



Original Research Article

ASSESSMENT OF PRESCRIPTION PATTERNS IN HYPERTENSIVE AND DIABETIC PATIENTS VISITING PRIVATE TERTIARY CARE HOSPITAL OF DHARAN MUNICIPALITY, NEPAL

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**Abstract**

This study was conducted to assess the drug prescribing trend of anti-hypertensive and hypoglycemic agents in hypertensive and diabetic patients in tertiary care private Hospital. The study was prospective, cross-sectional and observational study. A total of 100 prescriptions were recorded. 56% were males as compared to 44% females. The age group of the patients varied from 30 to 90 years with majority individual above 50 years of age. 59% patients were hypertensive; 26% patients were diabetic and 15% had both the diseases. For the treatment of HTN, both mono-therapy and combination therapy were followed. In mono-therapy, amlodipine was most commonly prescribed followed by losartan. In combination therapy, a two-drug combination consisting of calcium channel blockers (amlodipine) and diuretics (furosemide /hydrochlorothiazide) were given to the majority of patients, followed by Diuretics and Angiotensin receptor blocker combination. Among diabetic hypertensive, 66.67% of patients were treated with single anti-hypertensive drug and 33.35% of patients were treated with anti-hypertensive drug combinations with oral hypoglycemics. This study showed that calcium channel blockers were the most prescribed antihypertensive agents while biguanides were the mostly prescribed among anti-diabetic agents. Combination therapy was observed in a high percentage of prescriptions in hypertensive patients. Prescribing pattern among antihypertensive showed some dubitable adherences to existing evidence-based JNC guidelines.

**Keywords:** Drug utilization, prescribing pattern, Antihypertensive, Anti-diabetics

**INTRODUCTION**

Hypertension (HTN) is a chronic condition affecting 972 million people worldwide. It is estimated that the worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025.<sup>1</sup> People with hypertension are also progressively more predisposed to developing type 2 diabetes mellitus (DM). Studies show that prevalence of hypertension is around 2 times greater in patients with diabetes mellitus compared with comparable non diabetic individuals<sup>2, 3</sup>. Diabetes is a disease which leads to micro-vascular complications (like retinopathy, nephropathy, and neuropathy) and macrovascular complications (includes

ischemic heart disease, peripheral vascular disease, and cerebrovascular disease) resulting in organ and tissue damage in approximately one third to one half of people with diabetes<sup>4</sup>. Hypertension affects about 60% of patients with type 2 diabetes. Serious cardiovascular events are more than twice more likely in patients with diabetes and hypertension than either disease alone. The tight blood pressure (BP) controls in patients with diabetes is as essential as tight glucose control for the prevention of both macrovascular and microvascular complications<sup>4,6</sup>. The management of type-1 diabetes depends on insulin mainly, whereas the management of type-2 diabetes is mainly managed using oral antidiabetic agents<sup>7</sup>. Lifestyle modification and pharmacotherapy are needed in the

management of hypertension and diabetes and the ultimate goal of this is to reduce morbidity and mortality through a reduction in hypertension and diabetes associated complications<sup>8, 9</sup>. The drug treatment of Hypertension is complex and sometimes various drugs or combinations of drugs have to be tried to find what regimen is effective and suits the patient. Various clinical consideration and co morbid condition is essential in proper selection of drug therapy in treatment of hypertension and diabetes. This study aims to assess the prescribing trends in HTN and diabetic in the private tertiary care hospital of Dharan municipality, Nepal.

## MATERIAL AND METHODS

The prospective, cross sectional and observational study was conducted in Bijayapur Hospital which is a 100 bedded tertiary care hospital located in Dharan municipality, Sunsari Nepal for the period of 3 months. Hypertensive and diabetic patients irrespective of age and sex, with or without co- morbidity visiting hospital were included in the study. Diagnosed diabetic and hypertensive patients who do not receive pharmacological therapy, unable to reply verbal questions, mentally retarded and unconscious patients as well as pregnant patients were excluded from the study. The purpose and details of the study were discussed with the patients and consent was taken from all the participating patients, prior inclusion in the study. Ethical approval was taken from the hospital before conducting a study. All relevant data such as patients demography, antihypertensive and Hypoglycemic drug prescribed along with other clinical information was collected in patients data collection form suitably designed for the study. The data analyzed are presented in mean, frequency and percentage

## RESULTS

A total of 100 prescriptions were collected and analyzed. The proportions of males were slightly higher than females (male female ratio was 1: 0.78) with mean age  $57 \pm 12.7$  years. 59% patients were hypertensive, 26% were diabetic while 15% had both the diseases. More than half of the patients (59%) were in the age group of 51-70 years, whereas nearly 1/3 patients (30%) belonged to the age group 30-50 and rest were above 70 years of age. Out of total 59 prescriptions of only hypertensive patients, 17 (29%) were prescribed with single antihypertensive drug as monotherapy, 34 (57.62%) with two anti-hypertensive drugs and 8 (13.55%) were prescribed with three antihypertensive drugs in combination. As monotherapy, Calcium channel blockers (CCB) were the most commonly prescribed antihypertensive followed by angiotensin receptor antagonist and ACE (Angiotensin converting enzyme) inhibitors. Among combination therapy, the most prescribed combination was Diuretics + CCB (29.22%) followed by Diuretics+ Angiotensin receptor blocker

(22.44%). In our study, amlodipine (33%) was most frequently prescribed drugs among CCBs followed by losartan (19.9%) as angiotensin receptor blocker and furosemide (21.37%) /and or hydrochlorothiazide (13.74%) as diuretics. Frequency of  $\beta$  blockers and ACE inhibitors prescription consumption were found to be less than 6% of total drug prescribed. Among patients with Diabetes, 41% of all prescriptions carried at least one hypoglycemic agent (this includes prescriptions having antihypertensive drugs as well). The Biguanides (metformin) were prescribed frequently consisting 84.44% of all hypoglycemic agents prescribed. 15% of prescriptions consist of combination Therapy of Metformin + sulphonylureas and 2.50% prescription consists of Insulin. Glimepiride was mostly prescribed among sulfonylureas. Among diabetic hypertensive, 66.67% of patients were treated with single anti-hypertensive drug and 33.35% of patients were treated with more than one anti-hypertensive drug combinations with oral hypoglycemic whereby 6.6% prescription contains two hypoglycemic and two antihypertensive drugs and similar proportion contains prescription with the combination of insulin and antihypertensive. Metformin with Amlodipine drug combination were prescribed more often among diabetic hypertensive i.e. 40% of prescription followed by metformin with losartan (20%).

## DISCUSSION

In this study, Majority of patients were in the age group above 50 years of age. Blood pressure tends to rise with age and elderly are mostly susceptible to high blood pressure.<sup>10</sup> The study observed that hypertension and diabetic-hypertensive were more prevalent in male than in females which coincides with study conducted by Panda *et al.*<sup>11</sup>. Greater percentage of the anti-hypertensive were prescribed as orally administered drug, which is a good and rational approach, since pharmacokinetics and clinical trials indicates that oral forms of drugs are as effective as injections with oral medications and oral medications are more cost effective and safer in conscious patients.<sup>8</sup>

The present study observed that combination drug therapy was more commonly prescribed than single drug therapy. These results supported the work of Anand et al that showed blood pressure could be adequately controlled with the help of combination therapy<sup>12</sup>. The high prescription of combination therapy may be due to the high prevalence of patients with severe and moderate hypertension, and the presence of comorbid diseases, particularly diabetes mellitus and on combination therapy demonstrates for significantly higher reduction in systolic and diastolic blood pressures than those on mono-therapy alone.

Calcium channel blockers were the most commonly prescribed drugs among the antihypertensive which agreed with the result published by Anand et al and Vikash et al<sup>12,2</sup> but differs from other study where the angiotensin

converting enzyme inhibitors are the most commonly used drug both as a monotherapy and in combination therapy<sup>2,5</sup>. The calcium channel blockers were followed by Angiotensin converting enzyme inhibitors being the least prescribed.

Our study revealed that CCB has been most commonly used as a mono-therapy than ACEI and ARB. Calcium channel blockers is said to effectively reduce systemic blood pressure while maintaining the glomerular filtration rate and effective renal plasma flow. This finding coincides with the study conducted by J.M. Okonta et al in Nigeria<sup>8</sup> and GM. Khan et al in Pokhara Nepal<sup>9</sup>. According to JNC 7 short-acting CCBs are not recommended in the management of hypertension<sup>13</sup>. However JNC 7 guidelines supports diuretics as first line therapy for the treatment of hypertension, however despite these recommendation, high use of CCBs in this study may be due to the fact that Calcium Channel blockers have been found to lower blood pressure more than diuretics when both were used as mono therapy<sup>13</sup>.

Recommendation of JNC 8, for the Asian population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic, calcium channel blocker (CCB), angiotensin-converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB). While the African-American population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or CCB<sup>14</sup>.

Furthermore, the most prescribed oral hyperglycemic agent was the biguanides followed by the sulfonylurea and then, a combination of the two. This is in agreement with the report of Pooja et al who reported that metformin and glimepiride were the most prescribed drugs in diabetes management<sup>15</sup>. According to the study, the use of metformin may be due to its positive effects on cardiovascular risk factors especially on the lipid profile and also due to the fact that metformin has been shown not to promote weight gain. As such, metformin has been reported as first drug of choice for most patients with type 2 diabetes mellitus.

Metformin acts as a peripheral sensitizer of insulin and also has beneficial effects on insulin resistance, an important factor in the pathogenesis of type 2 diabetes. It reduces cardiovascular-related mortality rates more than sulfonylurea. Metformin is unlikely to cause severe hypoglycemia, because it does not stimulate insulin release. So the physicians may have preferred metformin over other OHAs<sup>16</sup>. Furthermore, the diabetic patients should be counseled about the chronic nature of the disease, dietary advice and importance of pharmacological as well as non-pharmacological intervention and consequences of non-compliance with the therapy.

This pattern is consistent with the current treatment algorithm for type 2 DM from the American Diabetes Association and the European Association for the Study of Diabetes, which suggests that metformin, should be started along with lifestyle recommendations at the time of diagnosis<sup>17,2</sup>. Metformin is the best first option at present due to its efficacy, weight reducing effect, cost and low incidence of adverse effects. It has an added advantage of improving lipid profile, not provoking hypoglycemia and can be associated with any other anti-diabetic agent. Sulphonylureas remain the best choice for combination with metformin although their effectiveness on glucose control decrease with time more rapidly<sup>18</sup>.

Hypertension was found to be significantly associated disease (15%) with diabetes, which is well correlated with the findings of Mohammad et al., who reported 31% hypertension as co-morbid in case of diabetics. Patients with diabetes and hypertension are at greater risk cardiovascular morbidity<sup>15</sup>. The Preference for Amlodipine in diabetics with and without nephropathy seems to relate to the positive pharmacokinetic findings which translate into convenient dosing in renal insufficiency<sup>3</sup>.

## CONCLUSION

In this study, it was observed that combination therapy was more often prescribed than the mono-therapy. Calcium channel blockers and biguanides were the most frequently prescribed agent among antihypertensive and oral hypoglycemics. However, prescribing pattern of antihypertensive showed some dubitable adherences to existing evidence-based JNC guidelines.

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