Polypharmacy Treatment of Hypertensionin Public Health Centers

Vasanthi A/P Nayagam,[1] Afiatin,[2] Herri S. Sastramihardja[3]
[1]Faculty of Medicine Universitas Padjadjaran, [2]Department of Internal Medicine Faculty of Medicine, Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital,Bandung, [3]Department of Pharmacology and Therapy Faculty of Medicine Universitas Padjadjaran

Abstract

Background: Hypertension is one of the most prominent global diseases. Despite the availability of effective therapies, hypertension remains poorly controlled in Indonesia. In many cases, patient's noncompliance may be attributable to the low patients' knowledge, attitude, and life-style practices such as polypharmacy. Polypharmacy is defined as the administration of many drugs at in one prescription. Polypharmacy increases expenses, possible adverse reaction to a single agent, incidence of drug interactions, and decreases patient's compliance This study aimed to identify the practice of polypharmacy in hypertension treatment in primary health centers.

Methods: A cross-sectional descriptive observational study was carried out on 60 patients from two primary health centers in Jatinangor, West Java, Indonesia in October 2013. Sociodemographic profile, degree of hypertension, types of antihypertensive drugs, concomitant drugs given together with antihypertensive drugs, and treatment compliance data were collected and presented in tables and figures.

Results: The incidence of hypertension was more common among male patients compared to female patients. Thirty-three patients (55%) have low compliance to their medication. Twenty-nine patients (48%) received single drug and 31 patients (52%) received more than one drugs.

Conclusions: The percentage of polypharmacy practice in treating hypertension in primary health centers is 52%. The most frequently prescribed anti-hypertensive are angiotensin-converting enzyme (ACE) inhibitors and calcium-channel blockers (CCB). Most of hypertensive patients have low compliance to therapy. **[AMJ.2016;3(4):633–9]**

Keywords: Compliance, hypertension, polypharmacy, public health center

Introduction

The prevalence of hypertension or blood pressure in Indonesia is quite high. Despite the availability of effective therapies, hypertension remains poorly controlled in Indonesia. Too often patients forget to take their medications as prescribed, stop taking a medicine without informing their health care provider, or only take their medications when they think they need them, which are all referred to as non-compliance.[1]

One of the central reasons for the failure to control hypertension in those receiving therapy is patient's noncompliance with prescribed treatments. In many cases, patient's failure to comply may be attributable to poor knowledge, attitude, and life-style practices such as polypharmacy.[2] Polypharmacy is defined as the administration of many drugs in one prescription. It is also defined as mixing various drugs in one prescription.3 Polypharmacy increases the expense for multiple drugs, possible adverse reactions to a single agent incidence of drug interactions, and decreases patient's compliance. The aim of this study was to analyze the practice of polypharmacy among hypertensive patients in health care centers in Jatinangor.

Methods

A cross-sectional descriptive observational study was used in determining polypharmacy

Correspondence: Vasanthi A/P Nayagam, Faculty of Medicine, Universitas Padjadjaran, Jalan Raya Bandung-Sumedang Km.21, Jatinangor, Sumedang, Indonesia, Phone: +62 87827571504 Email: anu4390@yahoo.com

practice in hypertension treatment in Jatinangor Public Health Center and Clinic Padjadjaran in October 2013. Sampling was performed using consecutive sampling technique.

The inclusion criteria were hypertension patients that visited the health care centers and who were cooperative and willing to be interviewed after giving an adequate informed consent. Thirty patients were sampled from each health care center. Variables used in this study comprise of polypharmacy practice and compliance to antihypertensive treatment. Polypharmacy is defined as administration of many drugs together in one prescription. Compliance to treatment is defined as the extent to which a patient acts in accordance with the prescribed interval and dose of dosing frequency.

Patients with hypertension were identified from the medical records of the selected health care centers in Jatinangor. The identified patients who were visiting the health care centers for control were given consent. Then, those patients who met the inclusion criteria were interviewed on their compliance of antihypertensive treatment. All data collected was grouped according to sociodemographic profile, distribution of degree of hypertension, types of antihypertensive drug, concomitant drugs given together with antihypertensive drugs, and compliance to medication using computer. The collected data were presented in percentage. The study was performed after approval from the Health Research Ethics Committee of Faculty of Medicine UniversitasPadjadjaran No. 369/UN6.C2.1.2/ KEPK/2013.

Results

Most of hypertensive respondents were between 50–59 years old which accounts for 25% of total population. The incidence of hypertension was more common among the male respondents (52%). About 26 respondents (43%) were employed, while 34 respondents (57%) were unemployed (Table 1).

Most patients were diagnosed as suffering from stage 2 hypertension, which accounted for 33 respondents (55%). Meanwhile, 25 respondents (42%) suffered from stage 1 hypertension consisted of 25 respondents (42%). Out of 60 respondents, 29 of them (48%) received single drug and 31 respondents (52%) received combination therapy. Furthermore, 25 respondents (42%) from both the health care centers received a combination of 2 drugs. Only 6 respondents (10%) received a combination of 3 drugs (Table 2).

In this study, the compliance to antihypertensive medication was found to be low. Out of 60 respondents, 33 respondents (55%) had low compliance to their medication. Meanwhile, 16 respondents (27%) had medium compliance and 11 respondents (18%) had high compliance (Figure 1).

Table 1 Respondent Characteristics

Characteristics	Categories	JPHC (n=30)(%)	CP (n=30)(%)	Total (n=60)(%)
Age(years old)	10–19	-	2(7)	2(3)
	20–29	3 (10)	1(3)	4(7)
	30–39	2 (7)	7(23)	9(15)
	40–49	9 (30)	3(10)	12(20)
	50–59	6 (20)	9(30)	15(25)
	60–69	6 (20)	5(17)	11(18)
	70–79	3 (10)	3(10)	6(10)
	>80	1 (3)	-	1(2)
Gender	Male	15(50)	16(53)	31(52)
	Female	15(50)	14(47)	29(48)
Employment	Employed	10(3)	16(53)	26(43)
	Unemployed	20(67)	14(47)	34(57)

Note: JPHC=Jatinangor Public Health Center, CP=Clinic Padjadjaran

Vasanthi A/P Nayagam, Afiatin, Herri S. Sastramihardja: Polypharmacy Treatment of Hypertensionin Public Health Centers

635

Table 2 Distribution of Degree of Hypertension and Type of Antihypertensive Drugs

Characteristics	Categories	JPHC (n=30)(%)	CP (n=30)(%)	Total (n=60)(%)
Degree of hypertension	Prehypertension	-	2(7)	2(3)
	Stage 1	10(33)	15(50)	25(42)
	Stage 2	20(67)	13(43)	33(55)
Types of antihypertensive drugs	Single	13(43)	16(54)	29(48)
	Combination of 2	15(50)	10(33)	25(42)
	Combination of 3	2(7)	4(13)	6(10)

Note: JPHC=Jatinangor Public Health Center, CP=Clinic Padjadjaran

Table 3 Distribution of Type of Antihypertensive Drugs by Degree of Hypertension

Degree of Hypertension	Type of drug (n=60)(%)		
	Single	Combination of 2	Combination of 3
Prehypertension	2(67)	-	-
Stage 1	20(69)	4(16)	1(17)
Stage 2	7(24)	21(84)	5(83)

Single drug therapy was given mostly to hypertension stage 1 patients, i.e. 20 (69%) patients. Twenty-one respondents (84%) were given a combination of 2 drugs. One of the reasons for promoting the use of two antihypertensive agents is that the probability for achieving more effective blood pressure-lowering is increased. Meanwhile, a combination of 3 drugs was given to more severe hypertension respondents (Table 3).

Most commonly given single drug was the ACE inhibitor (59%). This is usually the first-line choice in hypertension treatment. Calcium channel blockers (CCB) also weregiven to the respondents, which are about 8 respondents (27%). Calcium channel blockers are particularly effective against large vessel stiffness, one of the common causes of elevated systolic blood pressure in elderly respondents. It relaxes and opens up narrowed blood vessels, reduce heart rate and lower blood pressure (Table 4).

The combination of two antihypertensive drug classes given mostly was the ACEinhibitor with CCB, which accounts for 12 respondents (48%). This combination is usually given to respondents with diabetes or lipid abnormalities. The second highest combination is the ACEInhibitor with diuretics. This combination was given to 8 respondents (32%). This combination have particular role in the presence of heart failure or post stroke.

Based on the Heart Foundation, approximately 50% of hypertensive respondents require triple-drug therapy that is combination of three different classes of antihypertensive drugs. Six respondents were given triple-drug therapy. The combination of ACEInhibitor, calcium channel blocker and diuretics was given to 4 respondents (67%).

Other types of drugs given with antihypertensive medication were prescribed based individual complaints of the respondents. From the results above, the drugs that are most frequently given together with antihypertensive drug were the anti-inflammatory drugs (18%). Analgesics and antipyretics (16%) may be given to overcome the side effects like headache caused by the antihypertensive drugs.

Discussion

Based on this study it is discovered that, about 48% of respondents were given single drug treatment. In a study in Southwestern Ontario[4], most patients with hypertension received monotherapy (63%). A previous study in South Carolina showed that 74.2% of patients received one antihypertensive pill and medication category.[5] This might be because the target blood pressure could be obtained

Table 1 Respondent Characteristics

Type of drug	Total	Percentage (%)
Single (n=29)		
ACEI	17	58.62
Captopril		
Beta-blocker	2	6.90
Bisoprolol		
Diuretic	2	6.90
Hydrochlorothiazide		
Calcium channel blocker	8	27.58
Amlodipine		
Combination of 2 (n=25)		
ACEI – Vasodilator	2	8
Captopril + Isosorbidedinitrate		
ACEI – Diuretics	8	32
Captopril + Hydrochlorothiazide		
ACEI – β-blocker	1	4
Captopril + Bisoprolol		
ACEI – Calcium channel blocker	12	48
Captopril + Amlodipine		
Calcium channel blocker – Diuretics	1	4
Amlodipine + Hydrochlorothiazide		
Calcium channel blocker – β-blocker	1	4
Amlodipine + Bisoprolol		
Combination of 3 (n=6)		
ACEI – Calcium channel blocker – β-blocker	2	33.33
Captopril + Amlodipine + Bisoprolol		
ACEI – Calcium channel blocker – Diuretics	4	66.67
Captopril + Amlodipine + Hydrochlorothiazide		
Other drugs (n=131)		
Antibiotics	10	7.63
Anti-inflammatory	23	17.56
Antihistamine	12	9.16
Anti-diabetics	14	10.69
Gastrointestinal	17	12.98
Analgesic & Antipyretics	21	16.03
Antitussive, Expectorant and Mucolytic	13	9.92
Vitamin	9	6.87
Anti-hyperlipidemia	6	4.58

Note:ACEI= Angiotensin-converting enzyme inhibitor
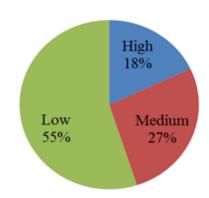
Distribution of patient's compliance

Figure 1 Distribution of Patient's Compliance

using a single drug therapy.

From the current study, a single drug therapy with ACE inhibitors (58.62%) was more strongly associated with good control of blood pressure than monotherapy with beta-blockers, CCBs, diuretics, or the use of multiple drugs. A study conducted in Southwestern Ontario[4] showed that the frequency of monotherapy by class was ACE inhibitor (34%). Moreover, to support this study, a study in South Carolina[5] stated that 28% of the hypertensive patients were given ACE Inhibitor. The ACE inhibitors lower the blood pressure by reducing the peripheral vascular resistance. It blocks the conversion of angiotensin I to the potent vasoconstrictor angiotensin II. Vasodilation occurs as a result of lower vasoconstriction caused by decreased levels of angiotensin II. By reducing circulating angiotensin II levels, ACE inhibitors also decrease the secretion of aldosterone, resulting in decreased sodium and water retention.[6]

The most commonly used of two drug-combination were the ACE inhibitors with CCBs. In patients with both diabetes and hypertension, ACE inhibitors provide clinical benefits that appear to be independent of blood pressure reduction. In a previous study, in ACE inhibitors with CCBs Cardiovascular Events Trial in patients with hypertension and diabetes, it was found that those receiving this combination were approximately 50% less likely to experience a major cardiovascular event.[7] However, a study conducted in Canada shows that the primary combination includes an ACE inhibitor and diuretic (78%), followed by an ARB and diuretic (16%), and an ACE inhibitor and CCB (6%).[4]

About 67% of respondents were given a combination of 3 drugs which comprises of ACE inhibitor, CCB and diuretics. A study in the United States stated that, 69.9% patients reach the blood pressure target of <140/90 mm/Hg with triple combination therapy.8Recent data indicated that few patients may require a third or fourth drug to adequately manage blood pressure. Preference should be given to the selection of an agent from a different class from the initial 2 drugs in the combination therapy.

The highest age group having hypertension was between 50–59 years old. The risk of having high blood pressure increases as the age increases. This is also shown in a previous study conducted in Indonesia,[9] where the highest number of patients having hypertension is in the age category of between 50–59 years old.

The prevalence of hypertension is higher in males. Out of 60 respondents, 31 of them are males, comprising about 51.67%. The hypertension prevalence in males in this study is comparable to a study conducted in India,[10] where the prevalence of males having hypertension is higher than females. In a study in Arab,[11] there were 243 (52.4%) and 221 (47.6%) male and female hypertensive patients, respectively. Current evidence suggests that estrogen may modulate vascular endothelial function, resulting in vasodilation which, in women, may, in part, contribute to lower blood pressures.

About 34 (57%) respondents were unemployed. Based on a study conducted in Ghana,[12] over 60.33% of the patients were unemployed. Unaffordable prices for antihypertensive drugs were the reason for this high number of patients. Another previous study in Arab[11] stated that hypertension seems to cluster more among those who are unemployed (32.6%). In addition, stress due to a low or absent of income could also be a contributing factor to the development of high blood pressure either directly or indirectly by causing depression and anxiety.

More than half of the respondents (55%) in the current study were determined or classified as poor compliers with antihypertensive medication. However, a survey in New Orleans shows that 59% of patients reported perfect antihypertensive medication compliance.[13] The most common reasons for non-compliance include forgetfulness, busy schedule, and insufficient supply of medication. When patients do not comply to their medications, their blood pressure tend to rise. This in turn causes their physician to add on another drug in their present medication which causes taking many drugs in one prescription which is called polypharmacy.

Stage 2 hypertension was diagnosed in 33 respondents. This is supported by a cohort study in India,[14] where there is an increase in stage 2 hypertension. Earlier study in the United States[15] shows, approximately 9.1 million adults had stage 2 hypertension, representing 25.4% from 51.8% of those with uncontrolled hypertension. The genetic and environmental factors can be responsible for the large increase in stage II hypertension in this population.

The limitation of this study was the use of observational, community-based practice data. The study was done in a public health center, which may not represent all population in that area because of time restrictions. As this was a small study using cross-sectional design, the effect of polypharmacy in patients could not be analyzed. So, further study could be done to see the effect of practicing polypharmacy in patients.

In conclusion, hypertension is an asymptomatic disease which needs lifelong lifestyle modifications and drug therapy. The prevalence of hypertension respondents whom were given polypharmacy in treating hypertension in the health centers is 51.67%. The antihypertensive drugs that mostly prescribed are the ACE inhibitors and CCB. Most of the hypertensive respondents have low compliance to medication which causes the blood pressure to be raised although they undergo drug therapy.

The most important cause of non-compliance is the lack of knowledge about the illness and its medication. The physician should explain the benefits and adverse effects of a medication effectively to the respondents. Effective communication between the primary care physician and the patient with a chronic disease compromises the patient's understanding of his or her disease, its potential complications, and the importance of medication adherence. This study has attempted to approach polypharmacy from a patient perspective and future studies could aim at identifying polypharmacy from the provider's side, improving patient's awareness on polypharmacy, and empowering them with the knowledge and tools they need to successfully reduce chances of adversities due to polypharmacy.

References

1. Setiati S, Sutrisna B. Prevalence of hypertension without anti-hypertensive medications and its association with social demographic characteristics among 40 years and above adult population in indonesia. Acta Med Indones-Indones J Intern Med. 2005;37(1):20–5.
2. Iyalomhe GBS, Iyalomhe SI. Hypertension-related knowledge, attitudes and life-style practices among hypertensive patients in a sub-urban Nigerian community. J Public Health Epidemiol. 2010;2(4):71–7.
3. Dorland WAN. Dorland's Medical Dictionary. 28th Ed. Philadelphia: Elsevier Saunders. 2009. Polypharmacy.
4. Petrella RJ, Merikle EP, Jones J. Prevalence, treatment, and control of hypertension in primary care: gaps, trends, and opportunities. J Clin Hypertens. 2007;9(1):28–35.
5. Egan BM, Bandyopadhyay D, Shaftman SR, Wagner CS, Zhao Y, Yu-Isenberg KS. Initial monotherapy and combination therapy and hypertension control the first year. Hypertension. 2012;59(6):1124–31.
6. Atlas SA. The renin-angiotensin aldosterone system: pathophysiological role and pharmacologic inhibition. J Managed Care Pharm. 2007;13(8):9–20.
7. Kalra S, Kalra B, Agrawal N. Combination therapy in hypertension: an update. J Diabetol Metab Syndr. 2010;2(1):44.
8. Calhoun DA, Lacourcière Y, Chiang YT,

Vasanthi A/P Nayagam, Afiatin, Herri S. Sastramihardja: Polypharmacy Treatment of Hypertensionin Public Health Centers

639

Glazer RD. Triple antihypertensive therapy with amlodipine, valsartan, and hydrochlorothiazide. Hypertension. 2009;54(1):32–9.

9. Rahajeng E, Tuminah S. Prevalence of hypertension and its determinants in Indonesia. Maj Kedokt Indon. 2009;59(12):580–7.

10. Yuvaraj BY, NagendraGowda MR, Umakantha AG. Prevalence, awareness, treatment, and control of hypertension in rural areas of Davanagere. Indian J Community Med. 2010;35(1):138–41.

11. Tohme RA, Jurjus AR, Estephan A. The prevalence of hypertension and its association with other cardiovascular disease risk factors in a representative sample of the Lebanese population. J Hum Hypertens. 2005;19(11):861–8.

12. OheneBuabeng K, Matowe L, Plange-Rhule J. Unaffordable drug prices: the major cause of non-compliance with hypertension medication in Ghana. J Pharm Pharm Sci. 2004;7(3):350–2.

13. Hyre AD, Krousel-Wood MA, Muntner P, Kawasaki L, DeSalvo KB. Prevalence and predictors of poor antihypertensive medication adherence in an urban health clinic setting. J Clin Hypertens(Greenwich). 2007;9(3):179–86.

14. Gupta R, Sharma AK, Gupta VP, Bhatnagar S, Rastogi S, Deedwania PC. Increased variance in blood pressure distribution and changing hypertension prevalence in an urban Indian population. J Hum Hypertens. 2003;17(8):535–40.

15. Valderrama AL, Gillespie C, King SC, George MG, Hong Y. Vital signs: awareness and treatment of uncontrolled hypertension among adults. Morbidity and Mortality Weekly Report. 2012;61(35):703–9.