OVERVIEW OF ANTIHYPERTENSIVE DRUGS USE IN ELDERLY PATIENTS WITH HYPERTENSION IN X HOSPITAL

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ABSTRACT

Hypertension is one of the cardiovascular diseases characterized by a systolic blood pressure >140 mmHg and a diastolic blood pressure >90 mmHg. This condition is the most at risk as a cause of death due to cardiovascular diseases in Indonesia. Based on Riskesdas data from 2018, the prevalence of hypertension in Indonesia reached 34.1%, an increase compared to Riskesdas data from 2013 (25.8%). Management of hypertension can be carried out through pharmacological and non-pharmacological therapy. Pharmacological therapy includes the use of various classes of antihypertensive drugs depending on the clinical condition of each patient. This study aims to analyze the use of antihypertensive drugs based on the type of therapy, class of drugs, and the names of the drugs prescribed to elderly hypertensive patients in the outpatient department. The sampling in this study was conducted using the simple random sampling technique. This study was conducted at X Hospital in September-November 2023 on 68 patients, showing that no patients received single antihypertensive drug therapy. All antihypertensive drugs were given to elderly patients in the form of a combination of two, three, and four drugs, respectively at 27.94%, 67.65%, and 4.41%. BB (32.45%), CCB (28.19%), and ARB (27.66%), are often part of combination therapy. The most dominant hypertension therapy is a combination of three drugs. The class of drugs most frequently prescribed is beta-blockers, with bisoprolol being the most commonly used medication.

Key words: antihypertensive drugs, elderly patients, pharmacological therapies.

INTRODUCTION

Hypertension is one of the cardiovascular diseases with systolic blood pressure values of >140 mmHg and/or diastolic blood pressure of >90 mmHg (Handayani, *et al*, 2015; Williams *et al*, 2018). Hypertension has the highest risk of cardiovascular disease which is the leading cause of death in Indonesia (Alaydrus dan Toding, 2019).

The World Health Organization (WHO) explained that in 2018, there were 1.3 billion people in the world who suffered from hypertension, and two-thirds of them were in developing countries. If prevention is not given, the number of sufferers will continue to increase to 1.6 billion people (29%) who will suffer from hypertension, and it is estimated that by 2025 there will be 9.4 million people who die each year from hypertension and its complications. in Southeast Asia, including Indonesia, has experienced 1.5 million deaths. According to the 2018 Riskesdas (Riset Kesehatan

Dasar), the prevalence of hypertension in Indonesia was 34.1%, up from the 2013 Riskesdas of 25.8% (Kementerian Kesehatan Republik Indonesia, 2018; Kementerian Kesehatan Republik Indonesia, 2019; Primadi *et al*., 2020; WHO, 2019).

The prevalence of older hypertensive patients by age group comparatively rises with age. According to Riskesdas (2018), the prevalence of hypertension is 18.31% among those aged 55–64, 23.31% among those aged 65–74, and 24.04% among those aged ≥75 (Tim Riskesdas, 2019).

Hypertension can be controlled through pharmacological and non-pharmacological therapy. Non-pharmacological therapy can be done through healthy lifestyle and diet management by reducing or avoiding foods that contain fat, high purine, and high cholesterol. While pharmacological therapy uses antihypertensive drugs from several types and classes of antihypertensive drugs. Antihypertensive drug therapy can use a single drug or a combination. In the early days of evidence-based medicine, first-line treatment included one of five drugs, including diuretics, angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs), calcium channel blockers (CCBs), or beta blockers (Nguyen, 2019).

The European Society of Cardiology and the European Society of Hypertension, the two most prominent associations in cardiology, have reached a consensus on initial combination therapy for most patients with persistent blood pressure ≥ 140/90 mmHg (Williams *et al*., 2018). Drug selection should consider efficacy, safety, and the patient's clinical condition.

Globally, a study of 1,762 adults showed that target blood pressure levels were achieved 18.5% faster in the initial combination group, resulting in a 23% reduction in the risk of cardiovascular events and death. In another study, continuous monitoring for two years significantly reduced the risk of heart failure (36%) and stroke (21%) (Gradman *et al*., 2013). This protection was not temporary, as fewer cardiovascular events were noted in hypertensive patients starting combination medication as opposed to those receiving monotherapy, demonstrating that combination therapy can decrease the number of high-risk patients who may arise at any point in the future. (Egan *et al*., 2012).

Factors to consider in the treatment of hypertension include previous medical history, age, baseline blood pressure, comorbidities, and concomitant medications. Combination therapy with the right dose produces simultaneous effects on various mechanisms, thus achieving therapeutic levels regardless of baseline blood pressure, cardiovascular risk, and comorbidities (Ghosh *et al*., 2016; Nguyen, 2019).

A preliminary study was conducted at X Hospital in January 2024. Hypertension patients in the outpatient installation of X Hospital are ranked second. Therefore, the researcher took the title "Overview of Antihypertensive Drugs Use in Elderly Patients with Hypertension in X Hospital.". The researcher's hope in this study is that research data can be used as initial data on the description of the use of antihypertensive drugs.

MATERIAL AND METHODS

This research is an observational study with a retrospective approach. The research location is at Hospital X, Jember Regency. This research has obtained ethical approval from the Health Research Ethics Committee of dr. Soebandi University with the number 472/KEPK/UDS/II/2024. The subjects included in this study are elderly patients diagnosed with hypertension with or without comorbidities who are receiving

antihypertensive medication, aged over 60 years or equivalent, and outpatients at Hospital X during the period from September to November 2023. The data in this study comes from medical records. The exclusion criteria established in this study are patients with incomplete or unreadable medical records, patients suffering from hypertensive crises (emergency and urgency), and patients treated in the ICCU (Intensive Coronary Care Unit). From the initial population that met the inclusion and exclusion criteria, the final sample size used was determined using the Slovin formula. This formula is used to calculate the size of a representative sample by considering a certain margin of error, which ultimately results in 68 patient samples as the main data in this study. In this study, the method used for sampling is simple random sampling. The output of this study was a profile of antihypertensive drug use in elderly outpatients diagnosed with hypertension at Hospital X. The profile of antihypertensive drug use included age, gender, and type of antihypertensive drug (the type of therapy, class of drugs, and the names of the drugs). Data analysis was conducted descriptively and performed using frequency and percentage.

RESULT AND DISCUSSION

The number of samples in the study conducted at X Hospital Jember was 68 patients. The characteristics of elderly patients with hypertension who used antihypertensive drugs from September - November 2023 period based on gender and age as listed in Table 1 below.

Based on the characteristic profile of elderly patients with hypertension who used antihypertensive drugs at Hospital X for the September-November 2023 period, the gender of the most hypertension patients were female, which was 47 patients (69,12%). Meanwhile, the male gender was only 21 patients (30,88%).

In the study of Wahyuni (2019), women tend to suffer from hypertension than men. In the study, 82.6% of women experienced hypertension, while for men it was only 17.4% [11]. Gender is one of the factors that affects blood pressure. The incidence of hypertension in women is higher than in men. Blood pressure or hypertension tends to increase after menopause (Kowalski, 2010). Women who have not yet menopausal are protected by the estrogen hormone which plays a role in increasing High Density Lipoprotein (HDL) levels.

Menopause usually begins in the mid-40s but can also start earlier. Women will experience an increased risk of high blood pressure or hypertension after menopause, namely over 45 years of age. Most likely, the sample of women patients in the outpatient installation of X Hospital have experienced menopause.

Based on the characteristic profile of elderly patients with hypertension who used antihypertensive drugs at Hospital X for the September-November 2023 period, the prevalence of hypertension is 57.35% among those aged 60–69, 36.77% among those aged 70–79, and 5.88% among those aged ≥80. Increasing age increases the risk of hypertension and causes blood vessels to lose their elasticity gradually. The high incidence of hypertension in the elderly is caused by changes in the structure of large blood vessels, so that the lumen becomes narrower and the walls of the blood vessels become stiff, causing systolic blood pressure (Kurnia, 2021).

The samples in this study were all in the elderly group (≥ 60 years). Usually, the elderly ≥ 60 years of age do less physical activity. Physical activity exposes blood vessels to repeated hyperemia. This causes blood vessel stress, resulting in

vasodilation of the blood vessels by increasing the expression of nitric oxide synthase (NOS) and releasing nitric oxide (NO). Lack of physical activity is associated with an increased risk of hypertension or high blood pressure and coronary artery disease (blockage of the arteries that supply blood to the heart). A person who is physically inactive has a 30% - 50% greater risk of developing hypertension.

Based on the data obtained, no patients received single antihypertensive drug therapy. All antihypertensive drugs were given in combinations of two, three, and four respectively was 27.94%, 67.65%, and 4.41% as listed in Table 2 below. According to Table 2, in the combination of two drugs, the most common combination is CCB + BB with 6 prescriptions (8.83%). The second most common combination is ARB + BB with 4 prescriptions (5.88%). The combination of ARB + CCB is the third most common combination with 3 prescriptions (4.41%). In the combination of three drugs, the most common combination is ARB + CCB + BB with 39 prescriptions (57.36%). The second most common combinations are ARB + Diuretic + BB, ACEI + Diuretic + BB, and BB + Diuretic + Diuretic, respectively with 2 prescriptions (2.94%). The combination of ACEI + CCB + BB is the third most common combination with 1 prescription (1.47%). Meanwhile, the combination of four drugs is only 1 type, namely ARB + CCB + Diuretic + BB with 3 prescriptions (4.41%).

In study that conducted at the Kowel Health Center, Pamekasan Regency, it was found that the pattern of use of single antihypertensive drugs was the CCB group, namely amlodipine, as many as 46 patients (61.33%). The most widely used combination antihypertensive drugs were CCB + ACE Inhibitors, namely amlodipine and captopril, as many as 3 patients (4%) (Alrosyidi et al., 2022). In a study conducted by Masfufah et al., (2023) the most common combination of three drugs was ARB + CCB + diuretic, namely candesartan + amlodipine + furosemide, as many as 13 prescriptions (5%). While the most common combination of four drugs was ARB + CCB + diuretic + beta blocker, namely candesartan + amlodipine + spironolactone + bisoprolol, as many as 6 prescriptions (2%).

Antihypertensive drug therapy begins with initial monotherapy followed by the addition of a second, third, or even fourth drug. A pharmacotherapy algorithm has been developed to provide practical recommendations for the treatment of hypertension. According to PERHI (2024), monotherapy is given to hypertensive patients with BP <150 mmHg, if blood pressure is not controlled with 1 drug then combination therapy is given. Some of the main recommendations, namely a combination of two drugs that are often used are RAS blockers (Renin-angiotensin system blockers), namely ACEI or ARB, with CCB or diuretics. A combination with other classes of drugs such as beta blockers is recommended if there are specific indications. The use of a combination of three drugs consisting of RAS blockers (ACEI or ARB), CCB, and diuretics if blood pressure is not controlled by a combination of two drugs (PERHI, 2024).

In the most common combination of two drugs (CCB + BB), there were 4 prescriptions using amlodipine + bisoprolol. The combination with the same drug class was also found in 2 other prescriptions, namely adalat oros (nifedipine) + bisoprolol. The combination of CCB with BB according to ISH (2020) is used in hypertensive patients with complications in the form of coronary heart disease. Overall, there were 6 prescriptions using ARB or ACEI combined with BB. The combination of ACEI / ARB with BB according to AHA/ACC (2018) and ISH (2020) is used in patients with complications in the form of coronary heart disease or heart failure. Then there were 5

prescriptions with a combination of ARB or ACEI with diuretics or CCB as a first-line combination in the hypertension therapy algorithm. The combination of these two drugs increases the response rate to hypertension treatment. In addition, there were 2 prescriptions using a combination of the same class (diuretics), namely furosemide + spironolactone. Spironolactone is a weak diuretic and its use is mainly in combination with other diuretics (HCT or furosemide) to prevent hypokalemia.

In the combination of the three most drugs (ARB + CCB + BB) there were 30 prescriptions using candesartan + amlodipine + bisoprolol. Combinations with the same drug class were also found in 9 other prescriptions. The combination consisting of valsartan + amlodipine + bisoprolol had 6 prescriptions, while the combination consisting of candesartan + adalat oros (nifedipine) + bisoprolol had 3 prescriptions. Meanwhile, the combination of ACEI + CCB + BB was only 1 prescription using ramipril + amlodipine + bisoprolol. The combination of ARB / ACEI + BB + CCB according to ISH (2020) is used in hypertensive patients with complications in the form of coronary heart disease. Overall, there were 4 prescriptions using ACEI / ARB + BB + diuretics. The combination of ACEI/ARB + BB + diuretics according to ESC (2018) is used in patients with complications in the form of heart failure. In addition, there are 2 recipes that use a combination of BB + diuretic + diuretic consisting of bisoprolol + spironolactone + furosemide. According to INASH (2021), this combination can be used if the patient experiences complications in the form of coronary heart disease or heart failure.

According to ESC (2024), a combination therapy of the four drugs consisting of ARB + BB + diuretic + CCB can be used in hypertensive patients with complications in the form of coronary heart disease. The combination of antihypertensive drugs from several groups that have different mechanisms will result in blockade of various pathways of increasing blood pressure.

Based on Table 3, the most widely used drugs are BB class drugs (32.45%), especially bisoprolol. Bisoprolol is prescribed in doses of 2.5 mg and 5 mg, reflecting its use as part of individual therapy, where the dose is adjusted to the patient's clinical condition, such as age, weight, and severity of hypertension. Beta blockers such as bisoprolol have a mechanism of action that lowers heart rate and reduces blood vessel resistance, making them effective in lowering blood pressure. The relatively mild side effects compared to other classes are also one of the reasons for their popularity among doctors (Ngyuen, 2019).

In addition to beta blockers, this study also shows that other drug classes, such as CCB (28.19%) and ARB (27.66%), are often part of combination therapy. Drugs from this class help complement the BB mechanism of action in controlling blood pressure. The combination of several of these classes provides a broader and more effective effect, especially in patients with complex clinical conditions (Williams, 2018). However, the use of antihypertensive drugs must also consider the potential for side effects and drug interactions. The use of a combination of three drugs, although effective, requires close supervision by a doctor to ensure patient compliance and prevent adverse side effects. Therefore, it is important for patients to receive adequate education about the importance of following the prescribed dosage and schedule (Egan, 2016).

Another factor that also needs to be considered in the management of hypertension is patient involvement in implementing a healthy lifestyle. Although

pharmacological therapy plays an important role, lifestyle changes, such as reducing salt intake, regular physical activity, and stress management, remain an integral part of hypertension management. Therefore, patient education in the outpatient unit must also include these aspects to improve the overall success of therapy (Ghosh, 2016).

CONCLUSION

In this study combining three medications is the most common treatment for hypertension. Beta-blockers are the most generally prescribed medicine class, with bisoprolol being the most widely used drug. The use of pharmacological therapy at Hospital X reflects an evidence-based approach that focuses on the needs of each patient. However, there are several challenges that need to be overcome, such as patient compliance with treatment, limited access to certain drugs, and the need for more intensive patient monitoring. Services in the outpatient unit also need to be equipped with a regular blood pressure monitoring program, so that the effectiveness of therapy can be continuously evaluated and adjusted to the patient's needs.

ACKNOWLEDGEMENT

Thank you to the dr. Soebandi University in helping carry out this research activit and one of Hospital in Jember who have allowed the author to conduct research in his working area.

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TABLE AND FIGURE

Table 1.
Characteristic Profile of Elderly Patients with Hypertension at X Hospital for September-November 2023 Period Based on Gender and Age

Characteristic	**N**	**(%)**
Gender		
Man	21	30.88
Women	47	69.12
Total	**68**	**100**
Age (Year)		
60 – 69	39	57.35
70 – 79	25	36.77
≥80 years	4	5.88
Amount	**68**	**100**

Source: secondary data at the outpatient installation of X Hospital

Table 2.
Distribution of Antihypertensive Drug Use Based on Type of Therapy and Class of Drug

Type of Therapy	**Class of Drug**	**Percentage (%)**	**Total Percentage (%)**
Single drug	-	0	0
Combination of two drugs	ARB+CCB	4.41	27.94
	ACEI+CCB	1.47	
	ARB+Diuretic	1.47	
	ARB+BB	5.88	
	ACEI+BB	2.94	
	CCB+BB	8.83	
	Diuretic-Diuretic	2.94	
Combination of three drugs	ARB+CCB+BB	57.36	67.65
	ACEI+CCB+BB	1.47	
	ARB+Diuretic+BB	2.94	
	ACEI+Diuretic+BB	2.94	
	BB+Diuretic+Diuretic	2.94	
Combination of four drugs	ARB+CCB+Diuretik+BB	4.41	4.41
Amount		**100**	**100**

Source: secondary data at the outpatient installation of X Hospital

Table 3.
Distribution of Antihypertensive Drug Use Based on Drug Name

Class of Drug	Drug	Percentage (%)	Total Percentage (%)
Beta- Blocker (BB)	Bisoprolol	32.45	32.45
Calsium Channel Blocker (CCB)	Amlodipine	25	28.19
	Nifedipine	2.66	
	Diltiazem	0.53	
Angiotensin Receptor Blocker (ARB)	Valsartan	5.32	27.66
	Candesartan	22.34	
Angiotensin Converting Enzyme (ACE) Inhibitor	Ramipril	3.19	3.19
Diuretic	Spironolacton	5.85	8.51
	Furosemide	2.13	
	Hydrochlorotiazide	0.53	
Amount		**100**	**100**

Source: secondary data at the outpatient installation of X Hospital