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Drug prescription pattern of hypertension patients at primary healthcare facilities in West Denpasar



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ABSTRACT

Background: In the treatment of hypertension, investigating and monitoring the prescription patterns of antihypertensive medications time by time is essential to assess the adherence to treatment guidelines. Inappropriate prescribing negatively impacts on health and economy of individual and the society.

Aim: The study aims to know the antihypertensive prescribing pattern of hypertension patients at primary healthcare facilities.

Method: This study is a descriptive study with cross sectional design as well as concern to the drug prescribing pattern of hypertension in

both 1st and 2nd West Denpasar primary healthcare (PHC), Bali as many as 54 samples from January-December 2016.

Result: Mean age is between 60-69 years old, and female were more prone to hypertension than male.

Conclusion: The study revealed that the prescription of antihypertensive medication in West Denpasar primary healthcare was related to JNC guidelines, except monotherapy of diuretics.

Keywords: hypertension, JNC, primary healthcare

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INTRODUCTION

Hypertension is the medical term for high blood pressure (BP). High blood pressure is defined as systolic blood pressure at or above 140 mmHg and/or diastolic blood pressure at or above 90 mmHg. According to the Joint National Committee 7 (Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure), hypertension is defined as physician office systolic blood pressure (BP) level of ≥ 140 mmHg and diastolic BP of ≥ 90 mmHg. The JNC 7 defines normal BP as a systolic BP < 120 mmHg and diastolic BP < 80 mmHg. The grey area between systolic BP of 120-139 mmHg and diastolic BP of 80-89 mmHg is defined as prehypertension.¹ Systolic blood pressure is the maximum pressure in the arteries when the heart contracts. Diastolic blood pressure is the minimum pressure in the arteries between the heart's contractions. Essential hypertension has no identifiable cause as its origins may be genetic, or due to your lifestyle including diet, weight and physical inactivity. Secondary hypertension is caused by another condition such as problems with your kidneys, certain medicines and some other medical problems.²

According to the World Heart Federation article, in the developed world, about 330 million people have hypertension, as do around 640 million in the developing world. The World Health Organization rates hypertension as one of the most important causes of premature death worldwide and the

problem is growing. In 2025 it is expected there will be 1.56 billion adults living with high blood pressure.²

The result of Basic Health Research 2007 conducted in Indonesia showed that non-communicable disease which caused the highest proportion of mortality was cardiovascular disease (31.9%) included hypertension (6.8%) and stroke (15.4%). This recognized that an increasing BP level is associated with a higher risk of heart attack, stroke, and kidney disease. In fact, for persons aged 40 to 70 years, each increment of 20 mmHg in systolic BP or 10 mmHg increase in diastolic BP doubles the risk of cardiovascular disease across the entire range of BP, from 115/75 to 185/115 mmHg. As to highlight this relationship between elevated BP and cardiovascular disease, a revised classification of hypertension has been provided by JNC 7.³

Antihypertensive are a class of drugs that are used to treat hypertension (high blood pressure). Antihypertensive therapy seeks to prevent the complications of high blood pressure, such as stroke and myocardial infarction. Many therapeutic agents can be used for the pharmacologic management of hypertension. The categories of antihypertensive are diuretics, beta-adrenergic blockers, and calcium channel blockers, angiotensin converting enzyme inhibitors, angiotensin receptor blockers and direct arterial vasodilators.⁴

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In the treatment of hypertension, investigating and monitoring the prescription patterns of anti-hypertensive medications time by time is essential to assess the adherence to treatment guidelines. Inappropriate prescribing negatively impacts on health and economy of individual and the society. Due to many factors, primary care physicians could have not adhered to the national and international guidelines. Many studies in many countries have been conducted like in Mexico, Sweden, India but none in Indonesia yet.

METHODS

This study was a descriptive study with a cross sectional design concerning to the drug prescribing pattern of hypertension in both 1st and 2nd West Denpasar primary healthcare, Bali from January to December 2016 as many as 54 samples. They were 40-69 years old, had diagnosed as hypertension on medical report, had been attending both 1st and 2nd West Denpasar primary health care for treatment, and willing to participate. The sample was selected by non-randomized sampling technique correctly using consecutive sampling technique. The subjects who

meet the inclusion criteria had included in this study until the minimum sample size is fulfilled. In preparation stage, research was committed together with recommendation letter from R&D as ethical clearance. Implementation stage was carried out upon approval from Head of Health Department of Denpasar city. Analysis stage was conducted due to post-data collection. The data were analysed descriptively.

RESULTS

Characteristics of Subjects

Table 1 showed the distribution of patients' characteristics according to age, gender, type of hypertension and class of drugs. The mean age was between 60-69 years old, and female is more prone to hypertension than male. The primary healthcare facilities handling more patients with primary or essential hypertension than secondary hypertension. Most of the patients with primary hypertension were diagnosed in routine medical check-up whereas some come to primary healthcare centres with symptoms like headache, nausea, neck pain, etc. Patients with secondary hypertension had underlying diseases like kidney diseases and tumours.

Types of treatment

Table 2 presented the distribution type of treatments. It's significantly showing that more patients were prescribed single drugs than combined drugs. Table 3 summarised the distribution of a variety of medications according to characteristics of subjects. Monotherapy or single-drug therapy was used more in overall compared to combined therapy. Concerning the use of combination therapy, there were no relevant differences between genders.

Class of drugs

Table 4 showed that ACEI drugs were more commonly prescribed followed by CCB drugs (Amlodipine 5 mg and Nifedipine). Captopril 25 mg as the ACEI was widely prescribed to patients. Table 5 summarised the geriatric patients had been prescribed for ACEI drugs more than CCB. Female patients had been prescribed ACEI commonly than male.

DISCUSSION

Hypertension is a frequently encountered chronic medical condition and is one of the most significant risk factors for cardiovascular morbidity and mortality. According to JNC 7, the ultimate public health goal of antihypertensive therapy is

Table 1 Distribution of characteristics of subjects

Characteristics	1 st West Denpasar PHC		2 nd West Denpasar PHC	
	n	%	n	%
Age				
40-49	7	13	14	25.9
50-59	13	24.1	18	33.3
60-69	34	63	22	40.7
Gender				
Male	24	44.4	26	48.1
Female	30	55.6	28	51.9
Type of hypertension				
Primary	37	68.5	50	92.6
Secondary	17	31.5	4	7.4
Grade of hypertension				
Stage 1	37	68.5	30	55.6
Stage 2	17	31.5	24	44.4

Table 2 Distribution type of treatments

Characteristics	1 st West Denpasar PHC		2 nd West Denpasar PHC	
	n	%	n	%
Single	52	98.1	44	81.5
Combined	2	0.9	10	18.5

Table 3 Distribution type of treatments according to characteristics of subjects

Characteristics	Single Drug		Combination	
	n	%	N	%
Age				
40-49	17	15.7	4	3.7
50-59	28	25.9	3	2.8
60-69	52	48.1	5	4.6
Gender				
Male	43	39.8	7	6.5
Female	53	49.1	5	4.6
Type of hypertension				
Primary	75	69.4	12	11.1
Secondary	21	19.4	0	0.0
Grade of hypertension				
Stage 1	62	57.4	5	4.6
Stage 2	34	31.5	7	6.5

Table 4 Class of drugs distribution

Characteristics	1 st West Denpasar PHC		2 nd West Denpasar PHC	
	n	%	n	%
ACEI	30	55.6	32	59.2
CCB	24	44.4	22	40.8

Table 5 Class of drugs distribution according to characteristics of subjects

Characteristics	CCB		ACEI	
	n	%	n	%
Age				
40-49	9	8.3	12	11.1
50-59	11	10.2	19	17.6
60-69	24	22.2	25	23.1
Gender				
Male	18	16.7	32	29.6
Female	26	24.1	32	29.6
Type of hypertension				
Primary	37	34.3	50	46.3
Secondary	9	8.3	12	11.1
Grade of hypertension				
Stage 1	32	29.6	35	32.4
Stage 2	14	13.0	27	25.0

to reduce cardiovascular and renal morbidity and mortality.⁵ Since most persons with hypertension, especially those more than 50 years of age, will reach the diastolic blood pressure (DBP) goal once the systolic blood pressure (SBP) goal is achieved,

the primary focus should be on attaining the SBP goal. Treating SBP and DBP to targets that are <140/90 mmHg is associated with a decrease in cardiovascular disease complications. In patients with hypertension and diabetes or renal disease, the BP goal is <130/80 mmHg. This survey highlighted the current utilisation of drugs in hypertensive patients accessing the services of the public health sector in West Denpasar, Bali. In this study we found that age group of 60-69 has higher number patients has been prescribed. Because ageing is a risk factor for hypertension, it is expected that increasing age would be associated with uncontrolled blood pressure. The risk of high blood pressure increases as you age. Through early middle age, or about age 45, high blood pressure is more common in men. Women are more likely to develop high blood pressure after age 65. This study shows that women are more treated for hypertension than men. Women tended to have more cardiovascular risk factors than men, including central obesity, elevated total cholesterol, and low HDL. Although on average, women had a lower diastolic blood pressure than men, women had a higher systolic blood pressure, which is a better predictor of the risk of cardiovascular and renal disease than diastolic blood pressure.⁶

This study shows that essential or primary hypertension overweighs secondary hypertension among local citizens. Primary hypertension or essential hypertension is a natural progression of blood pressure that suggests early elevations in blood volume and cardiac output might initiate subsequent changes in the systemic vasculature. Age, race or ethnicity, being overweight, gender, lifestyle habits, and a family history of high blood pressure can increase risk for developing high blood pressure. Besides that, there is evidence that obesity, insulin resistance, high alcohol intake, high salt intake, a sedentary lifestyle, stress, dyslipidemia, and low potassium or calcium intake increase BP in susceptible subjects which can solely depend on an individual's control over his/her life.^{7,8}

A large number of drugs are currently available for reducing blood pressure. According to JNC 7 guideline, thiazide-type diuretics are preferred initial agent because in trials comparing diuretics with other classes of antihypertensive agents. Diuretics have been virtually unsurpassed in preventing the cardiovascular complications of hypertension.³ It was also mentioned thiazide diuretics are less expensive than other antihypertensive drugs, although as members of other classes of drugs have become available in generic form, their cost has been reduced. The present study revealed that ACE inhibitors (57.4%) were prescribed more than calcium channel blockers (CCB) (42.6 %) were the drugs of choice for hypertensive patients as a

single drug therapy and overall utilization likewise mentioned in survey done in Trinidad with 67.1% of overall⁹ and Mexico 63.78% of overall¹⁰ utilization. Studies carried out in Trinidad noted that angiotensin-converting enzyme inhibitors were the most commonly used class of antihypertensive drugs and were prescribed in 281 patients (63.6%), followed by β -blockers (29.2%), diuretics (25.8%) and calcium channel blockers (12.0%). Enalapril was the ACE inhibitor of choice in the Trinidad primary health-care setting, either as monotherapy or polypharmacy.⁹ In Taiwan, the most regularly prescribed antihypertensive medications were calcium antagonists (54.9%) followed by beta-blockers (43.5%)¹¹ whereby in South Delhi diuretics (42.2%) were employed frequently followed by beta-blockers (39.1%).¹² This research has shown that ACEI is prescribed mostly for male where females were prescribed CCB more unlike in Sweden,^[14] where diuretics were more common in women while ACEI and CCB were more common in men. In primary healthcare centres in West Denpasar, Captopril is widely prescribed under ACEIs whereby Amlodipine is commonly prescribed under calcium channel blocker followed by Nifedipine which belongs to the latter class of drugs. In contrast with other studies, the current pattern of antihypertensive use in most of the countries would be that of a decline in the traditionally recommended medications, diuretics and beta-blockers, and an increase in newer medications such as ACEIs and calcium-channel blockers would have a marginal role in this pattern. According to assessment conducted in Taiwan, thiazide diuretics accounted for 7.2% of overall antihypertensive drugs prescribed for uncomplicated hypertension. The relatively low prescription rate of thiazides for antihypertensive treatment appears similar to those of Norway and France and is very different from that of the UK or Denmark.¹³ Angiotensin-converting enzyme (ACE) inhibitors are among the best tolerated antihypertensive drugs and have been used extensively as initial agents in the treatment of hypertension. However, the JNC 7 recommends ACE inhibitors as second-line agents in most patients with hypertension and as first-line choices only in selected patients. Over the past ten years, there has been a consistent increase in the use of ACEIs, ARBs and CCBs and many robustly conducted clinical studies have shown no consistent differences in antihypertensive efficacy, side effects and quality of life within these drug classes.¹⁴

Treatment strategies for developing countries, where access to health care system is less compared to developed countries, need to be simple, economical and forced time-bound titration by the primary care physician and not by the specialist or the tertiary care physician, to reach maximum number of patients.¹⁵

In this study it is found that patients were prescribed mono-therapy or single-dose drug with an 88.8% of overall patients than combined therapy unlike in South Delhi which means almost two-thirds of the patients were treated with monotherapy. According to the report from the survey done in South Delhi combination therapy was used more commonly than mono-therapy with percentage of 54.6% and 45.4% respectively. In Taiwan, among all of the mono-therapy prescriptions, the most frequently prescribed antihypertensive agents were calcium channel blocker at 33.5% and beta at 27.3%. Older patients aged over 55 years were treated with calcium channel blocker more often than younger patients, with beta-blockers being more frequently prescribed among the latter group. My study has shown that angiotensin-converting enzyme inhibitors (ACEI) and calcium channel blocker (CCB) were used commonly as combined therapy in the primary healthcare centres in West Denpasar. Combination of a calcium channel blocker and an ACEI is appealing on theoretic grounds. Although calcium antagonists exert much of their antihypertensive effect through a vasodilatory action, they also have diuretic and natriuretic properties. ACE inhibitors blunt the stimulation of the renin-angiotensin-aldosterone axis that may result from this diuretic effect. These agents also inhibit the central sympathetic stimulation that may result from calcium antagonist-associated vasodilatation, although both classes of drugs are potent vasodilators. ACEI and CCB work effectively in combination to lower blood pressure. However, Calcium channel blocker and ACE inhibitor combinations may result in fewer or milder side effects than occur with either agent alone.¹⁶⁻¹⁸

A major limitation of this study was that it reviewed drug usage in primary health care settings only. It is possible that a review of global prescriptions throughout the state or in other locations of Indonesia would give different results like in hospitals. The preferred drug list did not affect the use or order of antihypertensive drug class, but only individual branded agents. In the context of the treatment of hypertension, primary healthcare centres were not consistent on prescribing antihypertensive drugs as they highly depend on availability of drugs in a primary health care centre. As the efficacy of these two types of antihypertensive medication is similar, it seems that CCBs might be prescribed to substitute for some ACE inhibitors and vice versa in both primary healthcare centres depending on availability of the drug at that point of time, and this trend probably was unrelated to the different severity of hypertension. Laboratory results of subjects were not recorded as it was not available on the medical record, such as serum creatinine or albuminuria, which could have given insight into

disease progression. These laboratory results would have dictated the appropriate use of antihypertensive drugs, such as ACE inhibitors.

LIMITATION

Further evaluation of drug utilisation for hypertension should be done to determine their adequate blood pressure control in patients with an audit to assess the impact of drug therapy on disease outcome and strategies to improve patient adherence to drug treatment. The continued challenges in the management of hypertension still need special attention. In developing countries like Indonesia, more systematic studies are required on the evaluation of prescribing patterns and guideline-based antihypertensive medications' use, which can be tailored to suit the patients' requirements. In spite of these data and published guidelines, inconsistencies exist towards treatment approach, because of which physicians sometimes have to individualise the therapy, based on specific patient characteristics and response to treatment.

CONFLICT OF INTEREST

The authors stated that there was no conflict of interest according to the study.

CONCLUSION

The study revealed that the prescription of antihypertensive medication in West Denpasar primary healthcare was based on the JNC guidelines, except monotherapy of diuretics. The national and international guidelines for the management of hypertension have been published highlighting mono- or combination therapy according to the BP levels and associated comorbidity. Worldwide, hypertension treatment strategies have varied widely over time in terms of initial drug of choice from diuretic to ACEI/ARB/CCB, from monotherapy to low dose combination single-pill therapy. National health policymakers should consider evaluation and treatment of hypertension as a right in public health system for better outcomes in terms of morbidity and mortality from hypertension. The evaluation pattern, patient adherence to the treatment, physician adherence to hypertension management guidelines, cost implications and other data concerning comorbid conditions have been explored in many clinical studies.

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