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## EFFICACY OF ANTI-HYPERTENSIVE THERAPY IN HYPERTENSION PATIENTS ATTENDING IN TERTIARY CARE HOSPITAL.

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### ABSTRACT

**Introduction:**One of the most common causes for morbidity and mortality in the world is uncontrolled hypertension. Our study was conducted in Pokhara Academy of Health Sciences because of easy availability of adequate patient required for the data. The aim of the study is to follow up hypertensive patient and the control of their blood pressures after taking antihypertensive medications.**Materials and Method:**Antihypertensive medicine use, co morbidities and data regarding blood pressure was abstracted from medical records of 226 patients from medical out patient department of Pokhara Academy of health Sciences from April 2017 to August 2017. Controlled blood pressure is defined as systolic pressure < 140 mmHg and diastolic pressure <90 mmHg that in diabetic patient SBP <130 mmHg and DBP < 80 mmHg. Data was analyzed and entered in SPSS version 20.**Result:**46.9% patients had control blood pressure within normal range. Calcium channel blocker was the one which significantly controlled the blood pressure in our multivariate analysis (OR, 1.93; CI, 1.06, 2.51), likewise number of two or more prescribed antihypertensive drugs, diabetes, Age related; (OR, 1.88; CI 1.08, 3.27; OR, 1.24, CI, 0.73, 2.11; OR, 0.51, CI, 0.29, 0.89) respectively.**Conclusion** In this study, poor blood pressure control is seen as an important public health concern. Diabetes and age related (above 60 years of age) had poor blood pressure control which poses higher risk and can lead to co- morbidities. Further studies are needed to assess current outcomes in other centers as well.

**Key words:** Hypertension, antihypertensive, cardiovascular, Pokhara Academy of Health Science

## Introduction

Hypertension is major public health challenge world wide [1]. In 1980 high blood pressure patients were 600 million and 1 billion in 2008[1] where Africa and other parts of the world was seen to have 40% prevalence [1]. Premature mortality in terms of lost life of CVD has globally increased from 23.3 million (1990) to 37 million (2010) in south East Asia. Prevalence of hypertension among the young adults aged 25 years was 40% in 2008 [2]. In health care system increased blood pressure is major problem and it is the risk factor for cardiovascular diseases, stroke as well as coronary heart disease [2]. Heart failure, renal failure, eye complications (like retinal hemorrhage) and peripheral vascular disease are the complications of the high blood pressure [3]. Hypertensive patients with controlled blood pressure are in less risk of cardiovascular disease [4, 5]. To provide basic guide on controlled blood pressure to public health, surveillance to determine blood pressure and its control is important. However we don't have enough data on the level of control of blood pressure in patients of our region. Mathenge W et al showed that 24% patients receiving antihypertensive medicine actually had blood pressure within normal level [6].

A study shows that primary open angle glaucoma was significantly associated with hypertension and diabetes mellitus which were 2.05 times higher in Gurung ethnicity than others in Nepal and

over all, hypertension patient have 2.72 times more risk of having primary open angle glaucoma [8].

## Material and methods

This is the cross section observational study which included 226 hypertensive patients from Pokhara Academy of health sciences between April 2017 to August 2017. All the data were analyzed by using SPSS 20. According to guideline of seventh report of the Joint National Committee (JNC), Hypertension with diabetes mellitus, target blood pressure were defined as  $< 130/80$  while in non diabetic patient target blood pressure was defined as  $< 140/90$  mmHg. Patient who had  $\geq 140/90$  mmHg were taken in our study and further categorized in the following stages. Stage I (SBP 140-159 mmHg or DBP 90-99 mmHg) stage II (SBP  $\geq 160$  -179 mmHg or DBP  $\geq 100$ -109 mmHg) and stage III (SPB  $\geq 180$  mmHg or DBP  $\geq 110$  mmHg). Number of patients with SBP  $\geq 140$  and DBP  $< 90$  were determined as isolated uncontrolled systolic hypertension and those with DBP  $\geq 90$  mmHg and SBP  $< 140$  mmHg, as diastolic hypertension. In our study controlled blood pressure is defined as patient with SBP  $< 140$  mmHg and DBP  $< 90$  mmHg. At the beginning we analyzed bivariate analysis test ( $\chi^2$  test) accordingly with sex, age, patient with two or more number of prescribed antihypertensive, angiotensin converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), beta blockers, calcium channel blockers (CCBs), diuretics medicine, cardiovascular disease, diabetes and other comorbidities. Secondly logistic regression

analysis of factors associated with good blood pressure control was done.  $P < 0.05$  was considered significant. Inclusion criteria was all the patients was  $\geq 18$  years attending in MOPD with hypertension as defined or already under antihypertensive medication and giving consent for study. An exclusion criterion was pregnant women and CKD patient under Mechanical hemodialysis.

## Results

Among the 226 patients male hypertensive are 62 and female hypertensive are 164 patients. 134

(59.29%) patient were non diabetic hypertension and 92 (40.71%) were hypertensive with

diabetes mellitus and rest of other comorbidities. Among the 226 patients, 10 patients (4.42%)

had cardiovascular disease. Heart failure were present in 5 patients, similarly 3 patients had cardiovascular accident. Ischemic heart disease was present in 2 patients in our study. Among the 134 of non diabetic hypertensive only 67 patients i.e. 50% had blood pressure  $< 140/90$  mmHg. Diabetic hypertensive patients (12 patients) were below  $< 130/80$  mmHg. 78 patients had good blood pressure control noted as 34.5% in our study. 95 patients were at stage I (64.1%) and 53 patients were at stage II (35.8%) among patients with uncontrolled hypertension. Thiazides were the most common diuretics drugs used 48.6%. More than 2 antihypertensive medicines were found to have been used in 158 patients (69.9%) and amlodipine was used

in 155 patients (68.58%). CCB was single drug of choice for controlled hypertension. 120 patient (53%) had used Losartan. The above mentioned medicines are antihypertensive medications prescribed and listed in Table 1. Our study shows that, predictors of blood pressure control were significantly control BP ( $\chi^2$ ;  $p < 0.05$ ) in diabetes status. Bivariate analysis of the association between blood pressure control and other study are summarized in Table 2. CCB was significantly associated with well-controlled blood pressure in multivariate analysis, (OR, 1.93; 95% CI, 1.06, 3.51). However, the odds ratio of good control were significantly reduced if the patient were aged 60 years and over (OR, 0.51; 95% CI, 0.29, 0.89), diabetes (OR, 1.24; 95% CI, 0.73, 2.11) and number of prescribed antihypertensive drugs (OR, 1.88; 95% CI, 1.08, 3.27). Table 3 indicate the results of logistic regression analysis.

## Discussion

In our study we found that 46.9% of the hypertensive patients, on follow up, in western regional hospital had controlled blood pressure in the target range. In a study of Pandey et al in 1981 Prevalence of hypertension was 28.9% (male, 28.8%; female 30%). [9, 10]. Another study of national referral hospital (Kenyatta National Hospital) in 2009 shows 26% blood pressure under control in hypertensive patients [11]. The follow-up hypertensive patients at Nyeri Provincial General Hospital had controlled blood pressure as 33.4% [12].

In a study of USA in 2000, study shows hypertensive patients with controlled SBP and DBP were 32.7% 82.9% respectively

[13]. There are several trials that have been documented which show benefits of reduction of systolic blood pressure [14, 15, 16]. Multivariate analysis showed that in old age and/or diabetes the use of three or more drugs had significantly poor blood pressure control. An important risk factor of poor blood pressure control has been identified as older age [17, 18]. When comparing both groups (diabetic and non diabetic) both groups were significantly likely to have poorly controlled blood pressure. There are similar studies with results of poor control of blood pressure in both non diabetic and diabetic group [19, 20, 21]. A lot of evident based studies show that two or more combination of antihypertensive medicine is needed to adequately control the blood pressure [22].

Poor blood pressure control and Multi drugs regimens has been demonstrated by knight et al. 2001 studies. Ambulatory patients between multidrugs regimen and poor blood pressure control were found to have positive BP control. Patients were likely to have higher blood pressure control who takes four or more antihypertensive than single drug medication [23].

Duggirala et al. found that 35% more likely to have poor blood pressure controlled

the patients who are taking three or more drugs. [24]. CCB was associated with blood pressure control and patients taking CCB were twice likely to have well blood pressure control than those who were not taking CCB. Those finding of CCB are more beneficial related with other studies to achieving blood pressure control which are especially in the elderly. [25, 26].

### **Conclusion**

Efficacy of anti hypertensive medication patients study shows that a majority of hypertensive

patients in Pokhara Academy of Health Sciences have poorly controlled blood pressure. Diabetes and elderly patients are less likely to have blood pressure controlled, high rate to have complication and need close monitoring. Both Systolic and diastolic blood pressures are high in our study and need targeted intervention to address the problem. Calcium channel blockers were shown to have better blood pressure control in our study. Still further research is needed to address the evidence of a good blood pressure control by CCB.

Table: 1. Antihypertensive medication use by patients

Drugs CCBs	percentage
Amlodipine	155(68.58%)
Nifedipine	3(1.3%)
<b>ARBs</b>	
Losartan	120(53%)
Telmisatan	68(30%)
<b>Beta blockers</b>	
Atenolol Metoprolol	49(2.6%)
Propranolol	20(8.8%)
<b>ACIs</b>	8.(3.5%)
Enalapril Ramipril	7(3%)
<b>Diuretics</b>	5(2.2%)
Hydrocholothiazides Furosemide	
Adactone	110(48.6%)
<b>Number of drugs</b>	
1	5(2.2%)
2	4(1.7%)
3	68(30.08%)
	90(38.82%)

Table 2. Bivariate analysis of the association between blood pressure controls

Variable	Total	BP Controlled %	BP Uncontrolled%	P value
<b>Sex</b>				0.46
Male	62	25 (40.3)	37(59.7)	
Female	164	75(45.7)	89(54.3)	
<b>Age</b>				0.01
<60 years	81	40(49.3)	41(50.7)	
>60 years	145	95(65.5)	50(34.5)	
<b>Number of drugs used</b>				0.02
<2	136	66(48.6)	70(51.4)	
>3	90	30(33.3)	60(66.7)	
<b>on CCBs</b>				0.02
Yes	158	76(48.1)	82(51.9)	
No	68	22(32.3)	46(67.7)	
<b>ARBs</b>				0.42
Yes	188	71(37.7)	117(62.3)	
No	38	17(44.7)	21(55.3)	
<b>Beta blocker</b>				0.21
Yes	77	29(37.6)	48(62.4)	
No	149	69(46.3)	80(53.7)	
<b>ACEI</b>				0.66
Yes	12	5(41.6)	7(58.4)	
No	214	103(48.1)	111(51.9)	
<b>Diuretics</b>				0.42
Yes	119	53(44.5)	66(55.5)	
No	107	42(39.2)	65(68.9)	
<b>Cardiovascular disease</b>				0.82
Yes	10	4(40)	6(60)	
No	216	94(38.8)	122(61.2)	
<b>Diabetes</b>				0.05
Yes	91	33(36.2)	58(63.8)	
No	135	67(49.6)	68(50.4)	
<b>Other co-morbidities</b>				0.75
Present	15	6(40)	9(60)	
Absent	211	93(44)	118(56)	

Fig: 3 Logistic regression analysis with good blood pressure control

Variable	OR (95% confidence interval)	P value
On Calcium channel blocker	1.93(1.06,3.51)	0.001
Number of prescribed antihypertensive drugs	1.88(1.08,3.27)	0.001
Diabetes	1.24(0.73,2.11)	0.002
Age	0.51(0.29,0.89)	0.003



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