Jurnal Keperawatan Muhammadiyah Bengkulu, Volume 14, Nomor 01, April 2026; 110-118
P-ISSN : 2460-4550 / E-ISSN : 2720-958X
DOI : 10.36085/jkmb.v14i1.10271

JURNAL ILMIAH

DETERMINANTS OF BLOOD PRESSURE CONTROL AMONG CARDIAC PATIENTS: A CROSS-SECTIONAL STUDY IN A PRIMARY CARE CLINIC

Avita Dwi Anggraini[1], Yuni Asri [2*], Ananda Sagita Maharani[3]
[1-3]Department of Nursing, Faculty og Health and Science, Institute of Technology Science and Health RS dr. Soepraoen Kesdam V/Brawijaya Malang, Indonesia
*Korespondensi: yuniasri@itsk-soepraoen.ac.id

ABSTRAK

Pengendalian tekanan darah yang optimal merupakan faktor kunci dalam mencegah komplikasi dan kejadian kardiovaskular berulang pada pasien kardiak. Identifikasi faktor-faktor yang memengaruhi pengendalian tekanan darah di pelayanan kesehatan primer penting untuk meningkatkan luaran klinis. Penelitian ini bertujuan menganalisis faktor demografis, klinis, dan perilaku yang berhubungan dengan pengendalian tekanan darah pada pasien kardiak di klinik pelayanan kesehatan primer. Penelitian potong lintang ini dilaksanakan pada Januari 2026 di sebuah klinik pelayanan kesehatan primer dengan melibatkan 80 pasien kardiak melalui metode total sampling. Data dikumpulkan dari rekam medis dan dokumentasi terstruktur. Status tekanan darah diklasifikasikan sebagai terkontrol dan tidak terkontrol. Analisis dilakukan secara deskriptif dan menggunakan uji *Chi-square* atau *Fisher's exact* dengan nilai $p < 0,05$ menggunakan SPSS versi 26. Sebagian besar responden berusia lanjut (75,0%) dan 65,0% memiliki tekanan darah terkontrol. Lebih dari separuh pasien memiliki penyakit komorbid. Hanya riwayat penyakit komorbid yang menunjukkan hubungan bermakna dengan pengendalian tekanan darah (p = 0,030). Penyakit komorbid berperan penting dalam pengendalian tekanan darah pada pasien kardiak. Optimalisasi manajemen komorbiditas di pelayanan primer diperlukan untuk meningkatkan luaran kardiovaskular.

Kata kunci: Pasien kardiovaskular, Pelayanan kesehatan primer, Pengendalian tekanan darah, Penyakit komorbid.

ABSTRACT

Optimal blood pressure control is essential to prevent complications and recurrent cardiovascular events among cardiac patients. Identifying factors associated with blood pressure control in primary care is crucial for improving clinical outcomes. This study aimed to examine demographic, clinical, and behavioral factors associated with blood pressure control among cardiac patients in a primary care clinic. A cross-sectional study was conducted in January 2026 at a primary care clinic. A total of 80 cardiac patients were included using a total sampling method. Data were collected from medical records and structured documentation. Blood pressure status was classified as controlled or uncontrolled. Descriptive statistics were used, and associations were analyzed using Chi-

square or Fisher's exact tests with a significance level of p < 0.05. Statistical analyses were performed using SPSS version 26. Most participants were older adults (75.0%), and 65.0% had controlled blood pressure. More than half had comorbid conditions, including hypertension and/or diabetes mellitus. Among all variables examined, only the presence of comorbid disease was significantly associated with blood pressure control (p = 0.030), while demographic and behavioral factors showed no significant associations. Comorbid conditions play a critical role in blood pressure control among cardiac patients. Strengthening comorbidity management in primary care settings may improve blood pressure control and cardiovascular outcomes.

Keywords: *Blood pressure control, Cardiac patients, Comorbidity, Primary care*

INTRODUCTION

Cardiovascular disease (CVD) remains the leading cause of mortality worldwide and continues to place a substantial burden on health systems, particularly in low- and middle-income countries. Current global estimates indicate that CVD accounts for nearly one-third of all annual deaths, underscoring its persistent public health significance (World Health Organization, 2025).

Elevated blood pressure is one of the most important and modifiable risk factors for cardiovascular disease, contributing to vascular remodeling, increased myocardial workload, and endothelial dysfunction, which markedly increase the risk of myocardial infarction, stroke, heart failure, and premature mortality (NCD Risk Factor Collaboration, 2021). Despite the availability of effective antihypertensive therapies and evidence-based clinical guidelines, achieving optimal blood pressure control remains challenging in routine primary care practice (Ringwald-de Meyer *et al.*, 2025). This gap between evidence and practice is often driven by multifactorial barriers, including suboptimal medication adherence, therapeutic inertia, and limited healthcare resources. Furthermore, variability in patient engagement and lifestyle modification further complicates sustained blood pressure control in real-world primary care settings.

Cardiac patients constitute a particularly high-risk population in whom inadequate blood pressure control is associated with increased rehospitalization, major adverse cardiovascular events, and mortality (Tsao *et al.,* 2023). Poorly controlled blood pressure in this population accelerates disease progression and increases the likelihood of recurrent cardiovascular complications. In addition, cardiac patients often present with complex clinical profiles, including multiple comorbidities and polypharmacy, which further complicate blood pressure management. These challenges underscore the need for continuous monitoring and comprehensive, patient-centered management strategies to achieve optimal blood pressure control and improve long-term outcomes.

Primary care settings play a critical role in the long-term management of these patients through ongoing monitoring and continuity of care. In addition, primary care serves as the first point of contact for most patients with hypertension and provides accessible, continuous, and comprehensive care that is essential for early detection, routine blood pressure monitoring, and timely treatment adjustments. Effective hypertension management at the primary care level has been shown to significantly reduce the risk of cardiovascular complications and improve long-term patient outcomes. However, blood pressure control among

cardiac patients in primary care remains suboptimal, influenced by advanced age, multiple comorbidities, complex treatment regimens, unhealthy lifestyle behaviors, and variable medication adherence (World Health Organization, 2025). From a nursing perspective, blood pressure control in cardiac patients is closely aligned with chronic disease self-management and health behavior frameworks that emphasize patient engagement, medication adherence, lifestyle modification, and continuous monitoring (Visseren *et al.,* 2021). Nurses are uniquely positioned to operationalize these frameworks through structured education, behavioral counseling, and regular follow-up in primary care settings (Benjamin *et al.,* 2019). Evidence increasingly demonstrates that nursing-led interventions focusing on patient empowerment and adherence support are effective in improving blood pressure outcomes and reducing cardiovascular risk (Adzitey *et al.,* 2026).

Although numerous studies have examined determinants of blood pressure control, most have focused on essential hypertension rather than patients with established cardiac disease, and few have explicitly incorporated a nursing lens within primary care. Given the greater clinical complexity and vulnerability of cardiac patients, there is a clear need for context-specific research that identifies determinants of blood pressure control that are amenable to nursing intervention.

Therefore, this study aimed to examine demographic, clinical, and behavioral factors associated with blood pressure control among cardiac patients in a primary care setting. The findings are expected to inform the development of nursing-sensitive, patient-centered interventions and to strengthen nursing practice in cardiovascular risk management. Before conducting this cross-sectional study, a preliminary assessment was carried out through a review of medical records at Hasna Medika Clinic, a primary care facility. The initial findings indicated that more than half of cardiac patients (approximately 5-60%) had comorbid conditions such as hypertension and/or diabetes mellitus, and about one-third of patients (around 30-40%) had uncontrolled blood pressure during routine visits. Hasna Medika Clinic was selected as the study setting because it routinely manages cardiac patients with chronic conditions, maintains structured and comprehensive medical records, and provides continuous care and long-term monitoring. These characteristics enable the collection of reliable and clinically relevant data reflecting real-world primary care practice. These preliminary findings highlight the persistence of suboptimal blood pressure control and the complexity of patient characteristics, thereby providing a strong empirical basis for conducting this study.

METHODS

A cross-sectional study was conducted in January 2026 at Hasna Medika Clinic, a primary care facility, to examine demographic, clinical, and behavioral factors associated with blood pressure control among cardiac patients. The study population included all cardiac patients attending the clinic during the study period. A total of 80 patients were enrolled using a total sampling method. Eligible participants were adults aged ≥18 years with a documented diagnosis of cardiac disease and complete clinical records. Patients with comorbid conditions, including hypertension and/or diabetes mellitus, were included as these variables were analyzed as part of the study to assess their association with blood pressure control.

Exclusion criteria were applied to ensure data quality and reduce potential bias. Patients were excluded if they had incomplete or missing key clinical data, such as blood pressure measurements or comorbidity status. In addition, patients

with acute or unstable conditions at the time of data recording, such as acute cardiovascular events or critical illness requiring emergency care, were excluded, as these conditions could temporarily affect blood pressure measurements and not reflect stable clinical status. Patients with severe cognitive impairment or conditions that limited accurate clinical documentation were also excluded when such information was not adequately recorded.

Blood pressure control status was the dependent variable and was classified as controlled or uncontrolled based on clinical documentation. Independent variables included demographic factors (age group, sex, marital status, educational level, and employment status), clinical factors (genetic predisposition and history of comorbid conditions such as hypertension and/or diabetes mellitus), and behavioral factors (medication adherence, smoking, alcohol consumption, dietary pattern, and physical activity). Data were obtained from medical records and structured clinic documentation.

Data analysis was performed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize participant characteristics. Associations between independent variables and blood pressure control were assessed using Chi-square or Fisher's exact tests, with a significance level set at $p < 0.05$.

Ethical approval and administrative permission were obtained from Hasna Medika Clinic before the commencement of the study (Approval No. 023/EKS/DIR-HMMALANG/III/2026). All patient information was anonymized before analysis to maintain confidentiality. Because this study used retrospective clinical records and involved no direct patient contact or intervention, it posed minimal risk to participants.

RESULT

Table 1 describes the demographic, clinical, and behavioral characteristics of cardiac patients attending Hasna Medika Clinic in January. The study population was predominantly older adults (75.0%), while adults represented 25.0% of the sample. The gender distribution was relatively balanced, with a slightly higher proportion of females (55.0%) compared to males (45.0%). Most participants were married (91.3%). In terms of educational attainment, the majority had completed secondary education (76.3%), followed by higher education (17.5%), and a small proportion had low educational levels (6.3%). Employment status was nearly evenly distributed, with 51.2% employed and 48.8% unemployed.

Regarding clinical characteristics, most patients reported no genetic predisposition (87.5%). However, more than half had a history of comorbid conditions, specifically hypertension or diabetes mellitus (58.8%). Blood pressure was classified as controlled in 65.0% of patients, while 35.0% had uncontrolled blood pressure. Behavioral factors revealed complete medication adherence among respondents (100.0%). Smoking was rare (1.3%), and none reported alcohol consumption. Despite high medication adherence, dietary habits were suboptimal, with 76.3% categorized as having less healthy diets and 23.8% as unhealthy. Physical activity levels were also concerning, as 75.0% of patients reported inadequate activity, and only 25.0% met adequate activity criteria. These findings suggest that non-pharmacological factors, particularly diet and physical activity, remain suboptimal despite high reported medication adherence. This imbalance highlights the need for more comprehensive lifestyle-focused interventions in primary care to support optimal blood pressure control among cardiac patients.

Tabel 1. Demographic, Clinical, and Behavioral Characteristics of Cardiac Patients at Hasna Medika Clinic

Variable	Frequency (n)	Percent (%)
Demographic Characteristics		
Age Group		
Adults	20	25,0%
Older adults	60	75,0%
Gender		
Male	36	45,0%
Female	44	55,0%
Marital Status		
Married	73	91,3%
Not Married	7	8,8%
Educational Level		
Low Education	5	6,3%
Secondary Education	61	76,3%
Higher Education	14	17,5%
Employment Status		
Employed	41	51,2%
Unemployed	39	48,8%
Clinical Factors		
Genetic Factors		
Yes	10	12,5%
No	70	87,5%
History of Disease		
Yes (HT/DM	47	58,8%
None	33	41,3%
Blood Pressure Control		
Controlled	52	65,0%
Uncontrolled	28	35,0%
Behavioral Factors		
Medication Adherence		
Yes	80	100,0%
No	0	0%
Smoking Habit		
Yes	1	1,3%
No	79	98,8%
Alcohol Consumption Habit		
Yes	0	0%
No	80	100,0%
Dietary Pattern		
Less Healthy	61	76,3%
Unhealthy	19	23,8%
Physical Activity		
Adequate	20	25,0%
Inadequate	60	75,0%

Table 2 presents the associations between demographic, clinical, and behavioral factors and blood pressure control status. Most demographic variables were not significantly associated with blood pressure control ($p > 0.05$). Age group showed no statistical relationship with blood pressure control ($p = 1.000$), as both adults and older adults had comparable distributions of controlled and uncontrolled cases. Similarly, gender was not significantly related to blood pressure status ($p = 0.451$), although females slightly outnumbered males in the controlled group. Marital status, educational level, and employment status were also not significantly associated with blood pressure control, with p-values of 0.691, 0.482, and 0.761, respectively.

Genetic factors likewise demonstrated no meaningful association ($p = 1.000$). In contrast, the history of comorbid disease (hypertension and/or diabetes mellitus) showed a statistically significant relationship with blood pressure control ($p = 0.030$). Patients without a history of

comorbid conditions had a higher proportion of controlled blood pressure compared to those with such a history. This finding suggests that comorbidities may compromise optimal blood pressure regulation among cardiac patients. Behavioral variables, including smoking status, dietary pattern, and physical activity, were not significantly associated with blood pressure control ($p > 0.05$). Although Table 1 shows a high prevalence of inadequate physical activity and less healthy dietary patterns, these factors did not demonstrate a statistically significant relationship with blood pressure status in the bivariate analysis.

Table 2. Association between Demographic, Clinical, and Behavioral Factors and Blood Pressure Control among Cardiac Patients at Hasna Medika Clinic.

Variable	Blood Pressure Control			
	Controlled		Uncontrolled	
	n	%	n	%
Demographic Characteristics				
Age Group				
Adults	13	16,3	7	8,8
Older adults	39	48,8)	21	26,3
p-value				***1.000***
Gender				
Male	25	31,3	11	13,8
Female	27	33,8	17	21,3
p-value				***0.451***
Marital Status				
Married	48	60,0	25	31,3
Not Married	4	5,0	3	3,8
p-value				***0.691***
Educational Level				
Low Education	2	2,5	3	3,8
Secondary Education	40	50,0	21	26,3
Higher Education	10	12,5	4	5,0
p-value				***0.482***
Employment Status				
Employed	26	32,5	15	18,8
Unemployed	26	32,5	13	16,3
p-value				***0.761***
Genetic Factors				
Yes	7	8,8	3	3,8
No	45	56,3	24	31,3
p-value				***1.000***
History of Disease				
Yes (HT/DM)	26	32,5	21	26,3
None	26	32,5	7	8,8
p-value				***0.030****
Smoking Habit				
Yes	1	1,3	0	0,0
No	51	63,7	28	35,0
p-value				***1.000***
Dietary Pattern				
Less Healthy	39	48,8	22	27,5

Variable	Blood Pressure Control			
	Controlled		Uncontrolled	
	n	%	n	%
Unhealthy	13	16,3	6	7,5
p-value				***0.720***
Physical Activity				
Adequate	12	15,0	8	10,0
Inadequate	40	50,0	20	25,0
p-value				***0.588***

***Notes**: The Chi-square test was applied for categorical variables with an adequate data distribution, while Fisher's exact test was used when the expected cell count was less than 5. A *p*-value < *0.05* was considered statistically significant.

DISCUSSION

This study examined factors associated with blood pressure control among cardiac patients receiving care in a primary care clinic and found that comorbid disease was the only factor significantly associated with blood pressure control (Amare *et al.,* 2020). A substantial proportion of patients remained with uncontrolled blood pressure, highlighting persistent challenges in cardiovascular risk management despite ongoing treatment (Mills *et al.,* 2020). This finding is consistent with recent global and regional evidence demonstrating that poor blood pressure control remains a major contributor to preventable cardiovascular morbidity and mortality, including stroke, heart failure, and premature death (Tsao *et al.*, 2023).

The findings of this study can be meaningfully interpreted using Dorothea Orem's Self-Care Deficit Nursing Theory, which emphasizes the dynamic balance between self-care agency and therapeutic self-care demands (Freilich *et al.,* 2020). Cardiac patients with comorbid conditions such as hypertension and diabetes mellitus experience increased therapeutic demands, including complex medication regimens, dietary restrictions, and continuous self-monitoring (Ho *et al.*, 2022). When these demands exceed an individual's capacity for self-care, a self-care deficit occurs, leading to suboptimal clinical outcomes, including uncontrolled blood pressure. Recent studies have shown that multimorbidity significantly complicates self-management and is associated with poorer cardiovascular outcomes, particularly in primary care populations (Paukkonen *et al.,* 2022).

Although demographic and behavioral factors were not statistically significant in this study, their clinical importance should not be overlooked (Mohan *et al.,* 2021). Within Orem's theoretical framework, behaviors such as medication adherence, healthy dietary practices, and regular physical activity remain central components of self-care agency (Rajan *et al.*, 2020). Evidence from recent nursing and cardiovascular studies consistently demonstrates that inadequate adherence and unhealthy lifestyles are strongly associated with poor blood pressure control, even when statistical significance is not observed in smaller or secondary-data-based studies. The lack of significant associations in this study may therefore reflect limitations in data granularity rather than the absence of true behavioral effects (Mohan *et al.,* 2021).

From a nursing practice perspective, these findings underscore the critical role of nurses in identifying self-care deficits and delivering supportive–educative nursing systems, particularly for cardiac patients with multiple comorbidities (Yang *et al.,* 2022). Nurses in primary care are strategically positioned to provide individualized education, reinforce medication adherence, support lifestyle modification, and coordinate long-term care. Recent evidence indicates that nursing-led interventions, including

structured follow-up, motivational counseling, and self-management support, significantly improve blood pressure control and overall cardiovascular risk profiles (Berardinelli *et al.,* 2024).

CONCLUSION

In conclusion, this study contributes to the advancement of nursing science by demonstrating that comorbidity-related self-care demands are a key determinant of blood pressure control among cardiac patients in primary care settings. Integrating nursing theory into routine clinical practice provides a robust framework for developing targeted, nursing-sensitive interventions. Such approaches have the potential to strengthen self-care capacity, improve blood pressure control, and enhance long-term cardiovascular outcomes among cardiac patients.

Future research is recommended to employ longitudinal or experimental designs to better establish causal relationships between comorbidities, self-care behaviors, and blood pressure control. In addition, studies incorporating larger and more diverse populations across multiple primary care settings are needed to improve generalizability. Further research should also explore the effectiveness of nursing-led interventions, particularly those focusing on self-care enhancement and comorbidity management, in improving blood pressure outcomes among cardiac patients.

REFERENCES

Adzitey, S. P., Akimanimpaye, F., & Crowley, T. (2026). Effectiveness of nurse-facilitated hypertension self-management interventions: A mixed-methods systematic review and meta-analysis. *International Journal of Nursing Sciences*. https://doi.org/https://doi.org/10.1016/j.ijnss.2026.02.016

Amare, F., Nedi, T., & Berhe, D. F. (2020). Blood pressure control practice and determinants among ambulatory hypertensive patients attending primary health care facilities in Addis Ababa. *SAGE Open Medicine*, *8*, 2050312120946521.

Benjamin, E. J., Muntner, P., Alonso, A., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Das, S. R., Delling, F. N., Djousse, L., Elkind, M. S. V, Ferguson, J. F., Fornage, M., Jordan, L. C., Khan, S. S., Kissela, B. M., Knutson, K. L., … Virani, S. S. (2019). Heart Disease and Stroke Statistics-2019 Update: A Report From the American Heart Association. *Circulation*, *139*(10), e56–e528. https://doi.org/10.1161/CIR.0000000000000659

Berardinelli, D., Conti, A., Hasnaoui, A., Casabona, E., Martin, B., Campagna, S., & Dimonte, V. (2024). Nurse-Led Interventions for Improving Medication Adherence in Chronic Diseases: A Systematic Review. *Healthcare (Basel, Switzerland)*, *12*(23). https://doi.org/10.3390/healthcare12232337

Freilich, J., Nilsson, G. H., Ekstedt, M., & Flink, M. (2020). "Standing on common ground"-a qualitative study of self-management support for patients with multimorbidity in primary health care. *BMC Family Practice*, *21*(1), 233.

Ho, I. S.-S., Azcoaga-Lorenzo, A., Akbari, A., Davies, J., Hodgins, P., Khunti, K., Kadam, U., Lyons, R., McCowan, C., & Mercer, S. W. (2022). Variation in the estimated prevalence of multimorbidity: systematic review and meta-analysis of 193 international

studies. *BMJ Open*, *12*(4), e057017.

Mills, K. T., Stefanescu, A., & He, J. (2020). The global epidemiology of hypertension. *Nature Reviews Nephrology*, *16*(4), 223–237. https://doi.org/10.1038/s41581-019-0244-2

Mohan, D., Mente, A., Dehghan, M., Rangarajan, S., O'Donnell, M., Hu, W., Dagenais, G., Wielgosz, A., Lear, S., & Wei, L. (2021). Associations of fish consumption with risk of cardiovascular disease and mortality among individuals with or without vascular disease from 58 countries. *JAMA Internal Medicine*, *181*(5), 631–649.

NCD Risk Factor Collaboration. (2021). *Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019 : a pooled analysis of 1201 population-representative studies with 104 million participants*. *398*. https://doi.org/10.1016/S0140-6736(21)01330-1

Paukkonen, L., Oikarinen, A., Kähkönen, O., & Kyngäs, H. (2022). Adherence to self-management in patients with multimorbidity and associated factors: a cross-sectional study in primary health care. *Journal of Clinical Nursing*, *31*(19–20), 2805–2820.

Rajan, S., McKee, M., Rangarajan, S., Bangdiwala, S., Rosengren, A., Gupta, R., Kutty, V. R., Wielgosz, A., Lear, S., & AlHabib, K. F. (2020). Association of symptoms of depression with cardiovascular disease and mortality in low-, middle-, and high-income countries. *JAMA Psychiatry*, *77*(10), 1052–1063.

Ringwald-de Meyer, S., de La Harpe, R., Vollenweider, P., Marques-Vidal, P., & Vaucher, J. (2025). Factor associated with and risk of cardiovascular disease in people with uncontrolled hypertension. *Scientific Reports*, *15*(1), 375. https://doi.org/10.1038/s41598-024-84824-z

Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Anderson, C. A. M., Arora, P., Avery, C. L., Baker-Smith, C. M., Beaton, A. Z., Boehme, A. K., & Buxton, A. E. (2023). Heart disease and stroke statistics—2023 update: a report from the American Heart Association. *Circulation*, *147*(8), e93.

Visseren, F. L. J., Mach, F., Smulders, Y. M., Carballo, D., Koskinas, K. C., Bäck, M., Benetos, A., Biffi, A., Boavida, J.-M., & Capodanno, D. (2021). 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice: Developed by the Task Force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies With the special contribution of the European Association of Preventive Cardiology (EAPC). *European Heart Journal*, *42*(34), 3227–3337.

World Health Organization. (2025). *Cardiovascular diseases (CVDs): estimated 19.8 million people died from CVDs in 2022, representing approximately 32 % of all global deaths.* https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-%28cvds%29?utm_source

Yang, C., Lee, D. T. F., Wang, X., & Chair, S. Y. (2022). Effects of a nurse-led medication self-management intervention on medication adherence and health outcomes in older people with multimorbidity: A randomised controlled trial. *International Journal of Nursing Studies*, *134*, 104314. https://doi.org/10.1016/j.ijnurstu.2022.104314