

ASSOCIATION BETWEEN MEDICATION ADHERENCE, PHYSICAL SYMPTOM, AND DEPRESSION IN ELDERLY INDIVIDUAL HYPERTENSION IN INDONESIA

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ABSTRACT

Introduction: Depression is a common comorbidity among older adults with hypertension. Physical symptoms such as headache and fatigue, as well as behavioral factors like medication adherence, may influence depressive symptoms. However, evidence among Indonesian hypertensive older adults is limited. This study examined the association between medication adherence, headache, fatigue, and depression using data from the 2023 Indonesian Health Survey. **Methods:** A cross-sectional analysis was conducted using secondary data from 20,865 adults aged ≥ 60 years diagnosed with hypertension. Depression and physical symptoms were self-reported. Chi-square tests were used to assess associations between depression and medication adherence, headache, and fatigue. **Results:** The prevalence of depression was 5.7%. Depression was significantly associated with headache ($p < 0.001$) and fatigue ($p < 0.001$). Medication adherence was not significantly associated with depression ($p = 0.171$), although non-adherent individuals showed slightly higher depressive symptoms. **Conclusion:** Headache and fatigue were strongly associated with depression among hypertensive older adults, highlighting the importance of addressing somatic symptoms in mental health assessments. Although medication adherence showed no significant association, its role should be explored further using multivariable analysis. Integrated physical and mental healthcare approaches are recommended for this population.

Keywords: depression, elderly, fatigue, headache, hypertension, medication adherence.

HUBUNGAN ANTARA KEPATUHAN PENGOBATAN, GEJALA FISIK, DAN DEPRESI PADA LANSIA DENGAN HIPERTENSI DI INDONESIA

ABSTRAK

Pendahuluan: Depresi merupakan salah satu komorbiditas yang umum pada lansia dengan hipertensi. Gejala fisik seperti sakit kepala dan kelelahan, serta faktor perilaku seperti kepatuhan pengobatan, dapat memengaruhi munculnya gejala depresi. Namun, bukti penelitian pada lansia hipertensi di Indonesia masih terbatas. Penelitian ini bertujuan untuk menganalisis hubungan antara kepatuhan pengobatan, sakit kepala, kelelahan, dan depresi menggunakan data Survei Kesehatan Indonesia tahun 2023. **Metode:** Analisis cross-sectional dilakukan menggunakan data sekunder dari 20.865 responden berusia ≥ 60 tahun yang didiagnosis hipertensi. Depresi dan gejala fisik diukur berdasarkan laporan mandiri responden. Uji chi-square digunakan untuk menganalisis hubungan antara depresi dengan kepatuhan pengobatan, sakit kepala, dan kelelahan. **Hasil:** Prevalensi depresi sebesar 5,7%. Depresi berhubungan signifikan dengan sakit kepala ($p < 0,001$) dan kelelahan ($p < 0,001$). Kepatuhan pengobatan tidak berhubungan signifikan dengan depresi ($p = 0,171$), meskipun individu yang tidak patuh menunjukkan gejala depresi yang sedikit lebih tinggi. **Kesimpulan:** Sakit kepala dan kelelahan berhubungan kuat dengan depresi pada lansia dengan hipertensi, menunjukkan pentingnya penilaian

gejala somatik dalam evaluasi kesehatan mental. Meskipun kepatuhan pengobatan tidak menunjukkan hubungan yang signifikan, perannya perlu dikaji lebih lanjut melalui analisis multivariat. Pendekatan layanan kesehatan yang terintegrasi antara fisik dan mental direkomendasikan untuk populasi ini.

Kata Kunci: *depresi, lansia, kelelahan, sakit kepala, hipertensi, kepatuhan pengobatan.*

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INTRODUCTION

Depression is a common mental illness and frequently coexists with chronic diseases, including hypertension, particularly when symptoms are not properly recognized or managed (Albasara et al., 2021b; Albasara et al., 2021a; Tantowi et al., 2025a). Among older adults, depression is especially concerning because it is associated with increased morbidity, functional decline, reduced quality of life, and higher mortality (Zenebe et al., 2021; Devita et al., 2022).

As individuals age, chronic physical illnesses such as hypertension become more prevalent, and this condition has consistently been linked with depression. The bidirectional relationship between the two exacerbates disease outcomes: depression may lead to poorer self-care and treatment non-adherence, while hypertension-related discomfort and disability can heighten vulnerability to psychological distress (Turana et al., 2021;

Tantowi et al., 2025b; Stamoulis et al., 2024).

Alongside population aging, both hypertension and depression have emerged as significant health concerns among Indonesia's elderly. Riskesdas (2018) reported a hypertension prevalence exceeding 63% in individuals aged ≥ 65 years, while depressive symptoms affect approximately 10-15% of this population. Yet due to stigma and limited awareness, depression is often underdiagnosed and undertreated, particularly when symptoms manifest somatically, such as fatigue or chronic pain (Samari et al., 2022). Research continues to show close interactions between physical and mental health, with depression serving both as a consequence and a contributor to chronic disease progression (Herrera et al., 2021; Xiang et al., 2025).

Several studies have noted that older age may be associated with a lower likelihood of depressive symptoms, even when accounting for family characteristics

or working years (Asri and Chuang, 2019; Nadim et al., 2016). Despite increased attention to mental health in aging populations, national-level research specifically examining depression among elderly hypertensive individuals in Indonesia remains limited (Handajani et al., 2022; Alfian et al., 2025). Much of the existing literature focuses on general adult populations, institutionalized elderly, or small regional samples, and few utilize recent, nationally representative data.

Given these gaps, understanding the factors associated with depression among older adults with hypertension is essential for informing targeted screening and intervention strategies. This study aims to analyze these associations using data from the 2023 Indonesian Health Survey, contributing to improved mental health care for Indonesia's growing elderly population.

METHODS

Study Design and Data Source

This study employed a cross-sectional analytical design using secondary data from the 2023 Indonesian Health Survey (Survey Kesehatan Indonesia/SKI 2023), administered by the Indonesian Ministry of Health. The SKI 2023 is a nationally representative survey that employed stratified multistage sampling to collect health-related data across all provinces and districts. The dataset

includes variables on sociodemographic characteristics, health conditions, physical symptoms, lifestyle, and mental health indicators.

Study Population

The study population consisted of Indonesian individuals aged ≥ 60 years who were diagnosed with hypertension, either through a prior medical diagnosis or based on blood pressure measurements collected during the SKI survey. A total of 20,865 hypertensive elderly respondents met the eligibility criteria and were included in the final analysis.

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: age ≥ 60 years. Diagnosed with hypertension (based on self-reported responses or survey assessments). They provided complete responses to the depression screening questions.

The exclusion criteria were as follows: respondents with incomplete or missing data on key variables (e.g., depression, medication adherence, or physical symptoms). Respondents diagnosed with severe cognitive impairment (based on SKI survey notes) could affect response reliability.

Variables and Measurements

Dependent Variable: Depression: Depression was assessed using self-reported responses to questions aligned

with indicators of depressive symptoms. In the SKI 2023, respondents were asked whether they had experienced persistent sadness, loss of interest, or emotional distress in the past two weeks. Responses were categorized as (yes or no). This classification reflects the presence of depressive symptoms and is consistent with the validated screening tools used in large-scale population surveys. Depressive symptoms were assessed using SKI-2023 mental health items that evaluate emotional conditions experienced in the past two weeks. Respondents were asked whether they had felt persistent sadness, loss of interest, or emotional distress. Depression was operationally defined as reporting one or more of these depressive symptoms, consistent with the screening approach used in the SKI dataset. Headache and fatigue were measured through self-reported questions asking whether the respondents experienced these symptoms. Each symptom was coded dichotomously (yes/no). Medication adherence was assessed using a self-report item on whether respondents regularly took their prescribed antihypertensive medication. Responses were categorized as “regular” or “not regular.”

Independent Variables: Medication Adherence (Yes/No), Headache (Yes/No), Fatigue (Yes/No) Additional covariates included in the analysis: Age group (60-69,

70-79, ≥ 80), Gender (Male, Female), Education level (No education, Primary, Secondary, Higher), Marital status (Single, Married, Divorced/Widowed), Place of residence (Urban, Rural), Employment status (Working, Notworking).

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics version 27.0.1. Descriptive statistics were used to summarize the characteristics of the study population. Bivariate analysis was conducted using the chi-square (χ^2) test to identify associations between independent variables and the presence of depression.

To account for the complex sampling design of the SKI 2023, In order to account for the intricate survey design, which included stratification, clustering, and unequal likelihood of selection, sampling weights from the dataset were applied, guaranteeing more precise and representative values. Statistical significance was set at $p < 0.05$.

Chi-square tests were performed, and logistic regression was recommended to account for confounding variables. Sampling weights were applied to reflect the complex survey design.

RESULTS

Table 1 presents the characteristics of 20,865 older adults with hypertension included in the analysis. Most participants

were aged 60-69 years (65.2%), followed by 70-79 years (28.0%), while only 6.8% were aged ≥ 80 years. Women constituted the majority of the sample (61.1%). Educational attainment was generally low: 24.0% had no formal education, 39.8% completed elementary school, 11.7% junior high school, 15.6% senior high school, and 8.9% had college-level education. Most participants were married (62.5%), whereas 36.4% were divorced or widowed, and 1.1% were single. The sample was predominantly urban (60.9%), and more than half (58.1%) were still employed. Medication adherence was high, with 88.3% reporting regular use of antihypertensive treatment.

Regarding symptoms, 5.7% of respondents reported depressive symptoms, 20.4% experienced frequent headaches, and 6.4% reported fatigue. Overall, the distribution reflects a relatively younger elderly population, predominantly female and urban, with low educational attainment and high medication adherence, yet notable proportions reported headache, fatigue, and depressive symptoms.

Table 2 presents the bivariate associations between participant characteristics and depressive symptoms. Age group and regular antihypertensive use were not significantly associated with depression ($p = 0.806$ and $p = 0.171$,

respectively). Depression was more prevalent among women than men (4.0% vs. 1.7%; $p < 0.001$). Educational attainment showed a clear gradient, with lower education associated with higher depression: respondents with no education or elementary schooling reported higher depression (1.5–2.4%) compared with those with junior high, senior high, or college education (0.3–0.8%; $p = 0.002$).

Tabel 1. Frequency Distribution of Characteristics Among Elderly with Hypertension (n=20.865)

Variabel	Frequency	Percent
Age Group		
60 - 69	13607	65.2
70 - 79	5840	28.0
80 - 112	1418	6.8
Gender		
Male	8123	38.9
Female	12742	61.1
Educational Level		
None	5003	24.0
Elementary	8313	39.8
Junior High School	2437	11.7
Senior High School	3246	15.6
Collage	1866	8.9
Marital Status		
Single	221	1.1
Married	13043	62.5
Divorced	1418	36.4
Residence		
Urban	12713	60.9
Rural	8152	39.1
Job		
Doesn't Work	8752	41.9
Work	12113	58.1
Takes Medication Regularly		
Yes	18415	88.3
No	2450	11.7
Feels Depressed		
Yes	1186	5.7
No	19679	94.3
Experiences Headache		
Yes	16600	79.6
No		
Feels Tired		
Yes	1338	6.4
No	19527	93.6

Marital status demonstrated a strong association; divorced and married individuals had higher depression (2.6–3.1%) compared with those who were single (0.1%; $p < 0.001$). Urban residents also reported higher depression than rural residents (3.7% vs. 2.0%; $p = 0.004$). Employment status was statistically significant ($p < 0.001$), although the absolute difference between those not working and working was minimal (2.9% vs. 2.8%).

Both headache and fatigue were significantly associated with depression ($p < 0.001$ for each). Depression was more common among participants with headaches (3.1% vs. 2.6%). The pattern for fatigue (2.4% vs. 3.2%) appeared inconsistent with expectations, suggesting potential residual confounding, measurement error, or symptom misclassification that may require further examination.

Table 2. Factors association between medication adherence, physical symptom, and depression in elderly individuals hypertension in Indonesia using Chi-squared analysis (n=21.351)

Variabel	Depression		p – value
	Yes [1.186]	No [19.679]	
Age Group			0,806
60 - 69	763 (3,7)	12844 (61,6)	
70 - 79	340 (1,6)	5500 (26,4)	
80 - 112	83 (0,4)	1335 (6,4)	
Gender			<0,001*
Male	346 (1,7)	7777 (37,3)	
Female	840 (4,0)	11902 (57,0)	
Educational Level			0,002*
None	307 (1,5)	4696 (22,5)	
Elementary	501 (2,4)	7812 (37,4)	
Junior High School	140 (0,7)	2297 (11,0)	
Senior High School	166 (0,8)	3080 (14,8)	
Collage	72 (0,3)	1794 (8,6)	
Marital Status			<0,001*
Single	12 (0,1)	209 (1,0)	
Married	638 (3,1)	12405 (59,5)	
Divorced	536 (2,6)	7065 (33,9)	
Residence			0,004*
Urban	770 (3,7)	11943 (57,2)	
Rural	416 (2,0)	7736 (37,1)	
Job			<0,001*
Doesn't Work	601 (2,9)	8151 (39,1)	
Work	585 (2,8)	11528 (55,3)	
Takes Medication			0,171
Regularly	1032 (4,9)	17383 (83,3)	
Yes	154 (0,7)	2296 (11,0)	
No			
Experiences Headache			<0,001*
Yes	647 (3,1)	3618 (17,3)	
No	539 (2,6)	16061 (77,0)	
Feels Tired			0,000*
Yes	510 (2,4)	828 (4,0)	
No	676 (3,2)	18851 (90,3)	

* $p < 0.05$

DISCUSSION

This study examined factors associated with depression among older adults with hypertension in Indonesia using the 2023 Indonesian Health Survey. The prevalence of depression in this group was 5.7%, lower than previous national estimates such as Simanjuntak et al. (2022), who reported depressive symptoms in 23.1% of older Indonesians. Gender was significantly related to depression, with women reporting higher rates than men (Girgus et al., 2017; Paul et al., 2023). This pattern aligns with evidence suggesting greater biological and psychosocial vulnerability among older women (Schmitz, 2021).

Lower educational attainment was associated with higher depression, consistent with literature indicating that limited education may reduce coping capacity and access to health information (Magakwe et al., 2025; Asri and Chuang, 2023; Taple et al., 2022; Hidayah et al., 2023; Barrass et al., 2024; Kondirolli & Sunder, 2022). Marital status also showed a significant association, with divorced or widowed individuals reporting more depression, a pattern often linked to social isolation and bereavement in late life (Robards et al., 2012). Urban residence demonstrated higher depression than rural areas, possibly reflecting the influence of

urban stressors (Asri et al., 2019; Hoare et al., 2019).

Working status showed only small differences between groups, and medication adherence and age were not significantly related to depression in this study. Differences from earlier research may reflect variations in population characteristics or reporting patterns. Physical symptoms particularly headache and fatigue showed strong associations with depression, aligning with evidence that somatic complaints frequently accompany depression in older adults (Vassend et al., 2018; Mumang et al., 2021; Paiva & Soares, 2021).

Limitation: The cross-sectional design prevents conclusions about directionality. All variables, including depressive symptoms and physical complaints, were self-reported, which may introduce recall or reporting bias. The analysis relied on bivariate chi-square tests, limiting the ability to account for confounding factors. The dataset did not specify the diagnostic criteria or screening tools used for depression, which may influence accuracy.

Implication: Mental health screening should be integrated into routine care for hypertensive older adults, particularly those living in urban settings or with lower education or limited social

support (Hu et al., 2024; Chantakeeree et al., 2022). Primary healthcare providers should be trained to recognize somatic symptoms as potential indicators of depression. Future research should use longitudinal designs and multivariate analyses to clarify relationships and assess potential mediators such as social support, physical activity, and comorbid conditions.

CONCLUSION

Depression affects 5.7% of older adults in Indonesia living with hypertension. In bivariate analyses, higher odds of depressive symptoms were observed among women, those with lower education, divorced/widowed participants, urban residents, and by employment status (small absolute difference). Headache and fatigue are also associated with depression, underscoring the interplay between somatic complaints and mental health. In contrast, age group and regular antihypertensive use were not associated with depression. These findings support a holistic approach to geriatric hypertension care that routinely screens for depression, particularly in high-risk groups, and links patients to psychosocial support within primary care. Public health programs should strengthen mental health literacy and community and family support. Future studies using multivariable and longitudinal designs are

warranted to confirm these relationships and inform targeted interventions

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DATA AVAILABILITY STATEMENT

The Republic of Indonesia's Ministry of Health can provide the dataset used in this study upon request by using this link: <https://www.badankebijakan.kemkes.go.id/data-mikro-ski/>

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