



The Influence of Sociodemographic Factors and Disease Characteristics on the Medication Adherence among Hypertensive Patients

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Track Record Article	Abstract
<p>Revised: 23 April 2025 Accepted: 25 May 2025 Published: 30 June 2025</p> <p>How to cite : Siregar, F. A., & Asfriyati. (2025). The Influence of Sociodemographic Factors and Disease Characteristics on the Medication Adherence among Hypertensive Patients. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 7(1), 315–326</p>	<p><i>Hypertension is a major global public health concern associated with increased risk of cardiovascular morbidity and mortality. Despite the availability of effective antihypertensive therapy, suboptimal blood pressure control remains prevalent, particularly in low- and middle-income countries. Poor medication adherence is a key contributing factor, often influenced by various sociodemographic and clinical characteristics. This study aimed to assess the level of medication adherence among hypertensive patients and to examine the association between sociodemographic and clinical factors and adherence behavior in an urban Indonesian population. A cross-sectional study was conducted among 153 hypertensive patients attending six public health centers in Medan City, Indonesia, between August and October 2021. Participants were selected using purposive sampling. Medication adherence was assessed using the validated Indonesian version of the Eight-Item Morisky Medication Adherence Scale (MMAS-8). Data on age, education, income, family history, body mass index, comorbidities, and blood pressure were collected through interviews and direct measurements. Bivariate and multivariate logistic regression analyses were performed using SPSS version 24.0 to identify significant predictors of adherence. Among the participants, 52.3% demonstrated high medication adherence, while 47.7% had low adherence. Multivariate analysis revealed that age ≥ 45 years ($RP = 4.29$; $p = 0.023$), low education level ($RP = 1.50$; $p = 0.044$), and family history of hypertension ($RP = 2.05$; $p = 0.040$) were significantly associated with adherence. Other variables, including income, BMI, and comorbidities, were not significant predictors. Medication adherence among hypertensive patients remains suboptimal. Targeted interventions focusing on older adults, patients with lower education, and family-centered support may enhance adherence and improve hypertension management outcomes.</i></p> <p>Keywords: <i>Adherence, Education, Hypertension, Risk factors</i></p>

INTRODUCTION

Hypertension remains one of the most pressing global public health challenges, characterized by a persistently high prevalence and substantial morbidity and mortality worldwide (Banjarnahor, 2023; Siregar, 2020). It serves as a major modifiable risk factor for cardiovascular diseases, stroke, and renal complications, all of which significantly impair quality of life and burden healthcare systems (Gusty, 2022). Despite the availability of effective antihypertensive therapies, the proportion of patients achieving optimal blood pressure control remains suboptimal. For instance, in Japan, only about 30% of hypertensive individuals have their blood pressure controlled below the target threshold of 140/90 mmHg, highlighting a critical gap in disease management (Sagara, 2024).

A growing body of evidence attributes this gap, in part, to poor medication adherence a behavior defined as the extent to which patients take medications as prescribed by their healthcare providers (Choudhry, 2022) (Nishimura, 2020). Nonadherence to antihypertensive medications undermines the therapeutic effectiveness of treatment and is linked to increased risks of cardiovascular events, hospitalizations, and healthcare costs (Lee, 2021) (Pramiastuti, 2020). Even with robust public health goals and advancements in pharmacotherapy, adherence remains a persistent barrier to achieving adequate blood pressure control at the population level.

Globally, it is projected that by 2025, approximately 1.5 billion adults or 29.2% of the global adult population will be living with hypertension, with a substantial portion (17.3%) residing in developing countries (Amaliah, 2014). In Indonesia, the prevalence of hypertension continues to rise, from 25.8 per 100,000 in 2013 to 34.1 per 100,000 in 2018 (Allender, 2014). Alarmingly, most individuals with hypertension are asymptomatic, and only a small fraction around 4% achieve controlled blood pressure. The condition accounts for nearly 6.7% of deaths nationally (Garwahasada, 2020). In North Sumatera Province, hypertension prevalence rose from 24.7% in 2013 to 30% in 2018, with Medan City recording a prevalence of 22.53% in 2017, underscoring its public health significance in this region (Anteneh, 2015).

Medication adherence plays a pivotal role in the effective management of chronic conditions such as hypertension. Poor adherence is known to increase the risk of disease complications, elevate healthcare costs, and diminish patient outcomes (Aynalem, 2021) ; (Sartik, 2017). In a study involving 112,506 hypertensive patients, 26.2% were found to be nonadherent within the first year of initiating treatment (Sagara, 2024). Key determinants of nonadherence included younger age, male gender, the use of diuretics, monotherapy, comorbidities such as cancer, prescriptions issued by hospitals, and residence in smaller urban areas (Umemura, 2019). Additionally, adverse drug reactions (ADRs) have been associated with decreased adherence and deteriorated quality of life, particularly among patients experiencing moderate or severe side effects (Insani, 2025).

Various psychosocial and demographic factors influence adherence, including gender differences, educational attainment, complexity of medication regimens, and disease knowledge (Ullah, 2023; Ishida, 2019). Women have been reported to be more adherent than men, while higher education and better understanding of hypertension are positively correlated with adherence (Wakai, 2021; Giakoumidakis, 2024). Paradoxically, some patients with greater disease knowledge may exhibit lower adherence, potentially due to perceived self-efficacy or underestimation of disease severity.

Medan City, as one of Indonesia's major metropolitan areas, is characterized by high population density, cultural diversity, and disparities in healthcare access—factors that collectively reflect the complexity of medication adherence issues among hypertensive patients. At the primary healthcare level, particularly within community health centers (Puskesmas), antihypertensive medications are widely available and subsidized by the government. However, blood pressure control among patients remains suboptimal. This phenomenon suggests that the core issue lies not in the availability of medication, but rather in patient behavior and various social and clinical determinants that have yet to be thoroughly examined. In the Indonesian context, especially in urban areas such as Medan, there is a notable lack of empirical evidence exploring the association between sociodemographic and clinical characteristics and medication adherence in hypertensive populations. A comprehensive understanding of these factors is crucial for designing evidence-based educational and promotive interventions, as well as for strengthening the role of primary healthcare centers as the frontline in managing non-communicable diseases.

In the Indonesian context, and particularly in urban environments like Medan, empirical studies that explore how these sociodemographic and disease-related characteristics influence medication adherence are still limited. Most existing research tends to generalize findings without accounting for regional or cultural specificities, thereby limiting the applicability of such data for local health system strengthening. Without locally grounded evidence, efforts to improve hypertension control remain generic and may fail to address the nuanced barriers experienced by different subgroups of patients.

Therefore, this study seeks to fill a critical knowledge gap by investigating the relationship between sociodemographic and disease-related factors and medication adherence among hypertensive patients at the primary care level in Medan City. The findings are expected to inform the development of targeted, culturally appropriate, and evidence-based interventions that enhance medication adherence, optimize hypertension control, and ultimately reduce the burden of cardiovascular disease in urban Indonesian populations.

Given these dynamics, a comprehensive understanding of the sociodemographic and clinical determinants of medication adherence is essential to inform targeted interventions, especially in low- and middle-income settings. In Indonesia, where hypertension prevalence and treatment challenges persist, investigating these factors can help bridge the adherence gap and improve patient outcomes. Therefore, this study aims to assess the level of medication adherence among hypertensive patients in Medan City and to examine the sociodemographic

and clinical factors associated with adherence behavior using the validated Eight-Item Morisky Medication Adherence Scale (MMAS-8).

METHODS

This study employed an observational analytic design with a cross-sectional approach, aimed at identifying factors associated with medication adherence among hypertensive patients. The research was conducted from August-October 2021 across six primary healthcare centers (Puskesmas) in Medan City, Indonesia.

A total of 153 hypertensive patients were recruited using purposive sampling based on the following inclusion criteria: Diagnosed with hypertension by a health professional; Aged ≥ 18 years; Currently taking prescribed antihypertensive medication; Provided informed written consent.

Data were obtained through structured face-to-face interviews using a validated Indonesian version of the Eight-Item Morisky Medication Adherence Scale (MMAS-8). The MMAS-8 scores were categorized into: High adherence: score ≥ 6 ; Low adherence: score < 6 . Sociodemographic variables: age (categorized as <45 , $45-64$, >65 years), sex, educational attainment (low/high), monthly income (<3.3 million IDR / ≥ 3.3 million IDR), and family history of hypertension (yes/no). Clinical characteristics: body mass index (BMI), duration of hypertension, comorbidity presence, and systolic blood pressure (categorized per standard hypertension grades).

BMI was computed from measured height and weight. Height was measured using a Microtoise GEA stadiometer, and weight with a calibrated digital scale. BMI categories followed WHO criteria: underweight (<18.5 kg/m²), normal ($18.5-24.9$ kg/m²), overweight ($25.0-29.9$ kg/m²), and obese (≥ 30.0 kg/m²). Blood pressure was measured twice at 5-minute intervals using a standard mercury sphygmomanometer, and the average reading was used. Hypertension classification followed the JNC-8 guidelines: Normal, Prehypertension, Hypertension Grade I, Hypertension Grade II.

This study was approved by the Research Ethics Committee of the Faculty of Medicine, Universitas Sumatera Utara (Reference No: 597/KEP/USU/2021). All participants were informed of the study's purpose, procedures, and confidentiality safeguards before giving written consent.

Data were analyzed using IBM SPSS Statistics version 24.0. Descriptive statistics were presented as frequencies and percentages for categorical variables. Bivariate analyses using simple logistic regression were performed to explore associations between independent

variables and medication adherence status. Variables with $p < 0.25$ in the bivariate analysis were further analyzed in a multiple logistic regression model to determine independent predictors of medication adherence (Sastroasmoro, 2017). Statistical significance was set at $p < 0.05$, and the results were reported as risk probabilities (RP) with corresponding 95% confidence intervals (CIs).

RESULTS

A total of 153 individual participate in this study. According to Modified Morisky Adherence Scale (MMAS), half of respondents have high level of adherence medication in hypertension (52.3%), and 47.7 % have low level adherence as presented in Table 1. most respondents do not comply with hypertension treatment because they feel they have no more complaints.

Table 1. Distribution of Respondents According to MMAS Scale

MMAS Scale	Frequency	Percentage (%)
≥ 6 (high adherence)	80	52.3
< 6 (low adherece)	73	47.7

The majority of respondents (102) were aged 45 -64 years old (66.7%), 116 (75.8%) were female, 97 (75.1%) had a high education level, 99 (64.7%) had an income less than 3.3million, 96 (62.7%) had family history of hypertension and 82 (53.6%) with obesity (Table 2).

Table 2. Distribution of Respondents According to MMAS Scale

Variable	Frequency	Percentage (%)
Age		
<45 years	14	9.2
45-64 years	102	66.7
>65 years	37	24.2
Sex		
Male	37	24.2
Female	116	75.8
Education		
Low	56	24.9
High	97	75.1
Income		
<3.3 million	99	64.7
≥ 3.3 miliion	54	35.3
Family History with Hypertension		
Yes	96	62.7
No	57	37.3
Basal Metabolic Index (BMI)		
Underweight	5	3.3
Normal	41	26.8
Overweight	25	16.3
Obesity	82	53.6

The majority of respondents (71) with duration of hypertension less than 5 years (46.4%), 96 respondents (62.7%) have comorbidity, 55 respondents have high systolic blood pressure (35.9%) (Table 3).

Table 3. Distribution of Respondents According to Disease Characteristics

Variable	Frequency	Percentage (%)
Duration of Hypertension		
<5 years	71	46.4
5-15 years	61	39.9
15.1-30 years	19	12.4
>30 years	2	1.3
Comorbidity		
No	53	34.6
Yes	96	62.7
Don't know	4	2.6
Systolic Blood Pressure		
Normal	9	5.9
Pre Hypertension	34	22.2
Hypertension Grade I	55	35.9
Hypertension Grade II	55	35.9

Table 4. Factors Associated with Adherence Medication among Hypertensive Patients using Simple Logistic Regression

Variable	p	RP (95%CI)
Age	0.016	4.87 (1.33;1.78)
Education	0.189	1.67 (0.78;3.57)
Income	0.762	1.13 (0.53;2.41)
Family History with Hypertension	0.045	2.051 (0.02;4.15)
BMI	0.412	2.64 (0.26;26.9)
Systolic Blood Pressure	0.487	1.14 (0.79;1.65)
Duration of Hypertension	0.494	0.90 (0.67;1.74)
Comorbidity	0.859	0.95 (0.51;1.74)

Table 5. Factors Associated with Adherence Medication among Hypertensive Patients using Multiple Logistic Regression

Variable	p	RP (95%CI)
Age	0.023	4.29 (1.22;15.157)
Education Level	0.044	1.50(1.0;3.00)
Family History with Hypertension	0.040	2.05 (1.03;4.08)

Of the multivariate Logistic Regression, revealed that age, education level and family history with hypertension are significant factors for adherence medication among hypertensive patients. People aged ≥ 45 years have 4.29 times at risk to get nonadherence medication compared to <45 years of age (RP 4.29 (1.22; 15.15)). People who have low education have

1.50 times at risk to get non adherence medication compared to people who have high education (RP 1.50 (1.0;3.005). People who have family history with hypertension had 2.05 times at risk to adherence medication compared to those who have no family history with hypertension (2.05(1.03;4.08).

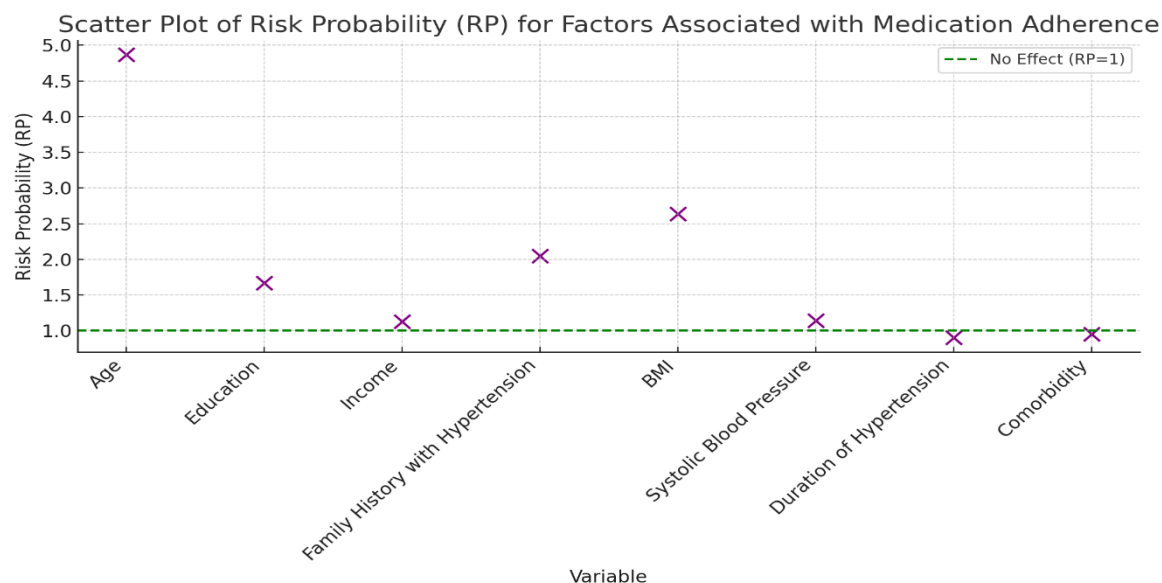


Figure 1. Scatter Plot of Risk Probability (RP) for Factors Associated with Medication Adherence Among Hypertensive Patients

This scatter plot displays the risk probability (RP) values for each independent variable. The green dashed line at $RP = 1.0$ represents the null effect values above this line indicate an increased likelihood of adherence, while values below suggest a reduced likelihood. Notably, age ($RP = 4.87$) and family history of hypertension ($RP = 2.05$) demonstrate higher risk probabilities, reinforcing their relevance as significant factors influencing adherence.

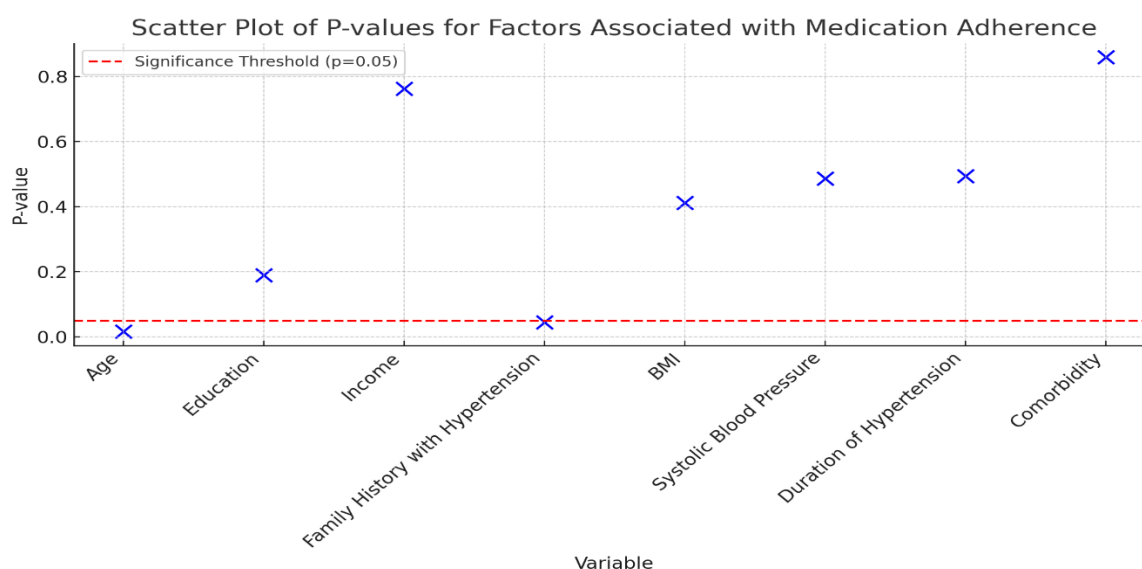


Figure 1. Scatter Plot of p-values for Factors Associated with Medication Adherence Among Hypertensive Patients

This scatter plot illustrates the p-values of eight independent variables analyzed through simple logistic regression. The red dashed line represents the conventional threshold for statistical significance ($p = 0.05$). Variables falling below this line are considered statistically significant. In this study, age ($p = 0.016$) and family history of hypertension ($p = 0.045$) are significantly associated with medication adherence, indicating they may be important predictors of adherence behavior among hypertensive patients.

DISCUSSION

Hypertension is a significant risk factor for cardiovascular disease, which remains the primary cause of mortality worldwide (Algabbani, 2020). Patient adherence to prescribed treatment regimens is a fundamental element in the effective management of hypertension and its associated complications.

This study provides important insights into medication adherence patterns among hypertensive patients in Medan City, Indonesia. The findings reveal that only 52.3% of patients demonstrated high adherence to antihypertensive medications, while 47.7% reported low adherence, reflecting a substantial public health concern. Similar adherence rates have been observed in other low- and middle-income countries, where structural and behavioral barriers continue to impede optimal hypertension control (Choudhry, 2022) (Sagara, 2024). Among the significant predictors identified through multivariate logistic regression, age, education level, and family history of hypertension were found to be independently associated with medication adherence. First, age was a significant determinant, with individuals aged ≥ 45 years being over four times more likely to exhibit nonadherence compared to their younger counterparts (RP = 4.29; 95% CI: 1.22–15.15; $p = 0.023$). This finding contrasts with previous assumptions that younger patients are more prone to poor adherence due to lifestyle distractions or lack of disease awareness (Umemura, 2019). In our study, older adults may underestimate the importance of long-term adherence due to the absence of symptoms or may be influenced by misconceptions that hypertension has been "cured" when symptoms subside. Additionally, polypharmacy and cognitive decline among older adults may also contribute to decreased adherence, as reported in earlier studies (Lee, 2021).

Educational level significantly influenced adherence, where patients with lower educational attainment had a 1.5-fold higher risk of nonadherence (RP = 1.50; 95% CI: 1.00–3.00; $p = 0.044$). This aligns with findings from Wakai et al. (2021) and Giakoumidakis et al. (2024), which emphasized that health literacy plays a critical role in medication-taking behavior. Educated individuals may better comprehend the long-term risks of uncontrolled

hypertension and the importance of maintaining consistent therapy (Wakai, 2021) (Giakoumidakis, 2024). Conversely, low-literate patients may struggle with understanding prescription instructions or the rationale for chronic medication use, leading to irregular dosing or discontinuation without medical advice (Poulter, 2020); (Herziana, 2017).

Third, patients with a family history of hypertension were twice as likely to adhere to their medications compared to those without such history (RP = 2.05; 95% CI: 1.03–4.08; $p = 0.040$). This suggests that shared familial experience and awareness may enhance perceived susceptibility and motivation to manage the condition proactively. Previous studies have shown that family-based interventions and social modeling positively impact health behaviors, including medication adherence (Ullah, 2023; Tarigan, 2021).

Other variables such as income, comorbidities, BMI, systolic blood pressure, and duration of hypertension were not significantly associated with adherence in this sample. Although financial constraints are often cited as barriers to medication access (Aynalem, 2021), the uniform provision of antihypertensive drugs through Indonesia's national health insurance (JKN) may have mitigated cost-related nonadherence in this context.

Interestingly, while obesity and comorbidities were prevalent (53.6% and 62.7%, respectively), they did not predict adherence levels. This could reflect a disconnect between patients' perceived health needs and actual clinical risks, reinforcing the need for personalized counseling and risk communication strategies. The high prevalence of patients reporting discontinuation due to absence of symptoms further underscores the importance of strengthening patient education on the chronic nature of hypertension and the silent progression of its complications (Susanti, 2020; Akbar et al., 2019).

Taken together, the findings highlight the multifaceted nature of adherence behavior, shaped by demographic, educational, and psychosocial dimensions. Targeted health promotion programs are warranted particularly those that integrate community-based education, simplified communication for low-literate patients, and family-centered support structures.

CONCLUSIONS

The persistent challenge of medication nonadherence among hypertensive patients in an urban Indonesian setting. With nearly half of the respondents exhibiting low adherence levels, the findings underscore the urgent need to address individual and contextual barriers to long-term treatment compliance. Three key determinants were identified as significantly associated with medication adherence: older age (≥ 45 years), lower educational attainment, and positive family history of hypertension. These factors provide critical entry points for

developing targeted and culturally sensitive interventions. In particular, improving health literacy among low-educated patients and reinforcing family-based support mechanisms may enhance adherence behaviors. Despite national policies that ensure drug accessibility, behavioral and perceptual factors remain substantial obstacles. Many patients reported discontinuing treatment due to the absence of symptoms, highlighting a widespread misunderstanding of hypertension as a silent, chronic condition. This emphasizes the importance of sustained patient education and effective risk communication by healthcare professionals. Given the rising burden of hypertension in Indonesia and the potential for preventable complications, public health programs should prioritize medication adherence as a core strategy for chronic disease control. Future research should explore intervention effectiveness across different population groups and examine the role of digital health tools, family engagement, and personalized follow-up systems in improving long-term treatment adherence.

REFERENCE

- Akbar, P. S., Parinduri, S. K., & Hidana, R. (2019). Gambaran Pelaksanaan Surveilans Epidemiologi Di Rumah Sakit Umum Daerah Leuwiliang Kabupaten Bogor Tahun 2018. *Promotor*, 2(5), 410–421. <https://doi.org/DOI: http://dx.doi.org/10.32832/pro.v2i5.2529>
- Alghabbani, F. M. (2020). Treatment adherence among patients with hypertension: findings from a cross-sectional study. *Clin Hypertens*, 26(18), 1–10. <https://doi.org/10.1186/s40885-020-00151-1>
- Allender. (2014). *Community Health Nursing Promoting The Public's Health* (8th Edditi). Lippincott Williams & Wilkins.
- Amaliah, F. (2014). Faktor Risiko Hipertensi Pada Orang Umur 45-74 Tahun Di Pulau Sulawesi. *Gizi Indonesia*, 37(2), 145-151. <https://doi.org/10.36457/gizindo.v37i2.160>
- Anteneh, Z. A. (2015). Prevalence and correlation of hypertension among adult population in Bahir Dar city, northwest Ethiopia: a community based cross-sectional study. *International Journal of General Medicine*, 8(1), 175–185. <https://doi.org/10.2147/IJGM.S81513>
- Aynalem, G. A. (2021). Factors affecting adherence to lifestyle modification among patients with hypertension at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, 2019. *SAGE Open Medicine*, 9(1), 1–10. <https://doi.org/10.1177/20503121211012523>
- Banjarnahor, R. O. (2023). Path Analysis on the Effect of Stress, Sleep Quality, and Hypertension on Type 2 Diabetes Mellitus Incidence in the 30–60 years Age Group in Medan City. *Contagion: Scientific Periodical Journal of Public Health and Coastal Health*, 5(4), 1169-1183. <https://doi.org/10.30829/contagion.v5i4.17688>
- Choudhry, N. K. (2022). Medication adherence and blood pressure control: A scientific statement from the american heart association. *Hypertension*, 79(1), E1–E14. <https://doi.org/10.1161/HYP.0000000000000203>
- Garwahasada, E. (2020). Hubungan Jenis Kelamin, Perilaku Merokok, Aktivitas Fisik Dengan Hipertensi Pada Pegawai Kantor. *Media Gizi Indonesia*, 15(1), 60-65. <https://doi.org/10.204736/mgi.v15i1.60–65>

- Giakoumidakis, K. (2024). Patient Knowledge, Medication Adherence, and Influencing Factors: A Cross-Sectional Study among Hypertensive Patients in Greece. *Healthcare*, 12(9), 916. <https://doi.org/10.3390/healthcare12090916>
- Gusty, R. (2022). Association between Knowledge and Self-care Adherence among Elderly Hypertensive Patient in Dwelling Community. *Open Access Macedonian Journal of Medical Sciences*, 10(1), 206–212. <https://doi.org/10.3889/oamjms.2022.8342>
- Herziana. (2017). Faktor Resiko Kejadian Penyakit Hipertensi Di Puskesmas Basuki Rahmat Palembang. *Jurnal Unja*, 1(1), 31–39.
- Insani, W. N. (2025). Exploring the association of adverse drug reactions with medication adherence and quality of life among hypertensive patients: a cross-sectional study. *International Journal of Clinical Pharmacy*, 47(2), 354–364. <https://doi.org/10.1007/s11096-024-01832-9>
- Ishida, T. (2019). Treatment patterns and adherence to antihypertensive combination therapies in Japan using a claims database. *Hypertension Research*, 42(2), 249–256. <https://doi.org/10.1038/s41440-018-0127-0>
- Lee, H. (2021). Adherence to Antihypertensive Medication and Incident Cardiovascular Events in Young Adults with Hypertension. *Hypertension*, 77(4), 1341–1349. <https://doi.org/10.1161/Hypertensionaha.120.16784>
- Nishimura, S. (2020). Adherence to antihypertensive medication and its predictors among non-elderly adults in Japan. *Hypertension Research*, 43(7), 705–714. <https://doi.org/10.1038/s41440-020-0440-2>
- Poulter, N. R. (2020). Medication adherence in hypertension. *Journal of Hypertension*, 38(4), 579–587. <https://doi.org/10.1097/HJH.0000000000002294>
- Pramiastuti, O. (2020). Manajemen Diri Untuk Pencegahan Penyakit Diabetes Melitus dan Hipertensi Masyarakat Desa Mangunsaren Melalui Produk Minuman Tanaman Herbal. *JABI: Jurnal Abdimas Bhakti Indonesia*, 1(2), 1–10. <https://doi.org/https://doi.org/10.36308/jabi.v1i2.214>
- Sagara, K. (2024). Medication adherence and associated factors in newly diagnosed hypertensive patients in Japan: the LIFE study. *Journal of Hypertension*, 42(4), 718–726. <https://doi.org/10.1097/HJH.0000000000003661>
- Sartik, R. (2017). Faktor – Faktor Risiko Dan Angka Kejadian Hipertensi Pada Penduduk Palembang. *Jurnal Ilmu Kesehatan Masyarakat*, 8(3), 180–191. <https://doi.org/10.26553/jikm.2017.8.3>
- Sastroasmoro, S. (2017). *Dasar-Dasar Metodologi Penelitian Klinis* (Edisi Ke-5). Sagung Seto.
- Siregar, P. A. (2020). Aktivitas Fisik, Konsumsi Makanan Asin dan Kejadian Hipertensi Masyarakat Pesisir Kota Medan. *Jurnal Ilmiah Kesehatan (JIKA)*, 2(1), 1–8. <https://doi.org/doi.org/10.36590/jika.v2i1.34>
- Susanti, N. (2020). Sensitivitas Dan Spesifisitas Titik Potong RLPTB Sebagai Prediktor Kejadian Hipertensi Pada Orang Dewasa di Dusun Sido Waras Desa Kwala Begumit. *Contagion : Scientific Periodical of Public Health and Coastal Health*, 2(2), 65–75. <https://doi.org/10.30829/contagion.v2i2.7083>
- Tarigan, A. R. (2021). Analysis of Family Support and Diet Compliance in Hypertension Patients. *Contagion : Scientific Periodical of Public Health and Coastal Health*, 3(1), 16–28. <https://doi.org/10.30829/contagion.v3i1.9123>
- Ullah, S. (2023). Use and outcomes of antihypertensive medication treatment in the US hypertensive population: A gender comparison. *Health Promotion Perspectives*, 13(2), 140–146. <https://doi.org/10.34172/hpp.2023.17>
- Umemura. (2019). The Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2019). *Hypertension Research*, 42(9), 1235-1481.

<https://doi.org/10.1038/s41440-019-0284-9>

Wakai, E. (2021). Effect of number of medications and complexity of regimens on medication adherence and blood pressure management in hospitalized patients with hypertension. *PLoS ONE*, 16(6), e0252944. <https://doi.org/10.1371/journal.pone.0252944>