

DETERMINANTS OF HYPERTENSION: THE ROLE OF DIABETES AND HEALTHCARE UTILIZATION AMONG ADULTS AT PUSPA MEDIKA CLINIC, JEMBER

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ABSTRACT

Background: Hypertension is a major contributor to cardiovascular disease and premature mortality worldwide, with rising prevalence in low- and middle-income countries such as Indonesia. Diabetes mellitus and healthcare utilization are thought to influence hypertension outcomes through biological and behavioral mechanisms. This study examined the determinants of hypertension, focusing on the role of diabetes and healthcare utilization among adults at Puspa Medika Clinic, Jember. **Methods:** A cross-sectional analytic study was conducted among 150 adults at Puspa Medika Clinic, Silo District, Jember Regency, East Java Province. Data were collected using structured questionnaires covering demographic, behavioral, and clinical characteristics. Hypertension status was the dependent variable, while independent variables included age, gender, education, occupation, smoking habits, diabetes, and healthcare utilization. Chi-square tests were used for bivariate analysis, and all data were processed with SPSS version 27.0.1 to adjust for complex survey design. **Results:** The prevalence of hypertension was 91.3%. Diabetes and outpatient care were significantly associated with hypertension ($p < 0.05$), while demographic and lifestyle factors were not. **Conclusion:** Diabetes and healthcare utilization were key determinants of hypertension among adults at Puspa Medika Clinic, Jember. Integrated chronic disease management focusing on diabetes control and preventive care is essential to reduce hypertension burden.

Keywords: cross-sectional study; diabetes mellitus; healthcare utilization; hypertension; Indonesia; Puspa Medika Clinic; risk factors.

DETERMINAN HIPERTENSI: PERAN DIABETES DAN PEMANFAATAN LAYANAN KESEHATAN PADA ORANG DEWASA DI KLINIK PUSPA MEDIKA, JEMBER

ABSTRAK

Latar Belakang: Hipertensi merupakan salah satu penyebab utama penyakit kardiovaskular dan kematian dini di seluruh dunia, dengan prevalensi yang terus meningkat terutama di negara berpendapatan rendah dan menengah seperti Indonesia. Diabetes melitus dan pemanfaatan layanan kesehatan diduga memengaruhi luaran hipertensi melalui mekanisme biologis maupun perilaku. Penelitian ini bertujuan untuk menganalisis determinan hipertensi dengan fokus pada peran diabetes dan pemanfaatan layanan kesehatan pada orang dewasa di Klinik Puspa Medika, Jember. **Metode:** Penelitian analitik dengan desain cross-sectional dilakukan pada 150 orang dewasa di Klinik Puspa Medika, Kecamatan Silo, Kabupaten Jember, Provinsi Jawa Timur. Data dikumpulkan menggunakan kuesioner terstruktur yang mencakup karakteristik demografi, perilaku, dan klinis. Status hipertensi digunakan sebagai

variabel dependen, sedangkan variabel independen meliputi usia, jenis kelamin, pendidikan, pekerjaan, kebiasaan merokok, diabetes, dan pemanfaatan layanan kesehatan. Uji chi-square digunakan untuk analisis bivariat, dan seluruh data diolah menggunakan SPSS versi 27.0.1. **Hasil:** Prevalensi hipertensi sebesar 91,3%. Diabetes dan pemanfaatan layanan rawat jalan menunjukkan hubungan yang signifikan dengan hipertensi ($p < 0,05$), sedangkan faktor demografi dan gaya hidup tidak menunjukkan hubungan yang signifikan. **Kesimpulan:** Diabetes dan pemanfaatan layanan kesehatan merupakan determinan utama hipertensi pada orang dewasa di Klinik Puspa Medika, Jember. Pengelolaan penyakit kronis yang terintegrasi dengan fokus pada pengendalian diabetes dan pelayanan preventif sangat penting untuk mengurangi beban hipertensi.

Kata Kunci: diabetes melitus, faktor risiko, hipertensi, Indonesia, Klinik Puspa Medika, pemanfaatan layanan kesehatan, studi cross-sectional.

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INTRODUCTION

Hypertension remains one of the most prevalent non-communicable diseases globally and is a leading cause of cardiovascular morbidity and mortality. It affects an estimated 1.28 billion adults worldwide, with the majority residing in low- and middle-income countries where health systems face challenges in prevention, early detection, and long-term management (Gupta & Xavier, 2018; WHO, 2021). Hypertension is often accompanied by comorbidities such as diabetes mellitus and obesity, which together exacerbate the risk of stroke, kidney disease, and heart failure (Ouyang et al., 2022; Upadhyay, 2022).

In Indonesia, hypertension continues to be a major public health problem, with

prevalence rates steadily increasing due to aging populations, urbanization, and lifestyle changes (Marissangan, 2024). Data from national health surveys indicate that hypertension affects nearly one in three adults, making it one of the most significant contributors to the national disease burden. At the same time, diabetes mellitus, an important metabolic disorder, often coexists with hypertension, amplifying complications and increasing healthcare utilization (Al-Sumaih et al., 2020; Park et al., 2025). This coexistence not only worsens clinical outcomes but also places an economic strain on both patients and healthcare systems.

Furthermore, patterns of healthcare utilization, such as frequency of outpatient visits and hospitalizations, reflect disease

management, continuity of care, and patient access to health services. However, few studies in Indonesia have examined how these healthcare-related factors interact with clinical and demographic variables in determining hypertension risk, particularly within primary healthcare settings (Chukwuma et al., 2019; Peer et al., 2020).

Puspa Medika Clinic in Silo District, Jember, serves a diverse rural and semi-urban population and provides key services such as chronic disease management. This setting is suitable for examining factors that influence hypertension, particularly the roles of diabetes and healthcare utilization. Understanding these determinants can support evidence-based strategies for prevention and management, help identify high-risk groups, and guide targeted interventions to improve patient outcomes and reduce healthcare burdens at the primary care level.

This study aimed to analyze the determinants of hypertension among adults attending the Puspa Medika Clinic in Jember. Specifically, it focused on assessing the role of diabetes and healthcare utilization, alongside demographic, behavioral, and clinical factors, in relation to hypertension. The findings are expected to support the development of integrated, community-based strategies for chronic

disease prevention and management in Indonesia.

METHODS

Data Source and Study Design

This study employed a cross-sectional analytic design conducted at Puspa Medika Clinic, located in Silo District, Jember Regency, East Java Province, Indonesia. The study aimed to identify determinants of hypertension with a focus on the role of diabetes and healthcare utilization. Data were collected through structured interviews using a validated questionnaire and clinical assessments performed by trained healthcare personnel.

Study Population

The study population consisted of adult patients aged 28 years and older who attended Puspa Medika Clinic during the study period. A total of 150 respondents who met the inclusion criteria were selected as participants.

Inclusion criteria included: Adults aged ≥ 28 years. Patients diagnosed with or without hypertension based on clinical assessment or medical records. Willingness to participate and provide informed consent. Availability of complete demographic, behavioral, and clinical data. Exclusion criteria included: Respondents with incomplete or missing data for key study variables. Patients with unclear or

self-reported inconsistent hypertension status. Pregnant women or individuals with temporary hypertension related to other medical conditions.

Variables and Measurements

Data were obtained using structured questionnaires and clinic records. Measurements included demographic, behavioral, and clinical characteristics. Demographic variables: age, gender, marital status, education level, and occupation. Behavioral variable: smoking status (yes/no). Clinical variables: diabetes mellitus status (yes/no) and outpatient care utilization (yes/no). Health insurance variables: BPJS (Indonesia's National Health Insurance) coverage (yes/no) and general insurance coverage (yes/no).

The dependent variable was hypertension status, determined based on a doctor's diagnosis or clinic records. Respondents were classified as hypertensive (yes) if they had a documented diagnosis of hypertension or were taking antihypertensive medication, and non-hypertensive (no) otherwise.

Independent variables included: Age: categorized into 28–44, 45–59, 60–74, and ≥ 75 years. Gender: male or female. Marital status: married or unmarried. Education level: elementary, junior high, senior high, or college. Occupation: employed or unemployed. Smoking status: current smoker or non-smoker. Diabetes mellitus:

presence or absence of a physician-diagnosed diabetes condition. Outpatient care utilization: history of outpatient visits within the past 12 months (yes/no). Health insurance coverage: BPJS or general insurance enrollment (yes/no).

Statistical Analysis

Data analysis was conducted using SPSS version 27.0.1. Descriptive statistics summarized respondent characteristics, and chi-square tests were used to assess relationships between independent variables and hypertension status. Survey design adjustments, such as stratification and unequal sampling probabilities, were applied to account for the complex sampling structure. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 presents the demographic and clinical characteristics of the 150 respondents who participated in this study at Puspa Medika Clinic, Jember. The majority of respondents were aged 45–59 years (48.7%), followed by those aged 60–74 years (40.0%), while smaller proportions were aged 28–44 years (6.7%) and 75–90 years (4.7%). This distribution indicates that middle-aged and older adults formed the largest group of hypertensive patients in this study population.

In terms of gender, females comprised 59.3% of respondents, while males accounted for 40.7%. All respondents were married (100%), reflecting the adult and family-based demographic served by the clinic.

Regarding educational attainment, the largest group had completed senior high school (38.0%), followed by elementary school (32.7%) and junior high school (28.7%), while only 0.7% had attained a college-level education. In relation to employment, 73.3% of respondents were employed, while 26.7% were not working at the time of the study.

From a clinical perspective, the majority of respondents were diagnosed with hypertension (91.3%), while 8.7% did not have hypertension. Diabetes mellitus was present in 23.3% of respondents, while 76.7% did not report a diagnosis of diabetes. Most respondents had utilized outpatient healthcare services (97.3%), reflecting the clinic's function as a primary care provider for chronic disease management.

Regarding health insurance coverage, 71.3% of respondents were enrolled in BPJS (Indonesia's National Health Insurance), while 28.7% were not. In contrast, 29.3% of respondents reported using general health insurance, and 70.7% did not. With respect to behavioral factors,

40.0% of respondents were smokers, whereas 60.0% were non-smokers.

Overall, these findings indicate that most respondents were middle-aged to older adults, predominantly female, married, and employed, with a high prevalence of hypertension and diabetes. Most participants had regular outpatient visits, suggesting ongoing engagement with primary healthcare services.

Tabel 1. Demographic and Clinical Characteristics of Respondents at Puspa Medika Clinic, Jember (n = 150)

Variable	Frequency (n)	Percent (%)
Demographic Characteristics		
Age (Years)		
28 – 44	10	6,7
45 – 59	73	48,7
60 – 74	60	40,0
75 – >90	7	4,7
Gender		
Male	61	40,7
Female	89	59,3
Marital Status		
Married	150	100,0
Educational Level		
Elementary	49	32,7
Junior High School	43	28,7
Senior High School	57	38,0
College	1	,7
Job		
Work	110	73,3
Doesn't Work	40	26,7
Hypertension		
Yes	137	91,3
No	13	8,7
Diabetes		
Yes	35	23,3
No	115	76,7
Outpatient		
Yes	146	97,3
No	4	2,7
BPJS		
Yes	107	71,3
No	43	28,7
General		
Yes	44	29,3
No	106	70,7
Smoking		
Yes	60	40,0
No	90	60,0

Table 2 presents the association between respondents' demographic, behavioral, and clinical characteristics and the presence of hypertension. The analysis revealed that diabetes mellitus and outpatient care utilization were significantly associated with hypertension ($p < 0.05$). In contrast, no statistically significant associations were observed between hypertension and other variables, including age, gender, marital status, education level, occupation, smoking habits, or type of health insurance.

Based on the results, respondents diagnosed with diabetes mellitus were more likely to have hypertension compared to non-diabetic individuals, indicating a strong comorbidity between the two chronic conditions. This finding aligns with prior evidence suggesting that insulin resistance, vascular inflammation, and metabolic dysregulation contribute to elevated blood pressure in individuals with diabetes.

A significant relationship was also observed between outpatient care utilization and hypertension. The majority of respondents who reported regular outpatient visits were hypertensive, suggesting that individuals with hypertension are more engaged with healthcare services for ongoing monitoring and treatment. This finding reflects the role of Puspa Medika Clinic as a primary

healthcare provider offering routine follow-up and management for chronic diseases.

No significant differences were observed across demographic factors such as age and gender, although hypertension was more prevalent among respondents aged 45 years and older and among females. Similarly, educational level and occupation were not statistically associated with hypertension, indicating that sociodemographic variables may play a less prominent role in this study population.

Regarding smoking behavior, no significant relationship was found between smoking status and hypertension, although 40.0% of respondents reported being smokers. This finding is consistent with mixed evidence in existing literature suggesting that while smoking acutely raises blood pressure, its long-term association with chronic hypertension may vary depending on frequency, duration, and lifestyle context.

In terms of health insurance, both BPJS (National Health Insurance) and general insurance coverage showed no significant association with hypertension status. However, the high proportion of BPJS-enrolled respondents (71.3%) indicates that most participants had access to essential healthcare services.

Overall, these results demonstrate that clinical factors, particularly diabetes mellitus and outpatient healthcare

utilization, are key determinants of hypertension among adults attending Puspa Medika Clinic, Jember. The lack of significant associations with demographic and behavioral variables suggests that chronic disease comorbidity and healthcare engagement play a more dominant role in influencing hypertension outcomes in this population.

Tabel 2. Association Between Respondents Characteristics and Hypertension Status at Puspa Medika Clinic, Jember (n = 150)

Variable	Hypertension				p- Value
	Yes n:137	91,3%	No n:13	8,7%	
Demographic Characteristics					
Age (Years)					.840
28 – 44	9	6,0	1	0,7	
45 – 59	67	44,7	6	4,0	
60 – 74	54	36,0	6	4,0	
75 – >90	7	4,7	0	0	
Gender					.447
Male	57	38,0	4	2,7	
Female	80	53,3	9	6,0	
Married Status					a
Married	137	91,3	13	8,7	
Education Level					.623
Elementary	43	28,7	6	4,0	
Junior High School	41	27,3	2	1,3	
Senior High School	52	34,7	5	3,3	
College	1	0,7	0	0	
Job					.314
Work	35	23,3	5	3,3	
Doesn't work	102	68,0	8	5,3	
Diabetes					.001*
Yes	22	14,7	13	8,7	
No	115	76,7	0	0,0	
Outpatient					.003*
Yes	135	90,0	11	7,3	
No	2	1,3	2	1,3	
BPJS					.268
Yes	96	64,0	11	7,3	
No	41	27,3	2	1,3	
General					.248
Yes	42	28,0	2	1,3	
No	95	63,3	11	7,3	
Smoking					.477
Yes	56	37,3	4	2,7	
No	81	54,0	9	6,0	

Note: p< 0.05*

DISCUSSION

The study examined factors influencing hypertension among adults at Puspa Medika Clinic, Jember. It found that diabetes mellitus and the use of outpatient healthcare services were significantly linked to hypertension, while demographic factors (age, gender, education, occupation) and smoking behavior showed no significant association.

The significant association between diabetes and hypertension aligns with previous research demonstrating that these two chronic conditions frequently coexist and share common pathophysiological mechanisms, including insulin resistance, endothelial dysfunction, and chronic vascular inflammation (Nuamchit et al., 2020; Park et al., 2025). Diabetes can induce microvascular damage and impair nitric oxide, mediated vasodilation, resulting in elevated blood pressure levels (Ouyang et al., 2022). This comorbidity increases the risk of cardiovascular complications and highlights the importance of integrated disease management (Bozkurt et al., 2016; Long & Dagogo-Jack, 2011).

The association between outpatient care utilization and hypertension may reflect the higher frequency of health service engagement among hypertensive individuals (Khera et al., 2020; Mahmood

et al., 2020). Similar findings have been observed in studies showing that patients with chronic diseases such as hypertension and diabetes often seek regular outpatient care for medication monitoring and lifestyle counseling (Al-Sumaih et al., 2020; Nualnim et al., 2022). This relationship underscores the importance of accessible and continuous healthcare in improving hypertension control and preventing complications.

Age and gender, although commonly identified as predictors of hypertension in global research, showed no significant association in this study. This outcome may be due to the narrow age range of participants, mostly middle-aged to older adults and the predominance of female respondents, who generally access healthcare more often and may have better-controlled blood pressure (El-Metwally et al., 2023; Jiang et al., 2025; Negara, 2023).

Smoking does not show a significant association with hypertension, aligning with previous studies that indicate its effects are more acute than long-term. Likewise, socioeconomic factors such as education, occupation, and insurance status were not linked to hypertension, implying that clinical factors may play a more dominant role in this population. (MICHA, 2017; Upadhyay, 2022).

Overall, the results indicate that hypertension among adults at Puspa

Medika Clinic is more strongly influenced by comorbid chronic conditions, such as diabetes, and patterns of healthcare utilization, rather than by demographic or behavioral characteristics. This finding emphasizes the need for patient-centered, integrated care models that address both diseases concurrently.

This study has several limitations, including its cross-sectional design, which prevents determining causal relationships; a small, single-clinic sample that may reduce generalizability; reliance on self-reported data that could lead to recall or reporting bias; and the lack of laboratory measures, such as lipid profiles or BMI, which restricts assessment of metabolic factors related to hypertension.

Indonesia's primary healthcare system can benefit from integrating diabetes and hypertension screening into outpatient services to improve early detection and treatment adherence. Community health workers should emphasize patient education, routine blood pressure checks, and proper diabetes management to prevent cardiovascular complications. Strengthening BPJS-supported outpatient programs and chronic disease care pathways at the policy level could enhance long-term patient outcomes and reduce hospitalizations from uncontrolled hypertension.

For nursing and clinical practice, these findings reinforce the importance of continuous patient engagement, health counseling, and lifestyle modification strategies, particularly among patients with comorbid diabetes.

CONCLUSION

This study demonstrated that diabetes mellitus and outpatient care utilization are significant determinants of hypertension among adults at Puspa Medika Clinic, Jember. In contrast, demographic and behavioral factors such as age, gender, education, occupation, and smoking were not significantly associated with hypertension. These findings highlight the central role of comorbid chronic diseases and healthcare engagement in influencing hypertension outcomes.

Efforts to control hypertension should focus on strengthening integrated chronic disease management, enhancing outpatient service quality, and promoting early detection and prevention programs. Future research with larger, multicenter samples and longitudinal designs is recommended to confirm these associations and identify causal pathways.

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DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Due to ethical and privacy considerations, individual participant data are not publicly available to protect respondents' confidentiality. Aggregated or anonymized data used in the analysis can be shared for academic and research purposes with permission from Puspa Medika Clinic, Silo District, Jember Regency, East Java Province, and the research ethics committee overseeing this study.

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