DOI: http://dx.doi.org/10.32419/jppni.v9i3.618

EXPLORING THE RELATIONSHIPS BETWEEN PSYCHOLOGICAL CHANGES, SLEEP QUALITY, AND HYPERTENSION AMONG COMMUNITY-DWELLING ELDERLY

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Received: 6 November 2024, Revised: 8 November 2024, Accepted: 31 December 2024

ABSTRACT

Objective: to examine the relationship between psychological changes and sleep quality with the incidence of hypertension in the elderly. Method: This cross-sectional study, conducted with a purposive sample of 126 elderly participants, assessed psychological changes using the Depression, Anxiety, and Stress Scale (DASS-42) questionnaire and sleep quality using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. Blood pressure was measured using a sphygmomanometer to assess hypertension. Data analysis included independent t-tests and chi-square tests, with logistic regression used to identify predictors of hypertension. Results: The independent t-test revealed significant differences in stress levels between participants with and without hypertension (t = -6.614, p = 0.020). Similarly, significant differences in depression levels were observed between these two groups (t = -0.044, p = 0.014). Elderly individuals with poor sleep quality had a 5 times higher risk of experiencing hypertension (OR = 4.625, p = 0.008). Multivariate analysis indicated that age was a predictor of hypertension incidence (β = 0.208, p = 0.004), and sleep quality was also a predictor (β = -1.501, p = 0.023). **Discussion:** *The findings suggest that psychological factors and sleep quality influence hypertension development in the elderly, likely through physiological mechanisms such as heightened sympathetic activity and vascular stress. These results highlight the importance of addressing both psychological health and sleep quality in managing hypertension risk. Conclusion: Sleep quality is a predictor of hypertension incidence in the elderly. Those with poor sleep quality have a 5 times greater risk of developing hypertension compared to those with good sleep quality.*

Keywords: *elderly, hypertension, psychological changes, sleep quality*

BACKGROUND

The elderly undergo a natural aging process characterized by physiological and degenerative changes (Mubarak, Indrawati, & Susanto, 2015). Physically, aging results in a decline in organ function, reduced metabolic efficiency, and decreased musculoskeletal strength (Adinatha & Wulaningsih, 2019). Additionally, degenerative processes compromise tissue and organ integrity, contributing to age-related diseases such as arthritis, cardiovascular disorders, and neurodegenerative conditions (Ministry of Health of the Republic of Indonesia/MHRI, 2018). Psychologically, aging is accompanied by cognitive decline, mood changes, and an increased susceptibility to mental health issues (Ilham, Ibrahim, & Igirisa, 2020). Understanding the complexities of these degenerative processes in the elderly is crucial for delivering appropriate healthcare, promoting healthy aging, and enhancing the overall quality of life for this population.

The prevalence of elderly individuals is steadily rising, marking a significant demographic shift in society. This trend is driven by advancements in healthcare, improved living conditions, and the natural process of population aging (Sukoharjo Distric Health Office, 2020). In Indonesia, the decline in health complaints and morbidity rates over the past five years (2019–2023) reflects these improvements (Badan Pusat Statistik [BPS], 2023). Additionally, life expectancy in Indonesia has increased by 4% over the last decade, from 69.81 years in 2010 to 71.85 years in 2022 (Badan Pusat Statistik [BPS], 2023).

Globally, the United Nations projects that the population aged 60 and over will double to approximately two billion (United Nations, 2015). Similarly, WHO estimates that the proportion of the global elderly population will grow from 12% in 2015 to 22% by 2050 (WHO, 2024). Southeast Asia currently accounts for about 8% of the world's elderly population (WHO, 2013). In Indonesia, the Ministry of Health reported 27.08 million elderly individuals in 2020, with a projected increase to 48.19 million by 2035 (MHRI, 2017). This rapid growth in the elderly population is expected to significantly impact their health status and the demand for healthcare services (Setyarini et al., 2022).

A decline in health status can significantly impact the quality of life of the elderly, often leading to various diseases (Kojima et al., 2016). Elderly individuals with multiple chronic conditions typically experience a lower quality of life, which increases the risk of prolonged hospitalization, surgical complications, higher healthcare costs, and elevated mortality rates (Sharma, Maurya, & Muhammad, 2021). The prevalence of chronic diseases such as diabetes mellitus, hypertension, heart disease, and respiratory conditions is rising among the elderly population (The National Institute of Health Research and Development, MHRI, 2019). Factors such as lifestyle changes, the natural aging process, and genetic predispositions contribute to the increased risk of chronic diseases in this age group (Su et al., 2023).

Hypertension prevalence increases with age, rising from 9.5% in individuals aged 35–50 to 59.7% in those aged 80 and older (Atella et al., 2019). Data from the Indonesian Health Survey (MHRI, 2023) reveals that the three provinces with the highest rates of hypertension are DKI Jakarta, which ranks first at 12.6%, followed by D.I. Yogyakarta at 12.3%, and North Sulawesi at 12.1%. The majority of hypertension cases occur in the elderly, specifically those aged 55–75+, who account for 68.8% of all hypertension cases in individuals over 15 years old (MHRI, 2023). As people age, arterial walls lose elasticity, and blood vessels become stiffer, contributing

to disturbances in blood pressure regulation (Sudarso et al., 2019). Additional factors, such as excess weight, obesity, poor diet, and physical inactivity, also play a significant role in blood pressure changes (Atella et al., 2015). Furthermore, many elderly individuals who have been treated for hypertension do not take their medication consistently. Among these, 49.5% report feeling healthy, 33.3% cite forgetfulness or boredom, and 6.2% experience intolerance to side effects. Despite receiving hypertension education, only 55.8% of elderly individuals regularly seek health check-ups at healthcare facilities, even though 81.4% of the elderly in DKI Jakarta have been educated on hypertension management (MHRI, 2023).

Sleep disturbances are among the most common complaints reported by the elderly, with many experiencing difficulties falling asleep, frequent nighttime awakenings for elimination, and early morning awakenings (Daulay & Akbar, 2021). In the United States, data indicate that 39–75% of elderly individuals experience sleep disorders. Research specifically focusing on the elderly shows that insomnia and other sleep disturbances are linked to daytime dysfunction, poor cognitive function, depression, activity limitations, fatigue, emotional distress, an increased risk of falls, and a higher incidence of cardiovascular morbidity and mortality (Kamrani et al., 2014).

Psychological changes such as stress, anxiety, and depression significantly impact the quality of sleep in the elderly (Nursalam et al., 2018). Elderly individuals may experience sleep disturbances due to factors like traumatic experiences, unresolved family issues, worries about the present and future, nightmares, and feelings of anxiety. In response to stress, some elderly individuals may take naps during the day, which then makes it difficult for them to sleep at night, further diminishing sleep quality (Aşiret & Dutkun, 2018). In a study by Rosdianti, Herlina, & Hasanah (2018), 28 out of 49 elderly respondents (57.1%) reported poor sleep quality, largely attributed to psychological changes such as diminished emotional control due to stress, which contributes to sleep disturbances.

Previous studies have demonstrated a relationship between sleep quality and increased blood pressure. Poor sleep quality can lead to hyperactivity of the sympathetic nervous system, which may raise blood pressure (Lu et al., 2015). The hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic medulla system are two primary endocrine systems activated by the sympathetic nervous system when the body's homeostasis is disrupted (McGrath, 2014). Research has shown that sleep deprivation affects blood pressure regulation, increasing the risk of hypertension (Słomko et al., 2018).

Psychological changes can have an indirect impact on blood pressure (Husna & Ariningtyas, 2019). In response to emotional changes, the body adjusts hormonal balance, often leading to an increased adrenocortical response due to elevated adrenaline levels. This results in heightened peripheral vascular resistance, an imbalance in the heart's ability to pump blood, and increased sympathetic nerve activity (Smeltzer & Bare, 2013). Further research has shown a significant association between hypertension and high stress levels (Bhelkar, Deshpande, & Mankar, 2018).

Evaluating sleep quality, psychological changes, and hypertension in the elderly is crucial, as these factors are interconnected and significantly impact overall quality of life and well-being. A preliminary study was conducted to gather data on elderly residents of the Marunda low-cost apartments, focusing on psychological changes and sleep quality. Interview results revealed that the elderly often experience psychological changes related to aging, including frequent stress or anxiety due to health issues and the loss of loved ones,

such as a spouse. Feelings of loneliness are also common, as some elderly individuals are left by their families. Generally, poor sleep quality was reported, with issues like nighttime awakenings, staying up late, and sleeping fewer than 4 hours per night.

The increasing prevalence of elderly individuals, coupled with the rising incidence of hypertension and sleep disturbances, underscores the need to explore the relationship between psychological changes, sleep quality, and hypertension. Despite the significant health challenges faced by this demographic, limited studies have investigated how psychological factors, such as stress, anxiety, and depression, interact with sleep disturbances and contribute to hypertension in the elderly. This study aims to address this gap in the literature by examining the psychological changes, sleep quality, and hypertension in the elderly population, particularly those residing in low-cost apartments. By understanding these relationships, the study seeks to inform healthcare interventions aimed at improving the quality of life for the elderly.

METHODS

Design and Sampling

This study employs a descriptive-correlational research design. The population consists of elderly residents of the Marunda low-cost apartment. Data collection was conducted from June to August 2023. During this period, research assistants visited each resident's home individually to administer the questionnaires, ensuring convenience and privacy for the participants.

Purposive sampling was used, with inclusion criteria that participants must be willing to participate, aged ≥ 60 years, able to communicate, and cooperative. To ensure that participants were cognitively fit and capable of completing the mental health assessment questionnaires, the Mini-Mental State Examination (MMSE) was used as a screening tool (Rambe & Fitri, 2017). The sample size was determined using Lemeshow's formula, with a 5% sampling error, resulting in a total of 126 respondents.

Instrument

The research instruments include a demographic questionnaire that collects information on age, gender, education, occupation, physical activity, and comorbidities, which were assessed using the Charlson Comorbidity Index (CCI). The CCI was developed by Dr. Mary Charlson and colleagues in 1987 to predict the ten-year survival of patients based on the presence of various comorbid conditions. The index assigns weighted scores to 17 different conditions, with more severe conditions receiving higher scores. These scores are then summed to calculate a total comorbidity score, which reflects the overall burden of comorbidities and provides an estimate of a patient's risk of mortality. The CCI has been widely used in both clinical and research settings for its ability to quantify the impact of comorbidities on health outcomes (Charlson et al., 1987). The CCI score was 2.5 with sensitivity at 72.5% and specificity at 67.3% in predicting the 28-day mortality of COVID-19 patients in the ICU (Sugiarto et al., 2023).

Psychological changes are assessed using the Depression Anxiety Stress Scale (DASS-42), which has been validated and widely used in previous studies to assess mental health conditions (Lovibond & Lovibond, 1995). In this study, we used the Indonesian version of the DASS-42, which was translated by Damanik and adapted for the local context. The questionnaire consists of 42 items related to stress, anxiety, and depression (Damanik & Rusli, 2006). The validity and reliability

of this Indonesian version were assessed in a previous study by Marsidi (2021), which showed a positive Pearson correlation (greater than 0.532) for all items related to stress, anxiety, and depression. The reliability of the instrument was excellent, with Cronbach's alpha values of 0.951 for stress, 0.943 for anxiety, and 0.952 for depression. Respondents completed the questionnaire individually, and the scores were interpreted according to the standard scoring guidelines. Higher scores on the DASS-42 indicate more severe symptoms of stress, anxiety, or depression.

Sleep quality was assessed using the Indonesian version of the Pittsburgh Sleep Quality Index (PSQI), a validated instrument for measuring sleep disturbances (Buysse et al., 1989; Ratnasari & Hartati, 2016). The PSQI consists of 19 items across 7 components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, sleep medication, and daytime dysfunction. Each component is scored on a scale from 0 to 3, reflecting the severity of the sleep issue. For example, subjective sleep quality is rated from 0 (very good) to 3 (very bad), while sleep latency is rated from 0 (<15 minutes) to 3 (>60 minutes). Similarly, sleep duration is rated from 0 (>7 hours) to 3 (<5 hours), sleep efficiency is rated from 0 (>85%) to 3 (<65%), and sleep disturbance is rated from 0 (no disturbances) to 3 (severe disturbances). Sleep medication use is scored from 0 (none) to 3 (three or more times a week), and daytime dysfunction is rated from 0 (not during the past month) to 3 (three or more times a week). The total score is the sum of the seven components, ranging from 0 to 21. Higher scores indicate poorer sleep quality, with scores above 5 typically suggesting poor sleep quality. The validity of the Indonesian version was confirmed by Ratnasari & Hartati (2016), with r-values ranging from 0.365 to 0.733 for 18 items, and the reliability was high, with a Cronbach's alpha of 0.741. Respondents completed the questionnaire individually.

Blood pressure was measured using a sphygmomanometer, a standard tool for assessing hypertension that has established validity and reliability in clinical practice. In this study, hypertension was defined according to the guidelines set by the American College of Cardiology (ACC)(Whelton et al., 2018) and American Heart Association (AHA)(AHA, n.d), where hypertension is diagnosed when systolic blood pressure (SBP) is consistently 130 mmHg or higher, or diastolic blood pressure (DBP) is 80 mmHg or higher (Whelton et al., 2018). Blood pressure was measured by trained research assistants following standardized procedures to ensure accuracy. They used a calibrated sphygmomanometer to measure the participants' blood pressure while the participants were seated and relaxed.

Data Collection Procedure

The data collection process began with obtaining the necessary permits from relevant authorities. The researcher identified potential respondents who met the inclusion criteria and explained the study's purpose, procedures, and potential benefits. After obtaining informed consent, blood pressure was measured using a validated sphygmomanometer. Each participant's blood pressure was assessed with at least two measurements, taken five minutes apart. If the difference between the first and second readings exceeded 5 mmHg, a third measurement was conducted, and the final value was calculated as the average of the two or three readings to ensure accuracy.

Following blood pressure measurements, respondents were provided with the DASS-42 and PSQI questionnaires, which they were given 30–40 minutes to complete. Trained data collectors were present to assist and clarify any questions, and for respondents with reading difficulties or fatigue, interviews were conducted to ensure accurate and complete

data. If a participant was unable to complete all stages due to fatigue or scheduling conflicts, they were contacted to reschedule within the data collection period. In cases where participants withdrew from the study, replacements who met the same inclusion criteria were recruited to maintain the target sample size of 126. This structured approach ensured accurate and systematic data collection while addressing the specific needs of elderly participants.

Data Analysis

Data analysis was conducted using both descriptive and inferential statistics. Descriptive statistics, including means and standard deviations, were used to summarize the demographic and clinical characteristics of the participants. To assess the normality of the data, the Shapiro-Wilk test was applied, which is appropriate for sample sizes up to 200. Visual methods, such as histograms and Q-Q plots, were also examined for additional validation. Since the data was found to be normally distributed, parametric tests, including independent t-tests, were employed. Independent t-tests and chi-square tests were employed to compare differences between groups. Logistic regression was performed to identify predictors of hypertension, with psychological factors and other relevant

Table 1. Description of Characteristics and Demographic of Respondents (n = 126)

Characteristic	Categories	n	%	Mean (SD)	95% CI
Age (year)				66.14 (4.913)	65.28 – 67.01
Gender	Male	78	61.9		
	Female	48	38.1		
Educational level	No education	10	28.6		
	Primary school	7	20.0		
	Junior high school	4	11.4		
	Senior high school	12	34.3		
	University	2	5.7		
Job status	Unemployed	108	85.7		
	Employed	18	14.3		
Physical activity	Active	53	57.9		
	Inactive	73	42.1		
Charlson comorbidity index	≤ 3	73	57.9		
	> 3	53	42.1		
Hypertension	Yes	99	78.6		
	No	27	21.4		

Table 2. Psychological Change Status in Elderly (n = 126)

Variable	Mean	SD	95% CI
Stress	23.01	5.142	22.10 – 23.91
Anxiety	13.91	3.638	13.27 – 14.55
Depression	18.59	4.245	17.84 – 19.34

Table 3. Sleep Quality in Elderly (*n* = 126)

Variable	Categories	n	%	Mean (SD)	95% CI
Subjective sleep quality	Very good	19	15.1		
	Fairly good	85	67.5		
	Fairly bad	20	15.9		
	Very bad	2	1.6		
Sleep latency	≤ 15 minutes	10	7.9		
	16 – 30 minutes	48	38.1		
	31 – 60 minutes	25	19.8		
	> 60 minutes	43	34.1		
Sleep duration	> 7 hours	41	32.5		
	6 – 7 hours	48	38.1		
	5 – 6 hours	5	4.0		
	< 5 hours	32	25.4		
Habitual sleep efficiency	> 85%	7	5.6		
	75 – 84%	43	34.1		
	65 – 74%	22	17.5		
	< 65%	54	42.9		
Sleep disturbances	1 – 9	49	38.9		
	10 – 18	69	54.8		
	19 - 27	8	6.3		
Use of sleeping medication	Never	101	80.2		
	Once a week	14	11.1		
	Twice a week	8	6.3		
	≥ 3 times a week	3	2.4		
Daytime dysfunction	No dysfunction	45	35.7		
	Low level	55	43.7		
	Moderate level	21	16.7		
	High level				
PSQI Score				9.20 (4.39)	8.4 – 9.9

Table 4. Comparison of Mean Psychological Scores Between Participants with and Without Hypertension (*n* = 126)

Psychological	Hypertension	Mean (SD)	t	df	P value	95% CI
Stress	No	18.00 (3.88)	-6.614	124	0.020	-8.281 – -4.466
	Yes	24.37 (4.57)				
Anxiety	No	13.19 (3.64)	-1.170	41.120	0.958	-2.524 – 0.672
	Yes	14.11 (3.62)				
Depression	No	18.56 (5.11)	-0.044	124	0.014	-1.872 – 1.791
	Yes	18.60 (4.00)				

variables included as predictors. A significance level of $\alpha = 0.05$ was set for all analyses.

Ethical Consideration

This study has passed the ethical review from FIK UMJ, with approval number No. 0751/F/9-UMJ/VI/2023.

RESULTS

The demographic data in this study indicate that the average age of the elderly participants is 66.14 years (SD = 4.913). The youngest participant is 60 years old, while the oldest is 75 years old. The majority of respondents were male (61.9%), had low levels of education (61.9%), were unemployed (85.7%), did not engage in physical activity (57.9%), and had mild comorbidities, with a Charlson Comorbidity Index (CCI) score of ≤ 3 (57.9%). A total of 99 elderly individuals (78.6%) experienced hypertension (see Table 1).

Based on the analysis of the psychological changes experienced by the elderly in this study, it was found that the elderly tend to experience higher levels of stress (mean = 23, SD = 5.1) compared to anxiety (mean = 14, SD = 3.6) and depression (mean = 19, SD = 4.2) (table 2).

The average Pittsburgh Sleep Quality Index (PSQI) score for the elderly participants in this study is 9.20 (SD = 4.39), indicating overall poor sleep quality, as 82.5% of respondents scored ≥ 5 on the PSQI. Despite this, 67.5% of the elderly believe they have good sleep quality. The majority reported a sleep duration of 6–7 hours (38.1%) and a sleep latency of 16–30 minutes (38.1%). Notably, 80.2% of participants did not use sleeping pills. However, the data also revealed that most elderly individuals exhibited sleep efficiency of less than 65% (42.9%).

Regarding sleep disturbances, a significant number of elderly participants reported experiencing disturbances, with 54.8% scoring between 10 and 18, indicating moderate disturbances. Additionally, 43.7% of respondents felt a moderate level of difficulty in daytime activities, highlighting the impact of poor sleep quality on their daily functioning (see Table 3).

The analysis reveals a significant relationship between stress levels and the incidence of hypertension. Participants with hypertension exhibited higher stress levels (Mean = 24.37, SD = 4.57) compared to those without hypertension (Mean = 18.00, SD = 3.88), yielding a t-value of -6.614 and a p-value of 0.020, indicating statistical significance (see Table 4).

Furthermore, a significant correlation was also identified between depression levels and hypertension incidence. The mean depression score for individuals with hypertension was 18.60 (SD = 4.00), while those without hypertension had a mean score of 18.56 (SD = 5.11). This resulted in a t-value of -0.044 and a p-value of 0.014, suggesting that higher depression levels are associated with the presence of hypertension.

In contrast, the correlation between anxiety levels and hypertension did not show significant results. Participants with hypertension had a mean anxiety score of 14.11 (SD = 3.62), while those without hypertension scored 13.19 (SD = 3.64). The t-value for this comparison was -1.170, with a p-value of 0.958, indicating no significant association.

The analysis of the relationship between sleep quality and the incidence of hypertension revealed that a notable proportion of elderly individuals with hypertension (54.5%) reported experiencing good sleep quality, while a significantly higher percentage (83.7%) of those with hypertension reported poor sleep quality. Statistical analysis yielded a p-value of 0.008, indicating a significant association between

Table 5. Association Between Sleep Quality and Hypertension: Odds Ratio Analysis (*n* = 126)

Sleep Quality	Hypertension				Total		OR	95% CI	P value
	No		Yes						
	f	%	*f*	%	*f*	%			
Good	10	45.5	12	54.5	22	100.0	4.625	1.497 –	0.008
Poor	17	16.3	87	83.7	104	100.0		5.288	
Total	27	21.4	99	78.6	126	100.0			

sleep quality and hypertension incidence (see Table 5).

Furthermore, the odds ratio (OR) calculated from the data was 4.625, suggesting that elderly individuals with hypertension are approximately five times more likely to experience poor sleep quality compared to those without hypertension. This highlights the critical impact of sleep quality on the health of elderly individuals with hypertension.

Logistic regression was employed to model the relationship between psychological changes, sleep quality, and the occurrence of hypertension, controlling for potential confounding variables such as age, gender, education, occupation, physical activity, and comorbidities.

The results from the logistic regression analysis reveal a significant association between age and the occurrence of hypertension, with an odds ratio (OR) of 1.23 (95% CI: 1.096–1.448). This indicates that older individuals are at an increased risk of developing hypertension. Additionally, sleep quality was found to have a significant relationship with hypertension incidence, with an OR of 0.22 (95% CI: 0.061–0.815), suggesting that poor sleep quality is associated with a lower likelihood of hypertension in this population.

Conversely, psychological changes—

Table 6. Multivariate Logistic Regression Analysis of Factors Associated with Hypertension (*n* = 126)

Variable	B	SE	Wald	Sig	OR	95% CI
Age (year)	0.208	0.072	8.266	0.004	1.23	1.096 – 1.448
Gender						
Male/female	0.241	0.520	0.125	0.643	1.28	0.459 – 3.524
Educational level						
Low/high	-0.232	0.593	0.153	0.696	0.80	0.248 – 2.535
Job status						
Employed/unemployed	0.594	0.799	0.552	0.458	1.81	0.378 – 8.671
Physical activity						
Active/inactive	-0.440	0.552	0.713	0.398	0.64	0.232 – 1.789
CCI						
≤ 3/> 3	-0.522	0.576	0.823	0.364	0.60	0.192 – 1.833
Stress	-0.009	0.050	0.031	0.860	1.00	0.899 – 1.093
Anxiety	-0.076	0.073	1.085	0.298	0.92	0.802 – 1.070
Depression	-0.003	0.063	0.003	0.957	1.00	0.881 – 1.127
Sleep quality						
Good/poor	-1.501	0.662	5.149	0.023	0.22	0.061 – 0.815

specifically stress, anxiety, and depression—did not demonstrate a statistically significant relationship with hypertension. The overall model explains 30.2% of the variance in hypertension occurrence among the elderly, as indicated by the Nagelkerke R^2 statistic (see Table 6).

DISCUSSION

The core findings of this study revealed significant relationships between psychological changes, sleep quality, and hypertension. This study identified a significant relationship between psychological changes, specifically stress and depression, and the incidence of hypertension, while no such relationship was observed for anxiety. These findings are consistent with Windarti's (2018) research, which demonstrated a correlation between stress levels and hypertension among the elderly. Age-related hormonal changes, such as decreased testosterone and dysregulated cortisol, can contribute to cognitive disturbances, mood swings, and overall increased stress, which in turn may elevate blood pressure (Windarsih, Suyamto, & Devianto, 2017).

In contrast, no relationship was found between anxiety levels and hypertension, aligning with Wijaya et al. (2022), who reported similar results in elderly populations. One potential explanation for this lack of correlation is that anxiety may manifest differently in older adults, often presenting as generalized worry or somatic complaints rather than direct physiological responses that would typically lead to hypertension. Additionally, older individuals may have developed coping mechanisms that mitigate the impact of anxiety on their blood pressure. Furthermore, factors such as social support and physical activity, which can influence both anxiety levels and cardiovascular health, may not have been adequately controlled for in the studies, potentially masking a relationship.

However, a significant relationship between depression levels and hypertension was observed, corroborating findings by Sefriantina, Purwaningtyas, & Dhanny (2023). The physiological mechanisms linking depression to hypertension include increased sympathetic nerve activity, which raises blood pressure as a response to stress. Furthermore, depression can activate the hypothalamus to stimulate sympathetic responses, leading to adrenal hormone release, blood clotting, and increased blood pressure (Cahyadi, 2021). Additionally, de Hartog-Keyzer et al. (2022) found that psychological distress is independently linked to new coronary events in elderly patients with hypertension, highlighting the broader implications of psychological factors on cardiovascular health.

This study reveals a significant relationship between sleep quality and the occurrence of hypertension among the elderly. Elderly individuals with hypertension exhibited notably poorer sleep quality compared to those without hypertension. Specifically, those suffering from poor sleep quality were found to be five times more likely to develop hypertension. The PSQI questionnaire results indicated that many elderly participants experienced difficulty sleeping, took longer than 30 minutes to fall asleep, and frequently woke up during the night, often due to the need to use the bathroom or because of body aches and headaches.

This finding is consistent with existing literature that indicates a correlation between sleep quality and blood pressure in the elderly population (Nainar, Rayatin, & Indiyani, 2020). Poor sleep quality can result from increased sympathetic nerve activity, which elevates heart rate and blood pressure during sleep. Additionally, unhealthy sleep habits contribute to various sleep disturbances, including physical, psychological, and social stress, all

of which can exacerbate hypertension. Further supporting this association, a study by Yuan et al. (2021) found that poor sleep quality is linked to new-onset hypertension across diverse age groups, reinforcing the idea that inadequate sleep is a significant risk factor for hypertension.

The multivariate analysis of this study reveals a significant relationship between sleep quality and the occurrence of hypertension, while psychological changes—specifically stress, anxiety, and depression—do not show a correlation with hypertension in the elderly population. Despite the presence of psychological changes among the elderly, the relatively low levels of stress, anxiety, and depression may not exert a significant influence on blood pressure.

Conversely, poor sleep quality emerged as a dominant factor affecting blood pressure. This suggests that addressing sleep-related issues may be crucial in hypertension management for this demographic. The findings contrast with previous research, where psychological changes were linked to blood pressure fluctuations. This discrepancy may be attributed to differences in the sample populations, measurement tools, or the psychological states assessed (Sefriantina, Purwaningtyas, & Dhanny, 2023).

It is recommended that future studies explore the interplay between sleep quality and psychological health more deeply, considering factors such as sleep hygiene, the impact of sleep disorders, and interventions aimed at improving sleep quality. Recent research highlights the effectiveness of cognitive-behavioral therapy (CBT) and mindfulness-based interventions in improving both sleep quality and psychological well-being, which could be pivotal in managing hypertension (Silva et al., 2022).

The majority of elderly respondents in this study were 66 years old, highlighting age as a significant factor in the occurrence of hypertension. As individuals age, they experience physiological changes, including the narrowing of blood vessels, which increases the risk of elevated blood pressure. In Indonesia, approximately 40% of individuals over the age of 65 are affected by hypertension (MHRI, 2018).

Additionally, this study found a predominance of male respondents. Literature indicates that gender influences hypertension prevalence, with men generally exhibiting higher systolic and diastolic blood pressure compared to women. This disparity can be attributed to hormonal factors; specifically, estrogen is known to raise high-density lipoprotein (HDL) levels, providing a protective effect against atherosclerosis. However, as estrogen levels decline with age, the risk of hypertension may increase (Aryantiningsih & Silaen, 2018).

Educational level also emerged as a critical factor in this study, with many elderly individuals reporting low levels of education. Limited education can hinder access to health information, leading to difficulties in understanding and managing health conditions, including hypertension (Iriana et al., 2022). Previous research supports this notion, indicating that individuals with lower educational attainment often struggle to obtain information on health management, including prevention, recognition of symptoms, and early detection of hypertension (Pebrisiana, Tambunan, & Baringbing, 2022).

Moreover, a significant portion of respondents in this study were unemployed, which is likely due to age-related limitations. This lack of employment can contribute to reduced physical activity levels, with findings indicating that many elderly respondents are inactive. Decreased physical activity is associated with an increased risk of hypertension, as individuals who are less active may experience higher heart rates and increased

peripheral resistance. Consequently, the heart must exert more effort to pump blood, raising blood pressure and contributing to obesity and hypertension risk (Rhamdika et al., 2023; Triyanto, 2014).

Lastly, the Charlson Comorbidity Index scores for respondents predominantly ranged from 1 to 2, suggesting that many elderly individuals have multiple health conditions. This is a common occurrence in seniors, as they often experience a decline in bodily functions. This study identified several comorbidities, including heart failure, myocardial infarction, and cerebrovascular diseases, which are often associated with hypertension.

In the community, the elderly predominantly experienced psychological changes characterized by stress and depression, while anxiety levels were notably lower among the three domains of psychological change. This study revealed that elderly individuals often become easily angered over trivial matters, are quick to take offense, and struggle to comprehend situations that do not align with their desires. Such behaviors may stem from dissatisfaction with their roles as parents, difficulties in performing daily activities, and a lack of outlets to share their problems (Amira, Suryani, & Hendrawati, 2021). Furthermore, elderly individuals living with their families may feel excluded from decision-making processes, often being perceived as having a traditional mindset (Oktora & Purnawan, 2018).

Anxiety was another significant psychological change reported by participants, primarily linked to fatigue and concerns about their health conditions. This finding is consistent with previous research indicating that the elderly frequently experience prolonged anxiety due to illness and dissatisfaction with their current circumstances (Kaldie, 2014).

Depression among the elderly in this study manifested as feelings of worthlessness, a lack of value, diminished interest in activities, and persistent sadness. These findings align with earlier studies by Priyoto (2016), which identified similar issues in depressed elderly individuals, including loss of self-confidence, diminished joy and interest, decreased concentration, feelings of guilt, and a pessimistic outlook.

Extreme psychological changes can disrupt the autonomic nervous system, resulting in elevated levels of norepinephrine and cortisol (Zhao, Zhu, & Yang, 2023). Such disturbances may lead to increased blood pressure due to the constriction or dilation of blood vessels coupled with an elevated heart rate. If these psychological disturbances persist, the risk of developing hypertension increases.

The findings of this study reveal that a considerable portion of the elderly in the community experiences poor sleep quality. Difficulties such as prolonged sleep latency, frequent awakenings, and intrusive thoughts significantly contribute to their overall dissatisfaction with sleep. These challenges can be attributed to various factors, including age-related changes in sleep patterns and potential underlying health issues, as noted by Silva et al. (2022), who highlighted the impact of physical exercise on sleep quality among elderly adults.

A notable discrepancy exists between the participants' perceptions of their sleep quality and the objective measures obtained through the PSQI. Although many participants perceived their sleep quality as good, the data reveals a significant prevalence of sleep disturbances. This discrepancy underscores the subjective nature of sleep quality, particularly in older adults, where self-assessments may not always reflect objective measures of sleep health. Such findings highlight the importance of increasing awareness and education about sleep hygiene and promoting the recognition of subtle signs of poor sleep quality that may

go unnoticed. Future research should integrate both subjective and objective measures to provide a more comprehensive assessment of sleep quality in this population.

The average sleep duration reported among the elderly aligns with general recommendations; however, the majority still struggle with sleep efficiency. This inefficiency can have cascading effects on their physical and psychological well-being, impacting daily functioning and overall quality of life. Yuan et al. (2021) found a correlation between poor sleep quality and the onset of hypertension, emphasizing the bidirectional relationship between sleep quality and health. Poor sleep can exacerbate existing health conditions, while physical and psychological health issues can further hinder sleep quality.

The moderate levels of sleep disturbances experienced by many participants underscore the importance of addressing sleep issues as part of holistic elderly care. Interventions that promote better sleep hygiene and consider the unique challenges faced by older adults could be beneficial. Factors such as cultural habits, dietary patterns, and the use of herbal therapies may also influence sleep quality, and future studies should explore these variables (Matic et al., 2024). Strategies to improve sleep quality in older adults could include creating conducive sleep environments, encouraging relaxation techniques, and promoting regular physical activity (Sella et al., 2023). These interventions, tailored to the individual needs of the elderly, have the potential to enhance sleep quality and improve overall health outcomes.

This study has several limitations that should be acknowledged. Blood pressure classification was based on measurements taken during data collection, in accordance with established clinical guidelines. However, it is possible that some hypertensive participants presented with normal readings at the time of measurement due to the effects of antihypertensive medications or other factors, potentially introducing misclassification bias. Furthermore, pharmacological interventions, such as the use of antihypertensive or psychotropic medications, were not explicitly controlled for in this study. These medications could influence blood pressure, stress levels, and sleep quality, creating potential confounding effects that were not accounted for in the analyses.

The cross-sectional design of the study also limits the ability to infer causal relationships or capture temporal fluctuations in variables such as blood pressure, stress, and sleep quality. This limitation restricts our understanding of how these factors interact over time. Additionally, the reliance on self-reported measures for assessing sleep quality and psychological changes may introduce recall bias or inaccuracies, as these measures depend on participants' subjective perceptions.

To address these issues in future research, it is essential to document participants' medication use and consider its effects in the analysis to minimize potential confounding. Multiple blood pressure measurements taken over several sessions would help to reduce variability and improve the accuracy of classification. A longitudinal study design could further enhance our understanding of the temporal and causal relationships between stress, sleep quality, and hypertension, providing a more comprehensive view of these interactions in the elderly population.

CONCLUSION

This study suggests that psychological changes and sleep quality issues are prevalent among the elderly and may be associated with the incidence of hypertension. Specifically, elderly individuals with hypertension tend to exhibit higher levels of stress and depression, as well as poor sleep quality. While age above

60 years and poor sleep quality were identified as factors associated with hypertension, further research is needed to explore whether sleep quality can be considered a direct predictor of hypertension in this population.

Early identification and assessment of hypertension risk factors in the elderly are essential. The findings of this study highlight the importance of monitoring psychological changes—particularly stress, anxiety, and depression—and addressing sleep quality in older adults. Healthcare professionals, particularly nurses, can play a pivotal role in providing targeted education and interventions to mitigate hypertension risk and promote better health outcomes in this vulnerable population.

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