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Relationship Between Stress Levels and Hypertension among Elderly

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Abstract:
Hypertension is the leading cause of death and cardiovascular disorders. Continuous increase in blood pressure in essential hypertensive clients will damage blood vessels in vital organs. This study aims to determine the relationship between stress levels and the incidence of hypertension in the elderly at the Pagar Dewa Bengkulu Elderly Service and Assistance Center. The research design is an analytical approach carried out by cross-sectional studies. The sample in this study was 54 older adults. Based on the results of the univariate analysis, it was found that the elderly experienced mild stress as many as 44 (81.5%), and the elderly who had moderate stress 9 (16.7%), no stress 1 (1.8%). Those who experienced mild hypertension were 38 (70.3%), moderate hypertension 9 (16.7%), and those who did not have hypertension as many as 7 (13.0%). In bivariate analysis with the results of the Chi-Square statistical test, the p-value of 0.012< α = 0.05. From the results of this study, it can be concluded that there is a relationship between stress levels and the incidence of hypertension in the elderly. Stress management interventions may play a crucial role in reducing the risk or severity of hypertension in elderly populations. These findings underscore the importance of addressing mental health as part of comprehensive geriatric care to improve overall well-being and health outcomes.

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INTRODUCTION

The global population is aging rapidly, with individuals aged 65 years and older constituting an increasingly significant proportion of the demographic landscape (Osareme et al., 2024). This demographic shift has intensified the focus on age-related health challenges, particularly cardiovascular diseases (CVDs), which remain a leading cause of morbidity and mortality among older adults (Zhou et al., 2022). Hypertension, a major modifiable risk factor for CVDs, affects approximately 73.6% of men and 77.5% of women in elderly populations worldwide (Díez-Villanueva et al., 2022). While genetic, dietary, and lifestyle factors are well-established contributors to hypertension, growing attention has turned to psychosocial determinants, including stress, as critical yet underexplored components of cardiovascular health in aging (Powell-Wiley et al., 2022).

Stress, particularly chronic stress, has long been implicated in the pathophysiology of hypertension (Agorastos & Chrousos, 2021). Prolonged activation of the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system (SNS) in response to stress triggers the release of cortisol and catecholamines, promoting vasoconstriction, sodium retention, and vascular remodeling (Dempster et al., 2021). These physiological responses elevate blood pressure and, over time, may contribute to sustained hypertension (Elsaid et al., 2021). Despite this mechanistic plausibility, research exploring the relationship between stress and hypertension in elderly

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populations remains limited, with inconsistent findings across studies. This gap is particularly pronounced in low- and middle-income countries, where aging populations face unique socioeconomic and cultural stressors.

The elderly population residing in institutional care settings, such as assisted living centers, represents a vulnerable subgroup often exposed to heightened stress due to factors like social isolation, loss of independence, and comorbid health conditions (Boamah et al., 2021; Kurniyawan et al., 2023). Institutionalized elderly individuals frequently exhibit higher rates of hypertension compared to community-dwelling peers, yet the role of stress in this disparity remains poorly understood (Vetrano et al., 2022). Addressing this knowledge gap is critical, as hypertension in older adults is often undertreated, and its management could benefit from holistic approaches that address both biological and psychosocial risk factors (Lombardi et al., 2021; Amir et al., 2023).

Few studies have examined the interplay between stress levels and hypertension severity in institutionalized elderly populations (Turana et al., 2021). Existing literature has predominantly focused on middle-aged adults or employed cross-sectional designs that limit causal inferences. Moreover, many studies rely on self-reported hypertension diagnoses, which may introduce bias or fail to account for confounding variables such as medication use or comorbidities. These limitations underscore the need for targeted research employing robust methodologies to evaluate stress-hypertension associations in aging populations (Marwaha, 2022).

This study investigates the relationship between stress levels and hypertension among elderly individuals at the Pagar Dewa Bengkulu Elderly Service and Assistance Center in Indonesia. The research assesses stress levels through validated screening tools and measures blood pressure to categorize hypertension severity. By focusing on an institutionalized population, the study aims to shed light on how stress management interventions might mitigate cardiovascular risk in resource-limited care settings (Yan et al., 2023; Cahyani et al., 2022).

The findings of this study hold significant public health implications. As the global burden of hypertension continues to rise, identifying modifiable risk factors like stress is essential for developing cost-effective, non-pharmacological strategies to improve elderly health outcomes (Dhungana et al., 2022). Institutional care facilities, often under-resourced, could benefit from evidence-based guidelines integrating mental health support into routine care (Saunders et al., 2021).

This research contributes to the broader discourse on healthy aging by emphasizing the biopsychosocial determinants of cardiovascular health (Kim et al., 2021). By bridging gaps in epidemiological and clinical knowledge, the study advocates for interdisciplinary approaches to elderly care that prioritize both physical and psychological well-being (Bar-Tur, 2021). The following sections detail this investigation's methodology, results, and implications, offering actionable insights for clinicians, policymakers, and researchers dedicated to enhancing the quality of life for aging populations.

METHOD

This cross-sectional study investigated the relationship between stress levels and hypertension among elderly individuals at the Pagar Dewa Bengkulu Elderly Service and Assistance Center in Indonesia. The research employed an analytical observational design to assess the association between stress (independent variable) and hypertension (dependent variable) at a single point in time. Ethical approval was obtained from the Muhammadiyah University of Bengkulu Ethics Committee, ensuring adherence to ethical standards for human subject research.

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The study population was 54 elderly residents aged 60 and older, selected through convenience sampling. Inclusion criteria required participants to be permanent center residents, capable of communication, and willing to provide informed consent. Data were collected through primary methods: guided face-to-face interviews using a structured questionnaire to assess stress levels and standardized blood pressure measurements to evaluate hypertension status. Stress levels were categorized as usual, mild, moderate, or severe using a validated stress assessment tool. At the same time, hypertension was classified as usual, mild, moderate, or severe based on systolic and diastolic blood pressure readings.

Blood pressure was measured twice in a seated position after 5 minutes of rest using a calibrated sphygmomanometer. Hypertension severity was defined as follows: normal (systolic <120 mmHg and diastolic <80 mmHg), mild (systolic 120–139 mmHg or diastolic 80–89 mmHg), moderate (systolic 140–159 mmHg or diastolic 90–99 mmHg), and severe (systolic ≥160 mmHg or diastolic ≥100 mmHg). Stress levels were assessed using a prevalidated item questionnaire scoring system, with cutoffs established for each stress category.

Data analysis was performed using SPSS. Univariate analysis described the distribution of stress levels and hypertension categories, while bivariate analysis employed the Chi-Square test to evaluate associations between stress and hypertension. A p-value <0.05 was considered statistically significant.

RESULT

Table 1. Frequency Distribution of Stress Levels in the Elderly at the Elderly Service and Support Center

Stress Level	Frequency	Percentage (%)
No Stress	1	1.8
Mild	44	81.5
Moderate	9	16.7
Severe	0	0
Total	54	100

Based on the results of Table 1 show that It can be seen from 54 older adults who are in the Pagar Dewa Bengkulu Elderly Service and Assistance Center which was sampled, there was one older adult (1.8%) who did not experience stress, 44 (81.5%) older adults who experienced mild stress, nine older adults (16.7%) experienced moderate stress, and no one experienced severe stress.

Table 1.2 Frequency Distribution of Hypertension in the Elderly at the Service and Assistance Center for the Elderly

Hypertension Level	Frequency	Percentage (%)
No Hypertension	7	13.0
Mild	38	70.3
Moderate	9	16.7
Severe	0	0
Total	54	100

Based on the results of Table 2, it shows that It can be seen from 54 older adults who are in the Pagar Dewa Bengkulu Elderly Service and Assistance Center were sampled; there were seven older adults (13.0%) who did not have hypertension, 38 (70.3%) older adults who experienced mild

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hypertension, nine older adults (16.7%) who experienced moderate hypertension, and no one experienced severe hypertension.

Table 3 Chi-Square statistical test relationship between stress levels and the incidence of hypertension in the elderly

Variable	p-value
Stress level Hypertension level	0.012

Based on the results of Table 3, the results of the Chi-Square statistical test, the p-value of 0.012< α = 0.05. From the results of this study, it can be concluded that there is a relationship between stress levels and the incidence of hypertension in the elderly at the Pagar Dewa Bengkulu Elderly Service and Care Center.

DISCUSSION

The present study investigated the relationship between stress levels and hypertension among elderly individuals at the Pagar Dewa Bengkulu Elderly Service and Assistance Center. The findings revealed a statistically significant association between stress and hypertension, with a p-value of 0.012 (<0.05), indicating that stress levels are linked to the prevalence and severity of hypertension in this population. Notably, 81.5% of participants experienced mild stress, and 16.7% had moderate stress, while 70.3% and 16.7% exhibited mild and moderate hypertension, respectively. These results align with prior research underscoring the role of psychological stress as a modifiable risk factor for cardiovascular conditions, particularly in aging populations (Ciumărnean et al., 2021; Suraying et al., 2024).

The high prevalence of mild stress (81.5%) and hypertension (70.3%) among participants highlights the pervasive nature of these health challenges in institutionalized elderly populations. Chronic stress, even at mild levels, may contribute to sustained sympathetic nervous system activation and dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, leading to prolonged hypertension (Sic et al., 2025). This is consistent with studies suggesting cumulative stress exposure accelerates vascular aging and increases arterial stiffness (Oliveira et al., 2022). However, the absence of severe stress or hypertension cases in this sample could reflect effective institutional care practices or the exclusion of critically ill individuals, warranting further investigation.

The observed correlation between stress and hypertension severity supports biopsychosocial models of health, which emphasize the interplay between psychological states and physiological outcomes (Giacomo et al., 2023; Amir et al., 2023). For instance, stress-induced cortisol release may elevate blood pressure directly through increased vascular resistance or indirectly via unhealthy coping behaviors (Ghasemi et al., 2024). However, this study's cross-sectional design limits causal inferences. Longitudinal research is needed to determine whether stress management interventions can mitigate hypertension progression in this demographic.

Comparing these results to prior studies, the prevalence of hypertension aligns with global trends of rising blood pressure in aging populations (Zhou et al., 2021). However, the lack of severe hypertension cases contrasts with data from community-dwelling elderly populations, potentially due to stricter health monitoring in institutional settings. Similarly, the stress distribution (1.8% stress-free) underscores the unique psychosocial challenges faced by elderly individuals in assisted living facilities, such as social isolation or loss of autonomy, which may exacerbate stress.

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A key limitation of this study is its reliance on a single-center sample, which may limit generalizability. Additionally, using self-reported stress measures and blood pressure assessments at a single time point could introduce bias. Future studies should incorporate longitudinal designs, objective stress biomarkers (e.g., salivary cortisol), and multi-center data to validate these findings (Krahel et al., 2020; Afkarina et al., 2022). Addressing these limitations could enhance understanding of the stress-hypertension pathway and inform targeted interventions.

The implications of these findings are critical for geriatric care. Integrating stress reduction programs—such as mindfulness-based therapies, physical activity, or social engagement initiatives—into elderly care protocols may help lower hypertension risk (Conversano et al., 2020; Deviantony et al., 2024). Policymakers and healthcare providers should prioritize mental health support alongside traditional biomedical approaches to address the holistic needs of aging populations.

This study provides evidence of a significant association between stress levels and hypertension in institutionalized elderly individuals. It underscores the need for interdisciplinary strategies to manage stress as a preventive measure against cardiovascular decline. Future research should explore mechanistic pathways and evaluate the efficacy of stress management interventions in reducing hypertension burden among the elderly (Kurniyawan et al., 2024).

CONCLUSION

This study aimed to investigate the relationship between stress levels and the incidence of hypertension among elderly individuals at the Pagar Dewa Bengkulu Elderly Service and Assistance Center. The findings revealed that most elderly experienced mild stress, while a smaller proportion reported moderate stress, and none exhibited severe stress. Similarly, the majority of participants were found to have mild hypertension, with a smaller group experiencing moderate hypertension, and no cases of severe hypertension were observed.

The statistical analysis using the Chi-Square test demonstrated a significant relationship between stress levels and hypertension among the elderly. This indicates that variations in stress levels are associated with differences in the occurrence and severity of hypertension. Therefore, it can be concluded that stress management interventions may play a crucial role in reducing the risk or severity of hypertension in elderly populations. These findings underscore the importance of addressing mental health as part of comprehensive geriatric care to improve overall well-being and health outcomes.

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CONFLICT OF INTEREST

There is no conflict of interest in this research. The research was conducted according to procedures, and official permission was obtained. Research is not related to the interests of other parties or anything else.

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