

RATIONALITY OF ANTIHYPERTENSIVE PRESCRIBING AND BLOOD PRESSURE PROFILE AT CIPAYUNG HEALTH CENTER DEPOK

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Abstract. Hypertension is one of the cardiovascular diseases that cause the highest mortality in the world and requires lifelong treatment, which in that long period of time allows irrational treatment. This study aims to evaluate the prescribing pattern and rationality of antihypertensive drugs which include the right indication, the right drug, the right patient, and the right dose, and analyze the blood pressure profile of hypertensive patients at the Cipayung Health Center Depok in 2023. This study is descriptive with Cross Sectional design and retrospective data collection through medical records. The sampling technique in this study was purposive sampling which was calculated using the slovin formula, 152 respondents met the inclusion criteria. The results showed that the number of female patients was 117 patients (77%) more than male patients. The age of most respondents was ≥ 60 years old (55.3%). The description of the pattern of prescribing antihypertensive drugs in hypertensive patients at the Cipayung Health Center Depok in 2023 is Single 106 prescriptions (69.7%) and Combination 46 prescriptions (30.3%). Evaluation of the rationality of prescribing antihypertensive drugs obtained Rational (76.3%) and Not Rational (23.7%) results. Blood pressure profile of respondents with uncontrolled blood pressure 123 patients (80.9%) and controlled 29 patients (19.1%).

Keywords: *hypertension, prescribing pattern, health center, rationality*

Introduction

Hypertension remains one of the most persistent and burdensome non-communicable diseases worldwide, contributing substantially to cardiovascular morbidity, premature mortality, and long-term pressure on primary healthcare systems. As a chronic condition that often requires lifelong pharmacological management, hypertension demands not only regular blood pressure monitoring but also continuous evaluation of prescribing quality, patient suitability, and therapeutic effectiveness. In Indonesia, the growing prevalence of hypertension among adults reflects a broader epidemiological transition marked by ageing populations, lifestyle-related risks, and increasing dependence on primary care facilities as the first point of diagnosis and treatment. The increase in hypertension prevalence from 25.8% in 2013 to 34.1% in 2018 indicates that hypertension is not merely an individual clinical problem, but a public health issue requiring systematic intervention at the level of health service delivery. In this context, Puskesmas play a crucial role in ensuring early detection, rational treatment, follow-up care, and prevention of complications among hypertensive patients.

Despite the availability of clinical guidelines and essential antihypertensive medications, the rational use of drugs remains a major challenge in primary healthcare practice. Irrational prescribing may occur when patients receive unsuitable drug choices, inappropriate combinations, incorrect doses, or therapy that does not correspond to the severity of hypertension or patient-specific conditions. Such prescribing problems are not minor technical errors; rather, they may directly influence treatment outcomes,

patient safety, medication adherence, healthcare costs, and the risk of uncontrolled blood pressure. The issue becomes more critical among elderly patients and those with comorbidities, who are often exposed to polypharmacy and are more vulnerable to adverse drug reactions or suboptimal therapeutic decisions. Therefore, evaluating antihypertensive prescribing rationality through indicators such as right indication, right drug, right patient, and right dose is essential for assessing whether pharmacological management aligns with evidence-based standards and contributes meaningfully to blood pressure control.

Although hypertension is among the most frequently treated conditions at Puskesmas in Depok City, limited local evidence is available regarding the rationality of antihypertensive prescribing and its relationship with patients' blood pressure profiles, particularly at the Cipayung Health Center Depok. This gap is important because national or general guideline compliance cannot be assumed to automatically translate into effective prescribing practice at the facility level. Each healthcare setting has its own patient characteristics, drug availability, prescribing culture, documentation quality, and monitoring capacity, all of which may affect treatment rationality and patient outcomes. Therefore, this study is significant because it examines not only the pattern of antihypertensive prescribing but also the extent to which such prescriptions meet rational drug-use criteria and correspond with controlled or uncontrolled blood pressure status. By focusing on medical record data from hypertensive outpatients at Cipayung Health Center Depok in 2023, this study provides practical evidence that may support stronger pharmacotherapy evaluation, better collaboration between doctors and pharmacists, improved patient monitoring, and more accountable hypertension management within primary healthcare services..

Materials and Methods

A retrospective and cross sectional analysis was conducted at the Cipayung Health Center Depok using medical record data of hypertensive patients in 2023. This study was approved by the Health Research Ethics Committee of Immanuel Institute of Health (020/KEPK/IKI/II/2024). The study population included all patients diagnosed with hypertension who were recorded in medical records at Cipayung Health Center Depok in 2023, totaling 2832 patients. The sample in this study was medical record data that contained antihypertensive drugs. The sampling technique in this study was purposive sampling. Data were taken based on the inclusion criteria and the sample size was calculated using the Slovin formula. The scope of the variables that became the research material included the pattern of prescribing antihypertensive drugs, the ratio of prescribing antihypertensive drugs (right patient, right drug, right dose and right indication), blood pressure profile, age, gender, comorbidities and the type/number of other drugs used by hypertensive patients. The data collection technique used in this study was to collect secondary data obtained from the medical records of outpatients at Cipayung Health Center Depok who met the inclusion criteria. The medical record numbers of outpatients who received antihypertensive drugs in 2023 were searched. The inclusion criteria in this study were outpatients diagnosed with hypertension with or without comorbidities, patients aged ≥ 18 years, patients with single/combined antihypertensive drugs and patients who received at least three antihypertensive drug prescriptions. Patients with kidney and liver dysfunction diagnosed with stroke and patients with incomplete, damaged and illegible medical record data were excluded.

The instruments in this study were patient medical record sheets that received antihypertensive drugs, Guidelines for Pharmaceutical Services in Hypertension, JNC 8 guidelines, Pharmacotherapy Handbook 12th edition and data collection sheets. The data collection sheet included patient identity including medical record number, gender, age, disease diagnosis, blood pressure measurement results, patient condition notes, drug name, drug dosage and drug usage rules. Univariate data analysis was performed to describe or explain the characteristics of each study variable. All data were processed and then presented in percentage form in a frequency distribution table.

Results and Discussion

Based on the research that has been conducted, a total population of 2832 respondents was obtained. Respondents who met the inclusion criteria were 152 patients diagnosed with hypertension who received antihypertensive therapy seen from the Drug Management Information System.

General description of respondent characteristics

The characteristics of respondents with a diagnosis of hypertension at the Cipayung Health Center Depok in the January-December 2023 period each have different characteristics. These characteristics include gender and age. The characteristics of respondents can be seen in *Table 1*. The highest number of patients with hypertension were female (77%) and patients with an age range ≥ 60 years (55.3%) listed in *Table 1*. In the characteristics of hypertensive patients, female patients experience more hypertension than male patients and the highest number of hypertensive patients are in the age range ≥ 60 years (55.3%) elderly category. The results of this study are in line with research conducted at the Siantan Hilir Health Center that women suffer more from hypertension (Untari et al., 2018). In another study, it was found that most hypertensive patients were aged ≥ 60 years with the number of patients (48.87%) (Ekaningtyas et al., 2021). Physiologically, the higher a person's age, the more at risk of developing hypertension (MOH, 2019a; 2011).

Table 1. *General description of respondents' characteristics.*

Category	Number of respondents (N=152)	
	Frequency (N)	Percentage (%)
Gender		
Male	35	23
Female	117	77
Age		
18-59	68	44.7
≥ 60	84	55.3

Prescribing pattern of antihypertensive drugs

Antihypertensive drugs available at the Cipayung Health Center Depok are Amlodipine (CCB), Captopril (ACEI), Hydrochlorothiazide (Thiazide Diuretic), and Methyldopa (Central Adrenolytic). In *Figure 1*, it was found that the most prescribed drug was Amlodipine 10 mg with a total of 67 prescriptions. The pattern of prescribing combined drugs (2 drugs) as many as 46 prescriptions, namely the prescription of amlodipine + captopril as many as 42 prescriptions and amlodipine +

hydrochlorothiazide as many as 4 prescriptions. Previous research found that Amlodipine is the most prescribed antihypertensive drug with a total of 174 prescriptions (Mongi et al., 2022). Amlodipine is a CCB class antihypertensive drug which is one of the first-line drugs used for the treatment of hypertension. The high prescription of amlodipine at the Cipayang Health Center Depok is due to the large number of elderly patients. The first line of administration in essential hypertension at the age of > 60 years is CCB class drugs (MOH, 2019b).

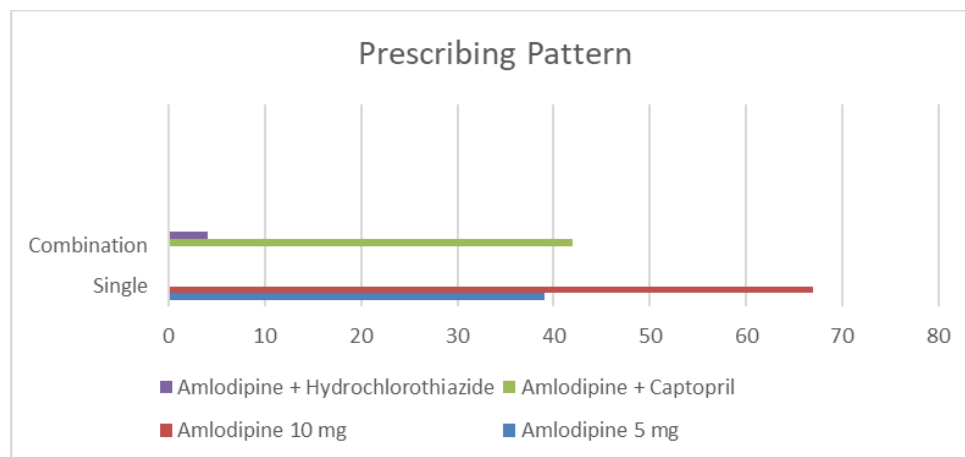


Figure 1. Distribution of antihypertensive drug prescribing patterns.

The most prescribed drug combination is amlodipine + captopril. There are 2 types of drug combinations prescribed in this study, namely the CCB + ACEI group (amlodipine+ captopril) and the CCB+ thiazide diuretic group (amlodipine+ hydrochlorothiazide). This is in line with previous research at RSUD Dr. Soegiri Lamongan where the most prescribed combination of antihypertensive drugs is the CCB group drug + ACEI as many as 64 prescriptions (Sa'idah, 2018). Combination therapy is given if the blood pressure target is not achieved with the use of single therapy. Combined drugs work on different physiological systems, which have a greater blood pressure lowering effect than single drugs (Ministry of Health, 2019). The combination of amlodipine and captopril results in effective blood pressure control because the mechanisms of action are complementary. In addition, the combination of these two drugs is beneficial for kidney and diabetes patients (Mongi et al., 2022). While the second drug combination, amlodipine + hydrochlorothiazide, is most effective in reducing blood pressure changes (MOH, 2019c). The combination of these two drugs can reduce the risk of heart attack and stroke. Elderly patients with isolated systolic hypertension are particularly suited to these two combinations, as they can protect against cerebrovascular disease (Mongi et al., 2022).

Therapies other than antihypertensive

In addition to antihypertensive therapy, patients also received other therapies including antibacterial, antacid and antiulcer, expectorant, platelet antiaggregation, antivertigo, antiemetic, oral antidiabetic, antifungal, antiallergic, analgesic, corticosteroid, antihyperlipidemia, vitamins and minerals. Drugs other than antihypertensives that are most widely used in hypertensive patients at the Cipayang Health Center Depok are analgesics, namely mefenamic acid, diclofenac sodium and paracetamol and antidiabetic drugs, namely glibenclamide and metformin. The majority of

patients were female and mostly experienced dizziness. This may be because women are less able to control their emotions which results in discomfort. A study at the Kolongan Health Center reported that as many as 30 hypertensive patients had diabetes mellitus comorbidities (Ekaningtyas et al., 2021). In this study, antidiabetic drugs, namely glimepiride and metformin, were also widely used in hypertensive patients. The relationship between blood sugar levels and blood pressure is due to the similarity of disease risk factor characteristics. Insulin resistance and hyperinsulinemia in patients with DM are believed to increase peripheral vascular resistance and vascular smooth muscle contractility through excessive responses to norepinephrine and angiotensin II. This condition causes an increase in blood pressure through physiological feedback mechanisms and the Renin-Angiotensin-Aldosterone system (Julianti, 2021).

Evaluation of the rationality of antihypertensive drug prescribing

The results showed that the accuracy of the use of antihypertensive drugs in hypertensive patients at Cipayung Health Center Depok with a total of 152 respondents was found to be the right indication (100%), the right drug (76.3%), the right patient (100%), and the right dose (100%) as listed in Table 2. It was found that 36 hypertensive patients (23.7%) did not meet the criteria for the right drug (Table 3).

Table 2. Rationality of antihypertensive drug prescribing in hypertensive patients.

Rationality Criteria	Number of appropriate drug use	%	Number of inappropriate drug use	%
Right Indication	152	100	0	0
Right Drug	116	76.3	36	23.7
Right Patient	152	100	0	0
Right Dose	152	100	0	0

Table 3. Results of drug inaccuracy in rationality evaluation.

Case Number	Reason Inaccuracy	Literature	N	%
13, 15, 18, 19, 23, 26, 28, 38, 41, 59, 61, 66, 70, 75, 77, 78, 80, 85, 87, 88, 102, 105, 114, 132, 133, 135, 136, 139, 142, 148, 150	Treatment of patients with grade ≥ 2 hypertension using only one drug	Therapy in patients with grade ≥ 2 hypertension started with 2 drugs	31	86,1
25, 47, 109, 143, 153	Patients with grade 1 hypertension received combination of 2 drugs	Therapy in patients with grade 1 hypertension started with 1 drug	5	13,9

The results of this study showed that 23.7% did not meet the criteria for appropriate medication. The inaccuracy of drugs is due to the inappropriate administration of antihypertensive drugs where there are 31 patients with grade ≥ 2 hypertension who only receive one type of drug therapy. Patients with grade ≥ 2 hypertension get therapy starting from 2 drugs (MOH, 2019a). This is in line with previous research where there were 27 patients with grade 2 hypertension receiving 1 type of drug therapy (Untari et al., 2018). The next drug inaccuracy is that there are 5 patients with grade 1 hypertension who get a combination therapy of 2 drugs. According to the Guidelines for Pharmaceutical Services in Hypertension and Pharmacotherapy handbook 12th edition, patients with grade 1 hypertension are sufficient to use 1 type of drug to control blood pressure. To improve the rationality of the appropriate drug criteria, it is recommended to monitor and evaluate therapy in hypertensive patients and conduct analysis related to patient compliance, Drug Related Problems (DRPs) and cost effectiveness at the Cipayung Health Center Depok. This study uses the guidelines for Pharmaceutical Services in Hypertension, JNC 8 guidelines, Pharmacotherapy Handbook 12th edition as the main reference.

Rationality of antihypertensive drug prescribing that meets all criteria: Right indication, right drug, right patient and right dose

In Figure 2, 42 patients received irrational therapy. Irrationality in the right drug indicator where patients who should get a combination of 2 drugs only get one drug and vice versa, there are also patients with normal range blood pressure who get antihypertensive therapy. Factors that support the achievement of rational drug use are the commitment of health workers, especially doctors and pharmacists to implement drug therapy management effectively and efficiently in accordance with patient diagnoses. This is also supported by good communication between health workers about the rational use of drugs (Untari et al, 2018).

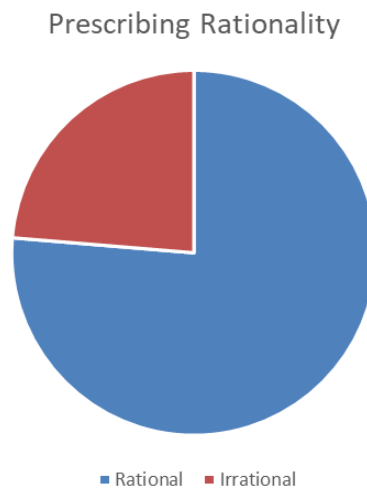


Figure 2. Rationality of prescribing antihypertensive drugs that meet all criteria.

Blood pressure profile

The blood pressure profile is obtained from the patient's blood pressure record in the medical record and then compared with the JNC 8 guideline based on age category, whether the patient's blood pressure is in the controlled or uncontrolled range. There were 29 patients (19.1%) with controlled blood pressure and 123 patients (80.9%) with uncontrolled blood pressure in outpatients at the Cipayang Health Center Depok as listed in Table 4. According to JNC 8, the target controlled blood pressure for ≥ 60 years old is (<150/90 mmHg) and for age < 60 years is (<140/90 mmHg). As for uncontrolled blood pressure uncontrolled blood pressure for age ≥ 60 years is (>150/90 mmHg) and for age < 60 years is (>140/90 mmHg). The blood pressure profile is obtained from the patient's blood pressure record in the medical record and then compared with the JNC 8 guideline based on the age category, whether the patient's blood pressure is in the controlled or uncontrolled range. In this study, there were many elderly patients with uncontrolled blood pressure.

Table 4. Blood pressure profile of hypertensive patients.

Category	Number of respondents (N=152)	
	Frequency (N)	Percentage (%)
Control	29	19.1
Uncontrolled	123	80.9

Total	152	100
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Other studies state that knowledge of blood pressure targets, the presence of drug side effects, regular blood pressure measurements, and knowledge of the risks of hypertension affect treatment adherence. Based on the research that has been done, the level of knowledge, stress, salt consumption and patient compliance can be factors that cause patients' blood pressure to be uncontrolled. It is important to monitor blood pressure in hypertensive patients because if hypertension is not treated properly it can cause complications (MOH, 2019b). Complications of hypertension can affect various target organs, such as the heart (ischemic heart disease, left ventricular hypertrophy, heart failure), brain (stroke), kidneys (kidney failure), eyes (retinopathy), as well as peripheral arteries (intermittent claudication) (Armstrong, 2014).

Conclusion

This study demonstrates that antihypertensive prescribing at the Cipayung Health Center Depok generally follows rational drug-use principles, particularly in relation to the right indication, right patient, and right dose. However, the finding that 23.7% of prescriptions were still classified as irrational indicates that important gaps remain in the selection of appropriate antihypertensive therapy. The main concern lies in the “right drug” criterion, where some patients with grade ≥ 2 hypertension received single-drug therapy when combination treatment would have been more appropriate, while some patients with grade 1 hypertension received unnecessary combination therapy. These findings suggest that rational prescribing should not be understood only as the act of providing medication, but as a clinical decision-making process that must be carefully aligned with blood pressure severity, patient characteristics, comorbidities, and established treatment guidelines. In this regard, the quality of antihypertensive prescribing is directly connected to the broader goal of improving patient safety, preventing complications, and strengthening the effectiveness of primary healthcare services.

More critically, the high proportion of patients with uncontrolled blood pressure shows that rational prescribing alone may not be sufficient to achieve optimal hypertension management. Although most prescriptions were categorized as rational, 80.9% of patients still had uncontrolled blood pressure, indicating that pharmacological appropriateness must be supported by continuous monitoring, patient adherence, lifestyle modification, regular follow-up, and effective communication between healthcare providers and patients. This study therefore highlights the need for a more integrated hypertension care model at the Puskesmas level, involving stronger collaboration between doctors, pharmacists, nurses, and patients in monitoring therapy outcomes. Future evaluation should also include patient compliance, drug-related problems, adverse effects, cost-effectiveness, and the quality of medical record documentation. By addressing these dimensions, Cipayung Health Center Depok can move beyond prescription evaluation toward a more comprehensive, patient-centred, and outcome-oriented approach to hypertension control.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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