THE ASSOCIATION BETWEEN UNCONTROLLED HYPERTENSION AND THE INCIDENCE OF HYPERTENSIVE HEART DISEASE AMONG PATIENTS AT THE CARDIOLOGY CLINIC OF HASNA MEDIKA MALANG

Riska Rahmawati[1], Juliati Koesrini[2]

[1,2]ITSK RS Dr. Soepraoen Malang
E-mail : riskarahmaaa04@gmail.com[1], juliatikoesrini@itsk-soepraoen.ac.id[2]

ABSTRACT

Hypertensive Heart Disease (HHD) is a serious complication of uncontrolled hypertension and a leading cause of cardiovascular morbidity in Indonesia. Persistent hypertension leads to structural cardiac changes including left ventricular hypertrophy, diastolic dysfunction, and heart failure. This study aims to analyze the relationship between uncontrolled hypertension and HHD incidence in patients at the Cardiology Clinic of Hasna Medika Malang. An observational analytic cross-sectional design was employed with a purposive sample of 50 respondents in June 2026. The independent variable was uncontrolled hypertension (BP ≥140/90 mmHg measured at least twice with a 5-minute interval); the dependent variable was HHD confirmed by specialist diagnosis via echocardiography and/or ECG. Fisher Exact Test was applied (α=0.05). Results showed 48 respondents (96.0%) had uncontrolled hypertension and 47 (94.0%) were diagnosed with HHD. Female predominance (56.0%), mean age 60.6 years. Fisher Exact Test: p=0.023, OR=3.750. There is a significant relationship between uncontrolled hypertension and HHD. Nurses should intensify education on medication adherence, dietary modification, and blood pressure self-monitoring to prevent HHD progression

Keyword : *Uncontrolled Hypertension, Hypertensive Heart Disease, Cardiology Outpatient, Blood Pressure, Nursing Intervention*

INTRODUCTION

Hypertension is one of the most prevalent non-communicable diseases worldwide, serving as a major contributor to cardiovascular disease, stroke, and renal failure. According to the World Health Organization (WHO, 2023), approximately 1.28 billion adults aged 30–79 years suffer from hypertension globally, with two-thirds residing in low- and middle-income countries, including Indonesia. The condition is often termed a silent killer because the majority of patients remain asymptomatic until serious complications develop; an estimated 46% are unaware of their diagnosis (Mills et al., 2020).

In Indonesia, hypertension prevalence continues to rise. The 2023 Indonesian Health Survey (SKI) reported a prevalence of 36.3% among adults aged ≥18 years, up from 34.1% in Riskesdas 2018. East Java recorded approximately 36.5%, while Malang City reached 38.2% (Dinkes Kota Malang, 2022). Uncontrolled hypertension inflicts serious systemic damage, most critically on cardiac structure and function, manifesting as Hypertensive Heart Disease (HHD) — a spectrum encompassing left ventricular hypertrophy (LVH), diastolic dysfunction, congestive heart failure, and atrial fibrillation (Williams et al., 2023). Approximately 75% of heart failure cases in developing countries are attributable to uncontrolled hypertension (Ponikowski et al., 2021).

Hasna Medika Malang Cardiology Clinic recorded 87 hypertensive outpatient visits from January to May 2026, of which 74 (85.1%) were diagnosed with HHD — highlighting a persistently low blood pressure control rate in this setting (Medical Records, Hasna Medika Clinic, 2026). Research exploring this relationship specifically in private cardiac clinics in Malang remains scarce; most prior studies were conducted in public referral hospitals with differing population characteristics. This research gap motivated the present study. Accordingly, this study aims to analyze the relationship between uncontrolled hypertension and HHD incidence among patients at the Cardiology Clinic of Hasna Medika Malang, to inform evidence-based nursing interventions.

METHOD

This study employed an observational analytic design with a cross-sectional approach. The population comprised all hypertensive patients attending the Cardiology Clinic of Hasna Medika Malang during June 2026. Purposive sampling yielded 50 respondents meeting inclusion criteria: (1) age ≥18 years with documented hypertension; (2) blood pressure measured at the visit; (3) complete medical records including cardiac history; and (4) provision of written informed consent. Exclusion criteria included congenital heart disease, incomplete records, and refusal to participate (Nursalam, 2020)

The independent variable was uncontrolled hypertension, defined as systolic BP ≥140 mmHg and/or diastolic BP ≥90 mmHg in patients on antihypertensive therapy, per ESC/ESH 2023 guidelines (Williams et al., 2023). Blood pressure was measured at least twice with a five-minute interval using a calibrated digital sphygmomanometer; the average of two readings was used (Unger et al., 2020). The dependent variable was HHD, established from cardiologist diagnosis recorded in medical records and confirmed via echocardiography and/or electrocardiography (ECG), encompassing LVH, diastolic dysfunction, and/or hypertensive heart failure (Williams et al., 2023).

Data were collected through direct blood pressure measurement and medical record review, supplemented by a validated structured observation sheet. Univariate analysis described frequency distributions and percentages. Bivariate analysis used Fisher Exact Test — chosen because cells with expected count <5 were present in the 2×2 contingency table — at a significance level of $p<0.05$, with Odds Ratio (OR) as the measure of association strength (Dahlan, 2021). The study received ethical clearance; principles of beneficence, non-maleficence, autonomy, and justice were observed throughout (Polit & Beck, 2021).

RESULTS AND DISCUSSION

Table 1 presents the demographic characteristics of the 50 respondents.

Table 1. Frequency Distribution of Respondent Characteristics (n=50)

Characteristic	f	%
Sex		
Male	22	44.0
Female	28	56.0
Age Group (years)		
≤40	4	8.0
41–60	21	42.0
>60	25	50.0
Education		
Elementary School	3	6.0
Junior High School	4	8.0
Senior High School	33	66.0
Diploma/Bachelor/Master	10	20.0
Marital Status		
Married	40	80.0
Widowed/Divorced	9	18.0
Single	1	2.0
Total	50	100.0

Source: Primary Data, June 2026

The majority of respondents were female (56.0%), consistent with the post-menopausal loss of estrogen's vasodilatory and antioxidant vascular effects, which substantially elevates hypertension risk in women (Mauvais-Jarvis et al., 2020; Regitz-Zagrosek et al., 2021). Half of the respondents (50.0%) were aged over 60 years (mean 60.6 years), reflecting the role of age-related arterial stiffness in perpetuating systolic hypertension among older adults (Unger et al., 2020). Senior high school education dominated (66.0%), a group associated with lower health literacy and reduced antihypertensive adherence (Huo et al., 2021).

Table 2. Distribution of Risk Factors among Respondents (n=50)

Risk Factor	f	%
Family History of Hypertension		
Yes	26	52.0
No	24	48.0
Smoking Habit		
Yes	16	32.0
No	34	68.0
Alcohol Consumption History		
Yes	4	8.0
No	46	92.0
Medication Adherence		
Good	35	70.0
Poor/Non-adherent	15	30.0
Diet Pattern		
Good	35	70.0
Poor	15	30.0
Physical Activity		
Good	25	50.0
Poor	25	50.0

Source: Primary Data, June 2026

The most prevalent risk factor was family history of hypertension (52.0%), a polygenic non-modifiable risk factor that increases hypertension susceptibility two- to four-fold and amplifies salt sensitivity, complicating blood pressure control (Carey et al., 2021; Lip et al., 2021). Smoking was identified in 32.0% of respondents; nicotine induces acute vasoconstriction and chronic endothelial dysfunction, increasing cardiovascular event risk 2.7-fold compared with non-smokers of equivalent hypertension severity (Benowitz et al., 2021; Faridah et al., 2021). Poor medication adherence (30.0%) remains a classic challenge; non-adherence raises major cardiovascular event risk by 2.3-fold (Krousel-Wood et al., 2022; Nuraini, 2021). Insufficient physical activity (50.0%) and poor dietary patterns (30.0%) further hinder blood pressure control through insulin resistance, sympathetic overactivation, and high sodium intake (Pescatello et al., 2022; He et al., 2021).

Table 3. Distribution of Blood Pressure Control Status and HHD Incidence (n=50)

Variable	f	%
Blood Pressure Status		

Uncontrolled (BP ≥140/90 mmHg)	48	96.0
Controlled (BP <140/90 mmHg)	2	4.0
HHD Incidence		
HHD Positive	47	94.0
HHD Negative	3	6.0
Total	50	100.0

Source: Primary Data, June 2026

A striking 96.0% of respondents had uncontrolled hypertension, consistent with WHO (2023) data showing fewer than 25% of hypertensive patients in developing countries achieve target blood pressure. HHD was identified in 94.0% of respondents, underscoring the heavy cardiac disease burden in this population.

Table 4. Fisher Exact Test: Uncontrolled Hypertension and HHD Incidence

BP Status	HHD (+)	HHD (−)	Total	p / OR
Uncontrolled	45 (93.8%)	3 (6.3%)	48 (100%)	p = 0.023
Controlled	2 (100%)	0 (0%)	2 (100%)	OR = 3.750
Total	47 (94.0%)	3 (6.0%)	50 (100%)	

Source: Primary Data, June 2026 | Fisher Exact Test (expected count <5)

Fisher Exact Test results confirmed a significant association between uncontrolled hypertension and HHD (p=0.023; OR=3.750), indicating that patients with uncontrolled hypertension are 3.75 times more likely to develop HHD than those with controlled blood pressure. These findings align with Soenarta et al. (2021) who reported OR=4.2 (95% CI: 2.8–6.3; p<0.001) for the relationship between uncontrolled hypertension and LVH in Indonesian hospitals, and with Wahyuni and Eksanoto (2020) who identified significant associations between hypertension severity and cardiac target-organ damage (p=0.001).

Pathophysiologically, sustained pressure overload on the left ventricle triggers adaptive concentric hypertrophy. Over time, this process becomes maladaptive, leading to decreased ventricular compliance (diastolic dysfunction), progressive systolic impairment, and ultimately heart failure (Bhatt et al., 2021). Persistent RAAS activation further accelerates myocardial fibrosis and inflammation via angiotensin II and aldosteron (Carey et al., 2021; Elijovich et al., 2020). Zhao et al. (2023) demonstrated that worsening blood pressure control correlates strongly with increasing left ventricular mass index (r=0.68; p<0.001), with each 10-mmHg rise in systolic BP above target associated with an 8.3 g/m² increment in LVMI. Kario et al. (2021) further showed that blood pressure variability — not merely elevated values — independently contributes to cardiac target-organ damage.

An important finding requiring careful interpretation is that both respondents with controlled blood pressure were also diagnosed with HHD. This is most plausibly explained by a long-standing hypertension history prior to achieving control, meaning structural cardiac damage had already developed before the study measurement. Additionally, the markedly unequal sample distribution (96.0% uncontrolled vs. 4.0% controlled) limits between-group comparisons and may overestimate OR magnitude; findings should therefore be interpreted with caution (Dahlan, 2021).

From a nursing practice perspective, the high prevalence of uncontrolled hypertension and HHD underscores the urgent need for strengthened nurse-led interventions aligned with SDKI, SIKI, and SLKI standards (PPNI, 2021). Relevant nursing diagnoses include Risk for Decreased Cardiac Output, Activity Intolerance, and Ineffective Health Management. Structured education using the teach-back method, blood pressure self-monitoring, DASH dietary counseling, and supervised exercise programs are evidence-based interventions shown to substantially improve blood pressure control (Carey et al., 2021; Kowalski et al., 2021; Azizah et al., 2021). Margolis et al. (2020) demonstrated that nurse-managed telehealth programs achieved BP control in 69% of participants versus 45% in controls ($p<0.001$), highlighting the potential of digital health strategies in this context.

CONCLUSIONS

This study demonstrated a statistically significant relationship between uncontrolled hypertension and HHD incidence at Hasna Medika Malang Cardiology Clinic (Fisher Exact Test: $p=0.023$; OR=3.750), with 96.0% of respondents having uncontrolled blood pressure and 94.0% diagnosed with HHD. Patients with uncontrolled hypertension are 3.75 times more likely to develop HHD than those achieving blood pressure targets. Nurses should prioritize structured education on antihypertensive adherence, low-sodium diet, regular physical activity, and self-monitoring blood pressure to prevent HHD. Future research using prospective cohort designs with larger, more balanced samples and objective cardiac diagnostic confirmation (echocardiography and ECG) is warranted to establish causality and improve generalizability

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