reported no increase in blood pressure. Conversely, those who had poor sleep had an increase in blood pressure, this occurred among those who had jobs with night shifts.
5.	(Kanki et al., 2023)	Cross-sectional	Europe	Shift workers are a group that is prone to experiencing sleep duration disorders and poor sleep quality, which can increase the risk of hypertension.
6.	(Phan et al., 2023)	Cross-sectional	Vietnam	Healthcare workers during the Covid-19 pandemic have poor sleep quality, which has resulted in an increase in blood pressure, among doctors, nurses, and laboratory technicians. In this study, healthcare workers with chronic comorbidities, such as diabetes and hypertension, were found to have a higher risk of experiencing poor sleep quality than those without chronic comorbidities.
7.	(R. Sari et al., 2023)	Cross-sectional	PKM Tamalate, Makassar	Older adults who experience hypertension have poor sleep quality because during the first 30 minutes, it is difficult to sleep and even often wake up because they have to go to the bathroom, aches, and pains in the body.
8.	(ika yesika Sari et al., 2024)	Cross-sectional	PKM Sumbersari, Jember	The majority of hypertensive patients have poor sleep quality, this is mostly caused by some not being able to fall asleep within 30 minutes, often waking up to go to the bathroom and even often waking up too early because they have to prepare for work.

No	Researchers	Type of Research	Location	Research Results
9.	(Samsiati et al., 2023)	Cross-sectional	PKM Maratpura, Banjar	Poor sleep quality as many as 77.3% experienced an increase in blood pressure. Lack of sleep duration and often waking up at night because you want to go to the bathroom or waking up because of heat or cold causes hypertension. In addition, poor sleep quality is affected by food intake When a person sleeps hungry, it will be difficult to start sleep and is at risk of waking up at night.
10.	(Yuhendra, 2024)	Cross-sectional	Johar Baru Hospital, Central Jakarta	The study showed that 57.3% of the samples suffering from hypertension resulted in poor sleep quality. A person with a young adult who experiences poor sleep quality tends to age and can cause mental and physical changes that alter sleep patterns. These changes include difficulty falling asleep at regular hours, waking up in the middle of the night, and difficulty falling back asleep. This can disrupt metabolism, change in the levels of the stress hormone cortisol, and change in the sympathetic nervous system that impact the cardiovascular system, and increase blood pressure.
11.	(Rahmadhani Kaban et al., 2022)	Cross-sectional	Terrain	This study shows that 13.2% of people with severe hypertension experience poor sleep quality while 55.3% with mild hypertension. This suggests that poor sleep quality will worsen the disease in hypertensive patients.
12.	(Budiman et al., 2023)	Cross-sectional	Thousand Islands	This study shows that in hypertension sufferers, 96.6% of the early elderly (46-55 years old) experience poor sleep quality. A person who experiences sleep disorders will change the function of the autonomic nervous system and if this continues it will cause impacts such as the appearance of stroke, heart attack, heart failure, and kidney failure.

Hypertension

Hypertension is a non-communicable disease that can play a central role in the burden of diseases in the world today and has an impact on the health of individuals and society as a whole. (Istyanto, Aswar, et al., 2024). Hypertension is a condition that appears when small blood vessels in the body (arteries) narrow, causing the blood to put excessive pressure on the walls of blood vessels and forcing the heart to work harder to maintain this pressure. (Istyanto, Aswar, et al., 2024; Ondimu et al., 2019). Hypertension is usually described as a systolic blood pressure of 140 mmHg or more and a diastolic blood pressure of 90 mmHg or more. (Bisognano et al., 2011; Ondimu et al., 2019).

The blood pressure of adults aged 18 years or older can be classified as follows: systolic less than 120 mmHg and diastolic less than 80 mmHg are normal, systolic 120-139 mmHg and diastolic 80-89 mmHg are pre-hypertensive, systolic 140-159 mmHg and diastolic 90-99 mmHg are stage 1, systolic 160 mmHg or more, and diastolic 100 mmHg or more is stage 2 (Alexander & Courtois, 2017).

Physiological changes including atherosclerosis and vascular changes that occur with age are responsible for most hypertension events in older populations. This is associated with an increased incidence of hypertension (Barregard et al., 2009; Dai et al., 2015; Jenson et al., 2011). The global prevalence of hypertension is 31%, it is estimated that premature death due to hypertension annually is around 7.1 million, which is 64 million years of life adjusted for DALY (Disability-adjusted life year) (Temu et al., 2017). Hypertension has been ranked third in the world, after being underweight and having unsafe sex, it is on the list of six major risk factors that contribute to the global burden of disease (Ezzati et al., 2002; Ondimu et al., 2019).

The Impact of Hypertension

This increase in blood pressure is associated with a large global burden of cardiovascular disease as well as premature death. In 2015, the number of deaths from all causes associated with systolic blood pressure ≥110–115 mmHg was 10.7 million (19.2% of all deaths) and systolic blood pressure ≥140 mmHg was 7.8 million (14.0% of all deaths) (Forouzanfar et al., 2017b). The largest number of deaths associated with systolic blood pressure ≥110–115 mmHg was caused by ischemic heart disease (4.9 million or 54.5% of ischemic heart disease deaths), ischemic stroke (1.5 million or 50.0% of ischemic stroke deaths), and hemorrhagic stroke (2.0 million or 58.3% of hemorrhagic stroke deaths) (Forouzanfar et al., 2017b; Mills et al., 2020).

Several prospective cohort studies have reported that elevated blood pressure is a strong independent risk factor for chronic kidney disease as well as end-stage kidney disease. (Anderson et al., 2015; Reynolds et al., 2007). An increased risk of hypertension is associated with a dose-response and is sustained with blood pressure levels above 120 mmHg (Anderson et al., 2015; Reynolds et al., 2007).

Sleep Quality

Sleep is an important component of human physiological processes controlled by neurobiology. (Krueger et al., 2016). Good sleep has an important role in improving health. (Irwin, 2015). Good sleep can increase the synthesis of growth hormones, promote human growth and development, and even regulate energy metabolism and appetite. (Robles & Carroll, 2011). Poor sleep quality can have adverse effects on

mental and physical health. (Magalhães et al., 2021). Poor sleep quality can increase the incidence and mortality of cardiovascular diseases, cancer, and even depression. (Cappuccio et al., 2011; Qin et al., 2014; Riemann et al., 2020). Hypertension correlates with poor sleep quality. (Yang et al., 2021; Yuan et al., 2021).

Several studies suggest that hypertensive patients have poor sleep quality cause the autonomic nervous system function of the heart to be abnormal and cause blood pressure to increase, which can promote the development of hypertension (Oliveira-Silva et al., 2020). More and more studies have found that sociodemographic factors, lifestyle factors, and clinical factors adversely affect the sleep quality of hypertensive patients, such as female gender, overweight, depression, tea drinking, divorce, lack of physical activity, stage I diastolic blood pressure and stage II diastolic blood pressure (Ayanaw et al., 2022; Birhanu et al., 2021).

The Impact of Poor Sleep Quality on the Incidence of Hypertension

Poor sleep quality will result in a decrease in antibodies with symptoms of weakness and fatigue, resulting in reduced immunity and instability of vital functions such as blood pressure. Unstable vital signs are caused by poor sleep quality which can lead to cardiovascular disease. (Novitri et al., 2021)

Research shows that short sleep duration and insomnia are associated with increased blood pressure and an increased risk of hypertension, with greater effects. (Cappuccio et al., 2010; Dean et al., 2012; Meng et al., 2013). An epidemiological study in populations aged 40-100 years found that habitually less than 7 to 8 hours of sleep per night was associated with an increased prevalence of hypertension, particularly in a person who slept less than 6 hours per night. (Gottlieb et al., 2006).

Poor sleep quality can have an impact on decreasing body antibodies with several symptoms such as weakness and fatigue which changes the stress hormone cortisol and the sympathetic nervous system, causing an increase in blood pressure. Hypertensive patients need good sleep quality to improve and restore the body's condition to stay healthy (Oliveira-Silva et al., 2020).

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CONCLUSION

Poor sleep quality has been increasingly recognized as a significant factor influencing blood pressure levels, particularly in individuals with pre-existing hypertension and comorbid conditions. The relationship between sleep disturbances and the exacerbation of hypertension is multifaceted, with disrupted sleep patterns contributing to increased sympathetic nervous system activity, elevated cortisol levels, and impaired autonomic function, all of which can lead to sustained increases in blood pressure. This persistent elevation in blood pressure, if left unmanaged, can contribute to the development of further complications, such as stroke, heart disease, and kidney failure. Additionally, poor sleep quality can hinder the effectiveness of hypertension treatment, prolonging the management process and increasing the risk of severe outcomes, including premature death. Given the impact of sleep quality on hypertension, there is an urgent need for more focused research to develop comprehensive, integrative treatment strategies that address both the physiological and behavioral aspects of sleep disturbances in hypertensive patients.

Future research should aim to explore the mechanisms through which sleep quality specifically interacts with hypertension and its comorbidities, focusing on identifying biomarkers and physiological processes that mediate this relationship.

Additionally, studies could examine the effectiveness of combined interventions targeting both sleep hygiene and blood pressure management, particularly in patients with chronic hypertension and multiple comorbidities. Further investigation into the role of behavioral therapies, such as cognitive-behavioral therapy for insomnia (CBT-I), alongside pharmacological treatments for hypertension, could provide valuable insights into the long-term benefits of addressing sleep disturbances. Ultimately, this research would contribute to developing holistic treatment models that not only control hypertension but also improve overall health outcomes by optimizing sleep quality.

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