

Comparison of antihypertensive drug utilization in community health centre and type B teaching hospital

Tromphin Sitorus^{*1}, Abraham Simatupang² 

¹Faculty of Medicine, Universitas Kristen Indonesia, Jakarta

²Department of Pharmacology and Therapy – Faculty of Medicine, Universitas Kristen Indonesia

*Corresponding Author: abraham.simatupang@uki.ac.id

ARTICLE INFO

Article history:

Received : 1 January 2023

Revised : 2 March 2023

Accepted : 7 July 2023

Available online 8 August 2023

E-ISSN: 2620-3731

P-ISSN: 2615-6199

How to cite:

Sitorus T, Simatupang A. Comparison of antihypertensive drug utilization in community health centre and type B teaching hospital. Indonesian Journal of Pharmaceutical and Clinical Research. 2023 Jul 20;6(1):025-030.

ABSTRACT

Antihypertensive medicine is one of the many complex factors contributing to the sustained rise in hypertension prevalence, which remains a global health concern. The Social Security Agency on Health, or Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan, in Indonesia is an integrated healthcare system that provides universal healthcare to its citizens. This retrospective cross-sectional study examined the use of antihypertensive medications covered by BPJS between January and December 2021 at the Rawabuntu Primary Health Centre and the Universitas Kristen Indonesia (UKI) type B public hospital. The necessary data was extracted from the medical files of 192 hypertensive patients. The patients' characteristics were analysed descriptively. The rationality of antihypertensive medication use was evaluated in accordance with Association of Indonesian Hypertension Physicians-approved guidelines. The majority of patients in both categories were female (52.1 percent at the Rawabuntu Primary Health Centre and 60 percent at the teaching facility). In both healthcare facilities, the correct indication, patient, and dosage were administered 100 percent of the time, according to this study. While only 66.7% and 85.4% of patients at the Rawabuntu Primary Health Centre and UKI hospital received the correct drug category, respectively. The rational use of antihypertensive medications was substantially lower at the Primary Health Centre than it was at the UKI Hospital ($p = 0.001$).

Keyword: hypertension, antihypertensive drugs, primary health centres, type B teaching hospital

ABSTRAK

Hipertensi masih merupakan masalah kesehatan global karena prevalensinya yang terus meningkat sebagai akibat masalah kompleks, diantaranya yaitu penggunaan obat. Indonesia telah memiliki sistem kesehatan terintegrasi yang dikenal sebagai Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan. Penelitian retrospektif *cross sectional* ini membandingkan penggunaan antihipertensi di Puskesmas Rawabuntu dan Rumah Sakit Umum (RSU) Universitas Kristen Indonesia (UKI) (termasuk kategori rumah sakit pendidikan tipe B) dengan merekrut data yang diperlukan dari rekam medik pasien hipertensi ($n=192$) periode Januari 2021 sampai Desember 2021. Karakteristik pasien dianalisis secara deskriptif. Kerasionalan penggunaan antihipertensi dianalisis berdasarkan *guidelines* yang disetujui oleh Perhimpunan Dokter Hipertensi Indonesia. Umumnya pasien pada kedua kelompok tersebut adalah perempuan (Puskesmas Rawabuntu: 52,1% dan RSU UKI: 60,4%). Hasil penelitian menunjukkan, dalam kriteria tepat indikasi, tepat pasien, dan tepat dosis baik di puskesmas maupun di rumah sakit memiliki capaian yang sempurna (100%). Sedangkan, dalam kriteria tepat obat, berturut turut sebanyak 66,7% dan 85,4% pasien mendapatkan obat yang tepat di Puskesmas Rawabuntu dan di RSU UKI. Penggunaan antihipertensi yang rasional secara signifikan lebih rendah di Puskesmas Rawabuntu dibandingkan dengan rumah sakit UKI ($p<0,05$).

Keyword: hipertensi, obat antihipertensi, puskesmas, rumah sakit pendidikan



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International.

<https://doi.org/10.32734/idjpcr.v6i1.11982>

1. Introduction

Hypertension is defined as a diagnosis when a person's systolic blood pressure is ≥ 140 mm Hg and/or diastolic blood pressure is ≥ 90 mmHg at rest/while calm after two measurements taken five minutes apart. This diagnosis should not be made in a single visit. The diagnosis of hypertension is confirmed in two to three visits separated by one to four weeks. If the patient's blood pressure is 180/110 mmHg and there is evidence of cardiovascular disease, a diagnosis can be made in a single visit [1]. Globally, around 3.5 billion adults have suboptimal systolic blood pressure, with 874 million having a systolic blood pressure 140 mmHg. Therefore, one in four adults has hypertension [2]. Using measurements of the population aged 18 years, the prevalence of hypertension in Indonesia was 34.1%, with a total of 63,309,620 cases and a mortality rate of 427,218 according to the 2018 Riskesdas [3].

The incidence of hypertension in an individual is influenced by both genetic and lifestyle factors. Age, gender, and family history are genetic factors, while alcohol consumption, smoking, and inactivity are lifestyle factors [4]. Reducing alcohol and salt intake, ceasing smoking, engaging in regular aerobic physical activity, rectifying obesity, and consuming fresh fruits and vegetables are the primary lifestyle modifications that determine the best outcomes for hypertension prevention and treatment [5].

The incidence of hypertension in an individual is influenced by both genetic and lifestyle factors. Age, gender, and family history are genetic factors, while alcohol consumption, smoking, and inactivity are lifestyle factors [4]. Reducing alcohol and salt intake, ceasing smoking, engaging in regular aerobic physical activity, rectifying obesity, and consuming fresh fruits and vegetables are the primary lifestyle modifications that determine the best outcomes for hypertension prevention and treatment [5].

Management of hypertension necessitates effective regulation. BPJS is responsible for administering health insurance programmes within Indonesia's integrated healthcare system. Law number 40 of 2004 on the National Social Security System stipulates that health insurance is provided nationally based on the principles of social insurance and equity, with the goal of ensuring that participants receive the benefits of health maintenance and protection to meet their fundamental health needs. One of the diseases covered by BPJS Kesehatan is hypertension. Depending on the severity of their condition, participants may be referred to secondary/tertiary institutions [6] after receiving care at primary health care facilities. Nonetheless, the use of antihypertensive medications among hypertensive patients admitted to public health centres and hospitals is frequently compared. Therefore, the author is interested in comparing the use of antihypertensive medications in public health centres and teaching hospitals of type B.

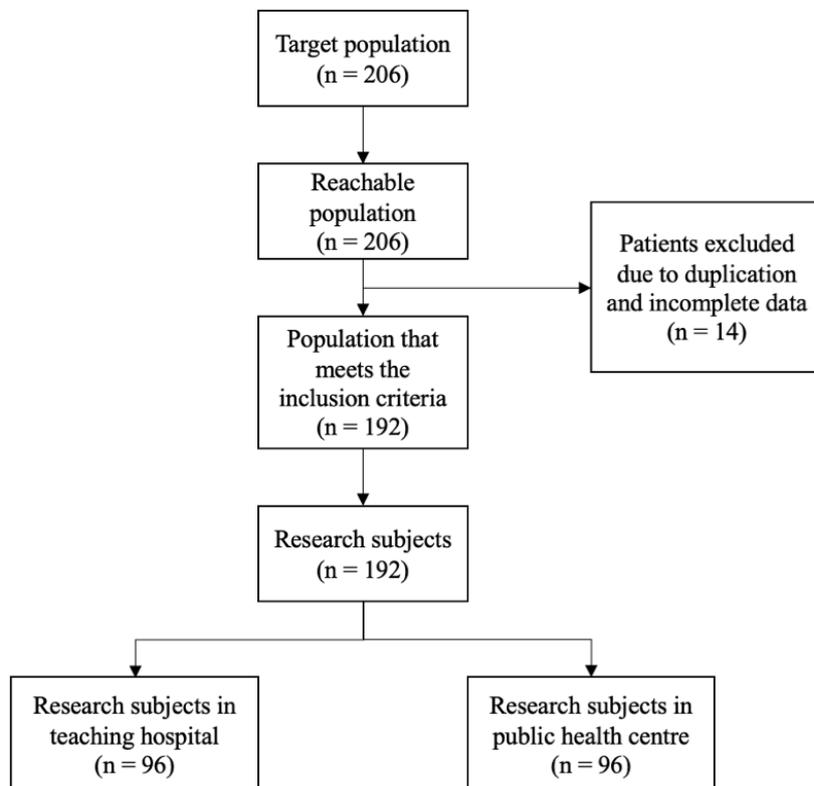


Figure 1. Flow Chart for Selection of Study Population

2. Method

This non-experimental retrospective cross-sectional study collected the necessary data from the medical records of hypertensive patients (n=96) at the Rawabuntu Public Health Centre and UKI public hospital between January 2021 and December 2021. The patients' characteristics were descriptively analysed. 2019 guidelines approved by the Association of Indonesian Hypertension Physicians (Perhimpunan Dokter Hipertensi Indonesia/PERHI) governed the comparison of antihypertensive drug use [7]. The analysis of drug rationality was based on the appropriate indication, patient, substance, and dose. Right indication is derived from the entire sample, which was then filtered based on two criteria: diagnosis of hypertension using PERHI 2019 criteria and treatment with anti-hypertensive medication. Right drug refers to the appropriateness of anti-hypertensive medication administration based on the therapeutic line class, variety, and combination of pharmaceuticals for hypertensive patients. The appropriate patient was selected based on the data of the appropriate medications; there should be no contraindications based on the comorbidities instrument and the administered anti-hypertensive drugs. According to the recommended dosage range, the data on the drug's suitability for use were used to determine the appropriate dosage. Chi-square analysis was used to compare the rationales for antihypertensive medication use among hypertensive patients admitted to both health centres.

3. Results and Discussion

From January 2021 to December 2021, a total of 206 hypertension-diagnosed patients' medical records were obtained. Due to duplicate and incomplete data, fourteen patients were excluded from this research sample, leaving 192 patients who met the inclusion criteria (Fig.).

Table 1 lists the characteristics of the patients. The majority of the patients were within the age range of 51-65 years old in both the public health centre and the teaching hospital (n=44; 45.8% and n=40; 41.7%), and most were female (public health centre: 52.1% and teaching hospital: 60.4%). In the study conducted in the public health centre, the majority of patients did not have any comorbidities (56.3%), while in the teaching hospital, the majority had comorbidities (80.2%). The majority of respondents in the public health centre and teaching hospital had stage 1 hypertension, accounting for 64.6% and 62.5%, respectively. In addition, the majority of patients (teaching hospital: 72.9%; public health centre: 96.9%) used calcium channel blockers and based on the distribution of medication, monotherapy was the majority given to patients admitted to the public health centre and teaching hospital.

Table 1. Characteristics of the Hypertensive Patients

Characteristics	n (%)	
	Rawabuntu Health Centre	UKI Hospital
Age (in years):		
21-35	5 (5.2)	0 (0)
36-50	24 (25.0)	17 (17.7)
51-65	44 (45.8)	40 (41.7)
>65	23 (24.0)	39 (40.6)
Gender:		
Male	46 (47.9)	38 (39.6)
Female	50 (52.1)	58 (60.4)
Comorbidities:		
Presence	42 (43.8)	77 (80.2)
Absence	54 (56.3)	19 (19.8)
Hypertension Stage:		
Stage 1	62 (64.6)	60 (62.5)
Stage 2	34 (35.4)	36 (37.5)
Antihypertensive Drugs:		
Angiotensin-Converting- Enzyme Inhibitors (ACEIs)	4 (4.2)	6 (6.3)
Angiotensin Receptors Blockers (ARBs)	0 (0)	49 (51.0)
Calcium Channel Blockers (CCBs)	93 (96.9)	70 (72.9)
Beta Blockers (BBs)	0 (0)	4 (4.1)
Diuretics	1 (1)	2 (2.0)
Distribution of Medication:		
Monotherapy	94 (97.9)	65 (67.7)
Combination of 2 Drugs	2 (2.1)	29 (30.2)
Combination of 3 Drugs	0 (0)	2 (2.1)

Table 2 lists the pattern of antihypertensive drug use. The majority of patients who received monotherapy were given amlodipine (public health centre: 91.8% and teaching hospital: 41.7%). Meanwhile, the combination of two drugs in the public health centre used amlodipine and HCT (1%) and amlodipine and captopril (1%). On the other hand, the combination of two drugs in the teaching hospital mostly used amlodipine and candesartan (18.8%). Patients at the public health centre did not receive the three-drug combinations, but in the teaching hospital, amlodipine, spironolactone, and lisinopril (1% each) and amlodipine, candesartan, and spironolactone (1% each) were administered.

Table 2. The Pattern of Antihypertensive Drug Usage

Medication Usage	n (%)	
	Rawabuntu Health Centre	UKI Hospital
Monotherapy:		
Amlodipine	91 (94.8)	40 (41.7)
Candesartan		22 (22.9)
Ramipril		1 (1)
Captopril	3 (3.1)	2 (2.1)
Irbesartan		1 (1)
Combination of 2 Drugs:		
Amlodipine & HCT	1 (1)	1 (1)
Amlodipine & Captopril	1 (1)	
Amlodipine & Candesartan		18 (18,8)
Amlodipine & Ramipril		1 (1)
Amlodipine & Irbesartan		1 (1)
Candesartan & HCT		2 (2.1)
Bisoprolol & Ramipril		1 (1)
Candesartan & Bisoprolol		2 (2.1)
Candesartan & Captopril		1 (1)
Bisoprolol & Irbesartan		1 (1)
Combination of 3 Drugs:		
Amlodipine & Spironolactone & Lisinopril		1 (1)
Amlodipine & Spironolactone & Candesartan		1 (1)

In the evaluation of drug administration and accuracy, an assessment was carried out as shown in Table 3. In terms of right indication, right patient, and right dose criteria, both in the public health centre and the hospital achieved perfect results (100%). However, in term of right drug criteria, 66.7% of the patients received the right drug in the public health centre, and 85.4% in the hospital, which represents rational drug use. The accuracy of drug use in this study fell short in the right drug component. The chi-square analysis comparing the accuracy of drugs use in public health centre and teaching hospital is shown in Table 4. It is shown that the accuracy of antihypertensive drug use was better in the hospital compared to the public health centre (85.4% vs 66.7%; p=0.002).

Table 3. Accuracy of Antihypertensive Drug Usage and Administration

Criteria	n (%)	
	Rawabuntu Health Centre	UKI Hospital
Right Indication	96 (100)	96 (100)
Right Drug	64 (66.7)	82 (85.4)
Right Patient	96 (100)	96 (100)
Right Dosage	96 (100)	96 (100)
Drug Usage Rationality	66.7 %	85.4 %

The majority of the patients were within the age range of 51-65 years old in both the public health centre and teaching hospital (n=44; 45.8% and n=40; 41.7%), and most were female (public health centre: 52.1% and teaching hospital: 60.4%) as shown in Table 1. This finding was in line with a prior study conducted at the Teaching Hospital (Universitas Kristen Indonesia Public Hospital) in 2020 by Lemauk et al., which revealed that women aged 55 to 64 had the highest prevalence of hypertension [8]. This is due to the fact that blood vessels go through a series of physiological changes in that age range that reduce its elasticity, resulting in a decreasing ability to adapt to the body's hemodynamic conditions [9]. It is also possible that the study's findings about the increased prevalence of hypertension in women are related to the area's predominately female population distribution.

In the public health centre and teaching hospital, respectively, 97.9% and 67.7% of respondents got therapy with monotherapy distribution as shown in Table 2. Amlodipine was given to the vast majority of patients who got

monotherapy. According to the PERHI guidelines in 2019, monotherapy is indicated for three conditions of hypertension, including hypertension with systolic blood pressure (SBP) <150 mmHg which is still classified as grade 1 with low risk, patients with blood pressure from normal to high but at high risk, and patients who are frail or elderly (≥ 80 years). Monotherapy is the most commonly chosen pattern, which can be due to several factors, including improving medication adherence, can be prescribed by general practitioners, and a wide range of indications for its use [10]. However, it is advised to begin therapy with a combination of two medications, per the 2019 PERHI guidelines. Two drugs can be combined to function on various routes, which improves the effectiveness of lowering blood pressure [11]. For hypertension that is resistant to a combination of two drugs, a combination of three drugs is advised. The three medications used in this study's combination are also in compliance with the PERHI 2019 guidelines, which urge using ACEi (lisinopril) or ARB (candesartan) along with CCB (amlodipine) and diuretics (spironolactone).

Table 4. Right Drug Comparison in Public Health Centre and Teaching Hospital

Location		Right Drug				P
		Accurate		Inaccurate		
		n	%	n	%	
Rawabuntu Health Centre		64	66.7	32	33.3%	0.002
UKI Hospital		82	85.4	14	14.6	
Total		146	76.1	46	23.9	

In the evaluation of drug administration and accuracy, an assessment was carried out as shown in Table 3. In terms of right indication, right patient, and right dose criteria, both in the public health centre and the hospital achieved perfect results (100%). The right indication shows that all subjects have met the criteria for receiving antihypertensive therapy and having their hypertension diagnosed according to the PERHI 2019 criteria. Right patient indicates that all subjects have met the criteria, thus there shouldn't be any contraindications based on the specified disease and antihypertensive drug instruments. The term right dose indicates that the medicine has been administered to all participants within the recommended dose range. In contrast, 66.7% of patients in the health center and 85.4% of patients in the hospital received the right drugs according to the right drug criteria, demonstrating rational drug use. This study's accuracy of drug use identified a lack of the right drug component. This is consistent with the 2015 study by Hendarti et al. that demonstrated the inaccuracy of hypertension drugs at the Ciputat Public Health Center [12]. Also, these findings support a 2019 study conducted at the Anutapura Hospital by Alaydrus et al. that exposed the inaccuracy of hypertension administration of drugs [13].

The chi-square analysis comparing the accuracy of drugs use in public health centre and teaching hospital is shown in Table 4 shows that the accuracy of drug use is better in hospital compared to public health centre (85.4% vs 66.7%; $p=0.002$). While individuals with hypertension that is higher than grade one continue to get monotherapy, the inaccuracy of hypertension drug administration in public health centre may be caused by a lack of accuracy in determining the degree of hypertension in patients. On the other hand, mistakes in choosing the drug combinations administered in patients who require drug combinations led to incorrect hypertension drug administration in hospitals. The selection of drug combinations should be tailored to specific patients, for example, beta-blockers should be used in people who have a history of cardiac problems, diuretics should not be given to those who have gout arthritis, and pregnant women shouldn't take ACEi and ARB medications.

The low accuracy of drug usage in the public health centre cannot be separated from the individual factors of the community and the factors from the healthcare provider itself. The geographic location of healthcare providers may have an impact on how well the public health center can deliver healthcare services to the surrounding communities in terms of information, resources, and staff. As a result, healthcare workers are less aware of the situation and less able to give patients the best care possible to assist their development. Ultimately, this is represented as the low accuracy of the use of antihypertensive drugs in the area of the public health centre [14]. In addition to the facility and demographic factors discussed earlier, this can also be influenced by efforts to improve the quality of health services represented by periodic evaluations. Hospitals tend to have more complex monitoring and evaluation mechanisms than primary health centers, thus providing an opportunity to improve the quality of health services in a more holistic manner. Inpatient treatment is an option for hospital patients as well, allowing for more controlled medication administration [15].

4. Conclusion

The rational drug use of antihypertensive drugs in Rawabuntu Public Health Centre was lower (66.7%) compared to that in UKI hospital with a value of 85.4%. Monitoring and analyzing the barriers that affect the rationality of hypertension drug use in both institutions need to be continued. It is necessary to further study the discrepancy in drug

use between Rawabuntu Public Health Centre and the UKI Public Hospital. In this approach, the standard of healthcare, particularly in the treatment of hypertension, can be improved in the future.

5. Acknowledgements

We appreciate everyone who helped with this study by participating and/or providing assistance.

6. Conflict of Interest

Competing interests: No relevant disclosures.

References

- [1] Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension* 2020; **75** (6):1334–57. doi: 10.1161/HYPERTENSIONAHA.120.15026.
- [2] Oparil S, Acelajado MC, Bakris GL, Berlowitz DR, Cifková R, Dominiczak AF, et al. Hypertension. *Nat Rev Dis Prim* 2018 Mar; **4**:18014. <https://doi.org/10.1038/nrdp.2018.14>.
- [3] Kemenkes RI. *Hasil Riset Kesehatan Dasar Tahun 2018*. Vol. 53; 2018.
- [4] Kim IG, So WY, Sung DJ. The relationships between lifestyle factors and hypertension in community-dwelling Korean adults. *J Phys Ther Sci* 2015; **27** (12):3689–3692. doi: 10.1589/jpts.27.3689.
- [5] Bruno CM, Amaradio MD, Pricoco G, Marino E, Bruno F. Lifestyle and Hypertension: An Evidence-Based Review. *J Hypertens Manag* 2018; **4** (1):1–10. doi.org/10.23937/2474-3690/1510030.
- [6] BPJS Kesehatan. *Panduan Layanan Bagi Peserta Jaminan Kesehatan Nasional Kartu Indonesia Sehat (JKN-KIS)*; 2021.
- [7] Perhimpunan Dokter Hipertensi Indonesia (PERHI). *Konsensus Penatalaksanaan Hipertensi 2019*. Indones Soc Hipertens Indones; 2019. 1– 90.
- [8] Lemauk P. *Gambaran Penderita Hipertensi di Rumah Sakit Umum Universitas Kristen Indonesia Tahun 2020*. Jakarta: Universitas Kristen Indonesia; 2022.
- [9] Harvey A, Montezano AC, Touyz RM. Vascular biology of ageing— Implications in hypertension. *J Mol Cell Cardiol* 2015; **83**:112–21. doi: 10.1016/j.yjmcc.2015.04.011.
- [10] Marinier K, Macouillard P, de Champvallins M, Deltour N, Poulter N, Mancina G. Effectiveness of two-drug therapy versus monotherapy as initial regimen in hypertension: A propensity score-matched cohort study in the UK Clinical Practice Research Datalink. *Pharmacoepidemiol Drug Saf* 2019; **28** (12):1572–82. doi: 10.1002/pds.4884.
- [11] Salam A, Kanukula R, Atkins E, Wang X, Islam S, Kishore SP, et al. Efficacy and safety of dual combination therapy of blood pressure-lowering drugs as initial treatment for hypertension: a systematic review and meta-analysis of randomized controlled trials. *J Hypertens* 2019; **37** (9):1768–74. doi: 10.1097/HJH.0000000000002096.
- [12] Hendarti Hana F, Siddiqa A, Sari FR. *Evaluasi Ketepatan Obat dan Dosis Obat Antihipertensi pada Pasien Hipertensi Rawat Jalan di Puskesmas Ciputat Januari-Maret 2015*. [Tangerang Selatan]: UIN Jakarta; 2016.
- [13] Alaydrus S, Toding N. Pola Penggunaan Obat Hipertensi Pada Pasien Geriatri Di Rumah Sakit Anutapura Palu Periode 08 Juli-08 Agustus 2019. *Jurnal Mandala Pharmacon Indonesia* 2019; **5** (02):65–73. doi: <https://doi.org/10.35311/jmpi.v5i02.46>.
- [14] Widiyanti Y. *Evaluasi Penggunaan Obat Antihipertensi Di Puskesmas Leuwigajah Kota Cimahi*; 2018.

- [15] Triyadi R, Rokiban A, Carima A. Evaluasi Penggunaan Obat Pada Pasien Hipertensi Rawat Jalan Di Rumah Sakit Umum Wisma Rini Pringsewu Tahun 2019. *Jurnal Farmasi Lampung* 2021; **9** (2):84–91. doi: 10.37090/jfl.v9i2.336.