

Research Article

Prescription pattern of anti-hypertensive drugs in Chitwan Medical College Hospital

Gita Paudel¹, Sirisa Karki², Karma Murti Bhurtyal³, Lokeshwar Chaurasia⁴

Department of Pharmacology
Chitwan Medical College
Chitwan, Nepal

^{1,2,3}Assistant Professor, Department of Pharmacology, Chitwan Medical College Tribhuvan University, Chitwan, Nepal

⁴Assistant Professor, Department of Pharmacology, Janaki Medical College, Tribhuvan University, Janakpur, Nepal

ABSTRACT

Background and Objectives: Hypertension is a crucial health issue globally. Cardiovascular and kidney disease is one of the results of hypertension which remarkably confer to overall mortality. Thus, the aim of this study is to investigate the prescribing pattern of anti-hypertensive drugs to hypertensive patients and also to establish the current trend of prescribing pattern of anti-hypertensive drugs at Chitwan Medical College (CMC).

Material and Methods: A descriptive cross-sectional study was conducted among 290 patients to assess the prescribing pattern of anti-hypertensive drugs from hypertensive patients visiting medicine OPD of CMC during study period and fulfilling the inclusion criteria. A standard proforma was used to collect information about patient's socio-demographic details and anti-hypertensive drugs used for them. Data was collected, compiled and analyzed by using Statistical Package of Social Science (SPSS) version 16.

Results: Out of 290 prescriptions, 201 (69.3%) patients received monotherapy while only 89 (30.7%) patients received combination therapy. In monotherapy, calcium channel blockers (CCBs) and Angiotensin receptor blockers (ARBs) were most commonly prescribed, while angiotensin receptor blockers (ARBs) + diuretics were the most commonly prescribed combination therapy.

Conclusion: In the present study, it was found that CCBs and ARBs were the most commonly prescribed anti-hypertensive drug in monotherapy.

Keywords: Anti-hypertensive drugs, Hypertension, Prescription, Pattern.

INTRODUCTION

Hypertension is a crucial health issue globally [1]. Cardiovascular and kidney disease is one of the result of hypertension which remarkably confer to overall mortality [2]. However, probability of stroke, coronary heart disease, and congestive cardiac failure and as a whole mortality can be turned down by appropriate and efficient therapy of hypertension [3]. These deleterious

consequences can be minimized by maintaining blood pressure efficaciously as proposed by many research-based findings [4]. A multi-centered study done in India discovered that overall prevalence of hypertension among elderly people was 65% [5]. Numerous amounts of national and international guidelines are available for the treatment of hypertension. Diuretics are considered as first line treatment according to the

JNC 7 guidelines. Nevertheless different groups of anti-hypertensive drugs are available and can be prescribed according to patient's condition. Yet, in case of severe hypertension combination therapy has been suggested. Different groups of drugs are combined for successful long term management of hypertension [6]. In spite of that, many clinicians practice their own prescribing pattern in treating hypertensive patients according to their clinical experience. Thus, the aim of this study was to investigate the prescribing pattern of anti-hypertensive drugs and also to establish the current trend of prescribing pattern of anti-hypertensive drugs at CMC. Only a few studies on this topic have been done in Nepal. This designates the importance of this study as it helps to collect data from an under-researched area of developing countries. Therefore, this research may have direct implications for the change in the current prescribing pattern of anti-hypertensive drugs; subsequently it will be beneficial for further research.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted to assess the prescribing pattern of anti-hypertensive drugs at CMC, from 15th October 2020 to 15th March 2021. Convenience sampling method was utilized to collect data from hypertensive patients visiting medicine OPD of CMC during study period and fulfilling the inclusion criteria. All hypertensive patients irrespective of age and sex visiting the medicine OPD during the study period and treated with at least one anti-hypertensive agents were included in the study. Patients not treated with anti-hypertensive agents, mentally retarded, pregnant lady and having other co-morbid conditions were excluded from the study. Formal consent was taken from all the participants. The sample size was derived using the Kish Leslie equation used in two of the similar type of study [7-8] for descriptive studies, as follows:

$$N = Z^2 pq / d^2$$

with 5% error,

sample size is calculated to be 288

($Z = 1.96$, $p = 0.25$, $d = 0.05$) [7-8].

Altogether 290 participants were included in the study. A proforma was used to collect information about patient's sociodemographic details and anti-hypertensive drugs used for them.

Prior to data collection, the study was approved by Institutional Review Committee of Chitwan Medical College (Ref No. CMC-IRC/077/078-046). Data was collected, compiled and analyzed by using Statistical Package of Social Science (SPSS) version 16. The data was analyzed using descriptive statistics.

RESULTS

In the entire course of study period, a total of 290 prescriptions for hypertensive patients were collected. Socio-demographic characteristics of these patients are presented in Table 1.

Among the participants of the study 165 (56.9%) were male and 125 (43.1%) were females indicating that hypertension is slightly more prevalent in the male gender. Their mean age was 60.5 ± 12.8 years. Majority of the patients were above 60 years (52.1%) and least between 21 - 40 years (7.2%). 36.3% of the females were housewives followed by involved in some services 31.4%.

Within various ethnic groups, greatest number of the patients were Brahmin 137 (27.2%) followed by Chettri 67 (23.1%) and the least belonged to other ethnic groups. The prevalence of hypertension was found out to be higher amongst illiterate (59.3%) over literate (40.7%) patients.

Table 1: Socio-demographic characteristics of study population

Variables	Frequency (%)
Age group	
21-40	21(7.2%)
41-60	118(40.7%)
Above 60	151(52.1%)
Sex	
Male	165(56.9%)
Female	125(43.1%)
Occupation	
Agriculture/Housewife	105(36.3%)
Business	53(18.3%)
Service	91(31.4%)
Others	26(9%)
Ethnicity	
Brahmin	137(27.2%)
Chettri	67(23.1%)
Newar	31(10.7%)
Mongolian	29(10%)
Others	26(9%)
Education status	
Illiterate	172(59.3%)
Literate	118(40.7%)

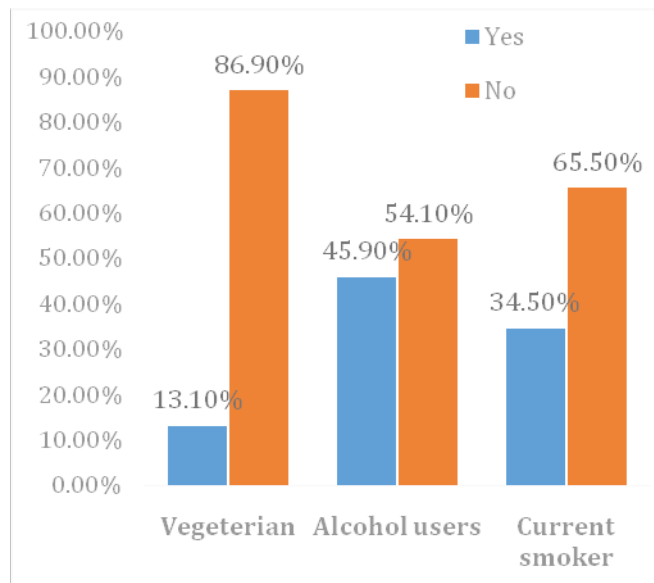


Figure 1: Dietary, Alcohol using, smoking current status (n=290)

Treatment strategy: Out of 290 participants, 201 (69.3%) were treated with monotherapy, while

89 (30.7%) were on combination therapy of anti-hypertensive drugs (Table 2).

Table 2: Types of treatment strategy of study population (n=290)

Types of anti-hypertensive treatment	Frequency (%)
Monotherapy	201 (69.3%)
Combination therapy	89 (30.7%)

Monotherapy prescription pattern: In the present study, the most commonly prescribed monotherapy was CCB (30.4%) and ARBs (30.4%), followed by Diuretics (21.8%) and BB (13.5%). ACEI and alpha blockers were the least prescribed drugs (Table 3).

Table 3: Monotherapy prescription pattern of study population (n=201)

Pattern of monotherapy	Frequency (%)
Diuretics (DIU)	44 (21.8%)
B-Blockers (BB)	27 (13.5%)
Calcium channel blockers (CCB)	61 (30.4%)
ACEI	8 (3.9%)
ARBs	61 (30.4%)
Alpha blockers	None

Combination drug therapy prescription pattern: Out of total participants (n=290), 89 were found to be on combination therapy. Among them 64 were on dual drug therapy and 25 on triple drug therapy. Out of 64 patients treated with dual drug therapy, ARB+ DIU was the most frequently prescribed (24.7%), followed by CCB+ARB (19.1%) and CCB+BB (11.3%). Among triple drug therapy, CCB+DIU+BB was the most commonly prescribed (11.3%), followed by DIU+CCB+ARB (8.9%) and DIU+BB+ARB (7.8%) as shown in Table 4.

Table 4: Prescription pattern of combined anti-hypertensive drugs (n = 89)

Combination therapy	Frequency (%)
CCB+BB	10 (11.3%)
CCB+ARB	17 (19.1%)
CCB+DIU	2 (2.3%)
CCB+ACEI	2 (2.3%)
ARB+DIU	22 (24.7%)
BB+ARB	8 (8.9%)
BB+DIU	3 (3.4%)
CCB+DIU+BB	10 (11.3%)
DIU+BB+ARB	7 (7.8%)
DIU+CCB+ARB	8 (8.9%)

DISCUSSION

The result of our study indicate that hypertension is slightly more prevalent in male (56.9%) than female gender (43.1%), though hypertension can happen to anyone regardless of gender. Similar result has been reported in an Indian study done by Jhaj R et al. [9] on hypertensive patients where prevalence of men (54%) was more than female (49%). On the contrary, a study conducted in Hong Kong by Lee PK et al. [10], showed that the prevalence of hypertension was more in females (57%) than in males (43%).

In the present study, majority of the hypertensive patients were above 60 years of age. This finding is comparable to the previous study done in India where it was found that, hypertension was more prevalent in the age group 60-64 years [11]. This result gives an indication that advanced age is risk factor for development of hypertension in Nepal. The prevalence of hypertension was seen high among illiterate as compared to literate. This may be due to lack of education among elderly people as the prevalence of hypertension is seen high in elderly in current study.

According to the result of our study, maximum number of the patients belonged to Brahmin and Chettri and similar result has been reported in a study done by Khan et al. [12]. This can be due to the fact that maximum population in Nepal belongs to Brahmin and Chettri ethnic group.

Majority of the patients were housewives as suggested by our study. The reason behind could be housewives stay at home, leading to decreased physical exercise which could be one of the factor to increased incidence of hypertension in females.

Non-vegetarian food contain high amount of fat, so maybe that was one of the factor that contributed to hypertension. Majority of the patients were found to be non-vegetarian which was supported by a similar study done by Gul et al. [13].

In the current study, it was ascertained that single drug therapy (69.3%) was more commonly prescribed than combination drug therapy which was in conference with the study done by Kuchake et al. [14] and Mishra et al. [5]. But the result was in contrast to the studies, where combination drug therapy were used as first line treatment for hypertension [16-18]. The high prescription rate of single drug therapy in our study may be because we have excluded the prescriptions of patients having other co-morbid conditions where combination drug therapy is mostly needed.

In the present study, it was revealed that CCBs (30.4%) and ARBs (30.4%) followed by diuretics (21.8%) were the most frequently prescribed anti-hypertensive drugs as single drug therapy. Identical results has been observed in the studies, where CCBs, ARBs and diuretics were frequently prescribed [15, 19]. CCBs and ARBs were most frequently prescribed this may be because CCBs have better tolerance, low cost and single daily dosing [20]. Likewise, ARBs show additional cardiovascular and reno-protective effects [21]. Furthermore, the study done by Sindhu et al. [22] also reported similar result.

Two previous studies conducted by Pittrow D et al. [23] and Johnson ML et al. [24], stated that ACE inhibitors were commonly prescribed drugs

which was in contrast to our study where ACE inhibitors were less frequently used. In the same studies, it was also mentioned that alpha blockers were least prescribed which was similar with our study.

The findings of this study suggests that among dual drug therapy, ARB+DIU followed by CCB+BB were most regularly prescribed. This corresponds with the other studies done by Johnson et al. [24] and Lamsal et al.[19].

Among triple drug therapy, CCB+ARB+DIU and CCB+BB+DIU were more familiar which is similar to the study done by Lamsal et al. [19] and NICE guidelines [25].

CONCLUSION

The present study concluded that single drug therapy was more commonly prescribed than combination drug therapy. This suggests that the prescribing pattern of anti-hypertensive drugs in CMC supports rational prescribing pattern. Prescribing pattern of drugs keep on changing with time and moreover new drugs are discovered very frequently. So, there is always requirement of further studies to enhance the prescribing pattern of anti-hypertensive drugs.

ACKNOWLEDGEMENT

The authors would like to thank all the physicians and patients of CMC who have supported on being part of the study.

Author contribution:

Gita Paudel contributes to the design of the study, analysis and write up of the manuscript.

Sirisa Karki, Karma Murti Bhurtyal and Lokeshwar Chaurasia contributed to the design, drafting and edition of the manuscripts.

All authors contributed to data analysis, drafting or revising the article, gave final approval of the

version to be published, and agree to be accountable for all aspects of the work.

Conflict of interest: None

Source of Support: None

REFERENCES

1. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. The Seventh Report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure: The JNC 7 report. *JAMA*. 2003; 289(19): 2560-72.
2. Johnston A, Stafylas P and Sterfiou GS. (2010): Effectiveness, Safety and Cost of drug substitution in hypertension; *BJCP*. 2010; 70(1): 320-34.
3. Psaty BM, Lumley T, Furberg CD, Schellenbaum G, Pahor M, Alderman MH et al. Health outcomes associated with various anti-hypertensive therapies used as first-line agents: a network metanalysis. *JAMA*. 2003; 289: 2534-44.
4. Neal B, MacMahon S, Chapman N. Blood Pressure Lowering Treatment Trialists' Collaboration. Effects of ACE inhibitors, calcium antagonists and other blood-pressure-lowering drugs: Results of prospectively designed overviews of randomised trials. *Lancet*. 2000; 356(9246): 1955-64.
5. Hypertension Study G. Prevalence, awareness, treatment and control of hypertension among the elderly in Bangladesh and India: a multicentre study. *Bull World Health Organisation*. 2001; 79:490-500.
6. Williams B, Poulter NR, Brown MJ, Davis M, McInnes GT, Potter JF, et al. British Hypertension Society guidelines for hypertension management 2004 (BHS-IV): summary. *BMJ*. 2004; 328: 634-40.
7. Kish Leslie. *Survey Sampling*. New York:John Wiley and Sons, Inc 1965.
8. Neupane D, McLachlan CS, Sharma R, Gyawali B, Khanal V, Mishra SR, et al. Prevalence of hypertension in member countries of south Asian Association for Regional Cooperation (SAARC): systematic review and meta-analysis. *Medicine (Baltimore)*. 2014; 93: e74.
9. Jhaj R, Goel NK, Gautam CS, Hota D, Sangeeta B, Sood A, et al. Prescribing patterns and cost of anti-hypertensive drugs in an internal medicine clinic. *Indian Heart J*. 2001; 53: 323-7.
10. Lee PK, Li RK, Chan JC, Chang S, Lee SC, Tomlinson B, et al. A prescription survey in a hospital hypertension outpatient clinic. *Br J Clin Pharmacol*. 1997; 44: 577-82.
11. Dalal PM. Hypertension: A report on community survey on casual hypertension in old Bombay, Sir. H N Hospital Research Society. 1980.

12. Khan GM, Thapa RK, Khakurel A, Shrestha G, Katila N, Bhurtel S, et al. Patient demographics and drug prescription pattern among hypertensive patients of pokhara valley. *Journal of Chitwan Medical College*. 2013; 3(4): 32-35.
13. Gul A, Ara T, Misger FA. Effect of diet on incidence of hypertension among vegetarian and nonvegetarian women, *Research Journal of Agricultural Sciences*. 2010; 1: 345-48.
14. Kuchake VG, Maheshwari OD, Surana SJ, Patil PH, Dighore PN. Prescription pattern of anti-hypertensive drugs in uncomplicated hypertensive patients at teaching hospital. *Indian J Pharm Pract*. 2009; 2(2): 74-80.
15. Mishra R, Kesarwani P, Keshari SS. Prescription pattern of anti-hypertensive drugs in a tertiary care teaching hospital. *Int J Med Sci Public Health*. 2017; 6.
16. Yusuff KB, Balogun OB. Physicians' prescribing of anti-hypertensive combinations in a tertiary care setting in southwestern Nigeria. *J Pharm Pharm Sci*. 2005; 8: 235-42.
17. Neutel JM. The role of combination therapy in the management of hypertension. *Oxford Journals. Nephrol Dial Transplant*. 2006; 21: 1469-73.
18. Gavras I, Rosenthal T. Combination therapy as first-line treatment for hypertension. *Curr Hypertens Rep*. 2004; 6: 267-72.
19. Lamsal KS, Neupane KR, Kafle RS. Prescription Patterns of anti-hypertensive Drugs at Tertiary Care Hospital: A Descriptive Cross Sectional Study, *JoNMC*. 2020; 9(1): 22-26.
20. Neal B, MacMahon S, Chapman N. Effects of ACE inhibitors, calcium antagonists and other blood-pressure lowering drugs: Results of prospectively designed overviews of randomized trials. *Blood pressure lowering treatment trialists' collaboration. Lancet*. 2000; 9246: 1955-64.
21. Kim-Mitsuyama S, Soejima H, Yasuda O, et al. Cardiovascular and renal protective role of angiotensin blockade in hypertension with advanced CKD: a subgroup analysis of ATTEMPT-CVD randomized trial. *Sci Rep*. 2018; 8(1): 3150.
22. Essam Al-Drabah, Yacoublrshaid, Nada Yasein, SuheilZmeili. Prescription pattern of anti-hypertensive drugs in Family Practice Clinics at Jordan University Hospital, *Medicine Science*. 2013; 2(1): 469-88.
23. Pittrow D, Kirch W, Bramlage P, Lehnert H, Hofler M, Unger T, et al. Patterns of anti-hypertensive drug utilization in primary care. *Eur J Clin Pharmacol*. 2004; 60: 135-42.
24. Johnson ML, Singh H. Patterns of anti-hypertensive therapy among patients with diabetes. *J Gen Intern Med*. 2005; 20:842- 46.
25. Rebecca J Boffa, Margaret Constanti, Christopher N Floyd, Anthony S Wierzbicki. Hypertension in adults: summary of updated NICE guidance, *BMJ*. 2019; 367(8220): I5310.

Corresponding Author:

Dr. Gita Paudel

Department of Pharmacology

Chitwan Medical College, Chitwan, Nepal

Email address: medrgita@gmail.com