Subscription Agency
Exploring and Distributing Knowledge Globally

Pharmaceutical Sciences
Volume 4 Issue 2, 2024
eISSN No.: 2582-8371

Assessment of Prescribing Pattern of Antihypertensive Therapy in Diabetic Patients Visiting in Government Hospital of Dolakha, Nepal

Stuti Shrestha*, Kedar Prasad Sah, Priyanka Bishwas, Ramesh Kumar Sah, Sapana Ghimire, Tripti Lamsal
Department of Pharmacy, Kantipur Academy of Health Sciences, Purwanchal University, Nepal

****Corresponding Author***
Email: stuvy.stu@gmail.com

ABSTRACT

Hypertension and Diabetes Mellitus are two major chronic disorders that frequently coexist progressively with age irrespective of gender. WHO has projected that about 300 million people will suffer from diabetes and 1.5 billion from Hypertension by 2025. Both Hypertension and type II diabetes are strongly interconnected and predispose an individual to atherosclerotic cardiovascular disease. Prescribing pattern assessment are powerful tools to promote rational use of drugs. As the patients require long life treatment, it has increased the burden of patients particularly in developing country like Nepal. In hospitals, there is genuine need for drug utilization study to determine appropriate, more safe and effective patterns of drug therapy among diabetic hypertensive patients.

***Methods**: A single centered retrospective cross-sectional study was conducted in Jiri Hospital, Dolakha from Feb 2022 to July 2022. A total of 148 prescriptions of the patient with hypertension and coexisting diabetes were analyzed.*

***Result**: The age group of the patients varied from 30-99 years with dominant age interval being32.4% of 50-59 years of age. Most of the patients were male comprising of 56.08% of the total population. 44.6% of the population represented Brahmin community.*

For the treatment of hypertension, both monotherapy and combination therapy were followed. In Monotherapy, amlodipine was most prescribed with the percentage of 66%, followed by Losartan (17%). For combination therapy, a two-drug combination of Amlodipine and Losartan was projected to the most commonly prescribed combination with a percentage of 59.18% followed by Losartan and Hydrochlorthiazide (26.5%).

***Conclusion:** The majority of the treated patients were prescribed on monotherapy (66.21%). Antihypertensives given were consistent with JNC VIII guidelines. However, there remains potential room for improvement in drug utilization and a critical need for better blood pressure control.*

***Keywords**: Antihypertensives, Diabetes, Hypertension, Prescribing pattern.*

INTRODUCTION

Hypertension (HTN) and Diabetes Mellitus (DM) are two major chronic disorders that frequently coexists progressively with age irrespective of gender.[1,2] Patients with HTN often exhibits insulin resistance and are at higher risk of developing diabetes.[2] WHO has projected that about 300 million people will suffer from DM and 1.5 billion from HTN by 2025. [3,4] Both HTN and T2DM are closely interlinked because of risk factors like vascular inflammation, arterial remodeling, dyslpidemia, atherosclerosis and obesity. The coexistence of each condition accelerates related complications and increases morbidity and mortality. [2,5]

Pharmaceutical Sciences
Volume 4 Issue 2, 2024
eISSN No.: 2582-8371

This study was conducted to observe the pattern of utilization of different group of antihypertensive drugs in patient with T2DM in Dolakha.

METHODS

This study was conducted in Jiri Hospital in OPD and endocrinology department of Jiri Hospital, Dolakha, Nepal. The prescription prescribed were collected, assessed and statistically analyzed. The drug treatment pattern of different antihypertensive agents with coexisting T2DM was evaluated. The participants declared their willingness on the details of study and treatment has been explained to the participants enrolled into study and they gave written informed consent. Categorical variables were presented as frequency and percentages. Continuous variables were presented as mean and standard deviation.

Inclusion Criteria

- Patients suffering from coexisting HTN and T2DM.
- Patients of either gender.
- Patients visiting OPD and endocrinology department.
- Above 18years of age.
- Receiving both antihypertensives and hypoglycemic during the study period.

Exclusion Criteria

- Below 18 years.
- Type-1 Diabetes (Insulin dependent diabetes)
- Hypertensive urgency and urgency.
- Recent attack of Myocardial infraction or stroke.
- Other comorbidies.

The intended work was divided into three steps:

- To collect prescriptions of hypertensive patients with DM.
- To separate prescriptions prescribing antihypertensive drugs.
- To statistically analyze the prescriptions on the following steps:
  a. Incidence HTN and DM according to gender and age groups.
  b. Assessment of patterns of utilization of antihypertensive drug classes and data was evaluated.

RESULTS

A total of 148 prescriptions were analyzed; belonging to 83 (56.08%) male and 65 (43.91%) female. The mean age of the patients included in the study was found to be 58.34±11.82 (Table 1 and Table 2). Monotherapy was predominantly used than combination therapy. Monotherapy was prescribed to 105 patients and combination therapy to 44 patients.

Table 1: Gender wise Distribution of Patients

Gender	Frequency (n)	Percentage (%)
Male	83	56.08
Female	65	43.91

Pharmaceutical Sciences
Volume 4 Issue 2, 2024
eISSN No.: 2582-8371

Table 2: Age wise Distribution of Patients

Age Category	Frequency (n)	Percentage (%)
30-39	7	4.7
40-49	28	18.9
50-59	48	32.4
60-69	30	20.3
70-79	25	16.9
80-89	9	6.1
90-99	1	0.7

During the overall study, use of five classes of antihypertensives were observed. Amlodipine was observed to be the most prescribed monotherapy drug (61.9%) followed by Losartan (18.09%) (Table 3). The use of ACE inhibitors among HTN with diabetes was very few (7.61%). ARBs were found to be used predominantly than ACE inhibitors. β blockers like Metoprolol, Propranolol was also not frequently prescribed. Prescribing pattern according to gender was found to be almost uniform. (Table 4)

Table 3: Individual antihypertensive drugs prescribed in monotherapy

Drugs	No. of Prescription (n)	Percentage (%)
Amlodipine	65	61.9
Losartan	19	18.09
Enalapril	8	7.61
Telmisartan	4	3.80
Metoprolol	5	4.76
Propanolol	2	1.9
Hydrochlorthiazide	2	1.9

Table 4: Gender wise prescription of class of antihypertensive drugs in monotherapy.

Class of drugs	Male (n)	Percentage (%)	Female (n)	Percentage (%)
CCB	34	61.81	31	62
ARB	12	21.81	11	22
ACEI	4	7.27	4	8
β-blockers	4	7.27	3	6
Diuretics	1	1.81	1	2
Total	55		50	

In Combination therapy, the most frequently prescribed combination was Amlodipine and Losartan which were prescribed to 26 patients (59.09%); followed by Losartan and Hydrochlorthiazide which were prescribed to 12 patients (27.27%). (Table 5)

Table 5: Combination Therapy of Antihypertensive Agents

Combination of two Antihypertensive Agents	No. of Prescription (n)	Percentage (%)
Amlodipine + Losartan	26	59.09
Losartan + Hydrochlorthiazide	12	27.27
Furesemide + Amiloride	2	4.54

Amlodipine + Atenolol	2	4.54
Telmisartan + Hydrochlorthiazide	1	2.27
Tamsulosin + Tolterodine	1	2.27

DISCUSSION

We studied patterns of antihypertensive use in patients with HTN and diabetes; without recent attack on MI, stroke or other comorbidities. Majority of the patients were in the age group above 50 years of age. HTN tends to be more prevalent with increase in age and elderly was more susceptible to be affected from it. [6]

We observed that the chances of getting HTN and diabetes together were more prevalent in male than in females; which coincides with study conducted by Dahal et al and Panda et al. [6,7] All antihypertensives were prescribed via oral route, which is a rational approach since pharmacokinetics and clinical trials indicates that oral forms of drugs are therapeutically effective as well as cost effective and safer in conscious patients. [8]

Our study showed the predominant use of monotherapy than fixed drugs combination of two antuhypertensives. Monotherapy was prescribed to 105 patient and combination therapy to 44 patients. This result was similar to study done by E. Vanathi et al and Hussain Z et al. [9,10] Most commonly prescribed antihypertensives agent as monotherapy was Amlodipine which was prescribed to 65 patient which accounts to 61.9% of the total patients followed by Losartan prescribed to 19 patients. CCBs can effectively reduce peripheral blood pressure without affecting glomerular filtration rate and renal perfusion [9]

This result correlated with the results published by S. Alavudeen et al, Dahal. P et al [11,7] where CCB was majorly used as monotherapy but contradicts with the study from others where ACE inhibitors or ARBs are most commonly used monotherapy antihypertensive drugs.[9,10] Our study showed that the highest prescribed combination of antihypertensive was Amlodipine and Losartan. Use of ARBs and CCB combination was frequenty prescribes in the study done by S. Kim et al., Mohan P et al and Mishra R et al. [12,13,14.]

Reduced use of ACE inhibitors may presumably be due to the deposition of bradykinin in lungs causing dry cough especially in Asian population. [15] It may also be due to the availability of alternative; ARBs which was less incidence of adverse effects. [16] A study conducted by Lim et al reported the increased use of ARBs and reduced use in diuretics in Korea.[17] Patients with both HTN and diabetes are at high risk of having cardiovascular morbidity. [18]. The preference of amlodipine in diabetes may seem to be related to positive pharmacokinetic findings which translates into convenient dosing in renal insufficiency. [19]
JNC VIII guidelines suggest thiazide diuretics as an first line agent for the management of blood pressure. However, frequent use of CCB in this study may be due to the fact that CCB is more effective and an antihypertensive agent than diuretics when used as monotherapy. [20]
The adherence to the JNC 8 guidelines was good except in case of diuretics.

CONCLUSION

The majority of the treated patients were prescribed on monotherapy (66.21%). Antihypertensives given were consistent with JNC VIII guidelines. However, there remains

potential room for improvement in drug utilization and a critical need for better blood pressure control

Limitations: Conducted in only one government hospital; and the data may be less diversified. We may need large scale sample size.

Acknowledgements: We would like to acknowledge Kantipur Academy of Health Sciences-Institutional Review Committee for the approval of the study and Golden Hospital, Biratnagar for assisting in data collection.

Conflict of Interest: None declared.

Ethical Approval: This study was approved by Kantipur Academy of Health Sciences-Institutional Review Committee.

ABBREVIATIONS

ACE: Angiotensin Converting Enzyme
ARBs: Angiotensin II Receptor Blockers
CCBs: Calcium Channel Blockers.
DM: Diabetes Mellitus
HTN: Hypertension
JNC: Joint National Committee
OPD: Out Patient Department
T2DM: Type 2 Diabetes Mellitus
WHO: World Health Organization

REFERENCES

1) El-Hazmi MA, Warsy AS. Association of hypertension and non-insulin-dependent diabetes mellitusin the Saudi population. Ann Saudi Med. 2001; 21(1-2):5-8
2) Petrie JR, Guzik TJ, Touyz RM. Diabetes, Hypertension and Cardiovasculr Disease: Clinical Insights and vascular mechanisms. Can J Cardiol. 2018 May; 34(5): 575–584. doi: 10.1016/j.cjca.2017.12.005
3) Wild S, Roglic G, Green A, Sicree R, King H. Global Prevalence of Diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care*. 2004;27(5):1047–1053.
4) Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK. Global burden of hypertension: analysis of worldwide data. *The Lancet*. 2005;365(9455):217–223.
5) Abdelbagi O, Musa IR, Musa SM. *et al.* Prevalence and associated factors of hypertension among adults with diabetes mellitus in northern Sudan: a cross-sectional study. *BMC Cardiovasc Disord* 21, 168 (2021)
6) Panda BB, Pati MR, Pratapsahu K. A study on survey of prescription pattern of antihypertensive drugs in hypertensive and diabetic hypertensive patients. Asian journal of Pharmaceutical and clinical Research 2015; 8(1): 250-52
7) Dahal P, Maharjan L, Dahal B, Gupta K. Assessment of Prescription Patterns in Hypertensive and Diabetic Patients visiting Private Tertiary Care Hospital of Dharan Municipality, Nepal. STCJ 2015;2(1):44-4
8) Okonta JM, Nduka SO,. Idodo VE. Prescribing pattern of antihypertensive and anti-diabetic agents in a secondary healthcare institution in Nigeria. Journal of pharmaceutical sciences and research. 2013, 5(1)12 – 17.

9) Elenchezhiyan V, Moorthy S, Sagar MK, Bheemesh Naidu MB, Sayana S. Study of prescribing pattern of antihypertensive drugs in diabetic patients in a tertiary care centre, Vizianagaram. Int J Basic Clin Pharmacol 2019;8:1192-5.
10) Hussain Z, Sana A, Mohammed SA, Razzaq MA. Patterns of drug therapy among diabetic hypertensive patients with other complications. Int J Pharm Pharm Sci. 2014;6(6):270-7.
11) Alavudeen SS, Alakhali KM, Mohammad S, Ansari A, Khan NA. Prescribing pattern of antihypertensive drugs in diabetic patients of Southern Province, Kingdom of Saudi Arabia.
Ars Pharm. 2015; 56(2): 109-114
12) Kim SH, Shin DK, Kim S,Han K, Park SH, Kim YH, et al. Prescribing Patterns of Antihypertensives for Treatment-Naïve Patients in South Korea: From Korean NHISS Claim Data, *International Journal of Hypertension*, vol. 2019, Article ID 4735876, 10 pages, 2019. https://doi.org/10.1155/2019/4735876
13) Sang Hyuck Kim, Dong Wook Shin, Shinhye Kim, Kyungdo Han, Sang-hyun Park, Yul-Hee Kim, Shin-Ae Jeon, Yong-Chol Kwon, "Prescribing Patterns of Antihypertensives for Treatment-Naïve Patients in South Korea: From Korean NHISS Claim Data", *International Journal of Hypertension*, vol. 2019, Article ID 4735876, 10 pages, 2019. https://doi.org/10.1155/2019/4735876
14) Mishra R, Kesarwani P, Keshari SS. Prescription
pattern of antihypertensive drugs in a tertiary care teaching hospital. Int J Med Sci Public Health. 2017
;6(4):684-86
15) Mohan P, Bhandare B. Pattern of Antihypertensive therapy among Diabetic hypertensives. World J Pharm Res. 2015;4(8):2403-10.
16) S. E. McDowell, J. J. Coleman, and R. E. Ferner, "Systematic review and meta-analysis of ethnic differences in risks of adverse reactions to drugs used in cardiovascular medicine," *BMJ*, vol. 332, no. 7551, pp. 1177–1181, 2006
17) B. Lim, E. Kang, S.-h. Yoo, and S. Sunwoo, "Utilization pattern of anti-hypertensive medications according to comorbidities in a hospital-based family medicine practice," *Korean Journal of Family Practice*, vol. 7, no. 4, pp. 563–568, 2017.
18) Pooja M., Sumeet, D., Chandan, R., Sachin S, Akshat, D. Prescribing pattern and surveillance of anti-diabetic drugs in village and city hospital of Indore district. . Drug Invention Today 2010; 2(9): 415-416.
19) Dutta S , Udupa A L. Antihypertensive drug use in patients having comorbid diabetes: cross
sectional prescription pattern study in a tertiary care hospital. Asian journal of pharmaceutical and clinical research 2010 ;3(4): 43-45
20) 2014 Evidence based guidelines for the Management of high blood pressure, report from the panel members appointed to the eighth joint national committee (JNC 8), JAMA 2013. doi:10.1001/jama.2013.284427