



International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR | Volume 4 | Issue 4 | Oct - Dec - 2016
www.ijamscr.com

Research article

Medical research

Study on appropriate and rational drug use in hypertensive patients with other comorbid diseases

Shivashankar Velu, Alfatih Khalil, Pheba Susan Thomas

Department of Pharmacy Practice, College of Pharmacy, Sri Ramakrishna Institute of Paramedical Sciences, Sri Ramakrishna Hospital Campus, Coimbatore, Pin – 641044, Tamil Nadu, India

*Corresponding Author: Shivashankar Velu

Email id: v.shivshan@gmail.com

ABSTRACT

Hypertension is one of the major chronic diseases resulting in high mortality and morbidity worldwide. It is a leading risk factor for coronary heart disease, stroke and chronic renal disease. There are many classes of antihypertensive available. Rational prescribing is essential as hypertension is highly prevalent and therapy is chronic. Health care professionals need to utilise limited resources wisely in order to provide effective, safe and affordable antihypertensive therapy. The objective of the study is to determine the appropriateness and rationality of antihypertensive drugs in the selected study population as per our inclusion criteria. The data were collected from regular ward rounds and they were analysed. The appropriateness was analysed using the JNC-7 guidelines. A total of 97 patients were included in our study, their prescriptions were analyzed. The age categorization reveals that majority of patients were above 40 years. The analysis of risk factors associated with hypertension shows that 33 (34.02%) patients were smokers, 30 (34.39%) patients were alcoholics and 36 (37.11%) patients were found to be with BMI >30. The total numbers of antihypertensive drugs prescribed in the study population was found to be 156. It was found that β -blockers were the most commonly prescribed in 41 (26.28%) patients, followed by CCBI (Dihydropyridines) in 33 (21.15%) patients. The total numbers of inappropriately prescribed drugs were found to be 29 (18.59%) and they were found to be prescribed in contraindicated co-morbid conditions. Among the inappropriately prescribed drugs 11 (37.93%) drugs of ACE inhibitors were found to be contraindicated in renal failure patients, 9 (31.03%) diuretics were contraindicated in dyslipidaemic patients, 6 (20.69%) beta blockers were contraindicated in asthmatics and 3 (10.34%) ARB's were contraindicated in patients with renal failure & hyperkalemia. The rationality of prescribed drugs was analyzed; the results reveals that 138 (88.46%) drugs prescribed were found to be rational and 18 drugs (11.54%) prescribed were irrational. The irrational prescription drugs were analyzed and it was found that 8 (44.44%) prescriptions contain drugs from same class, 6 (33.33%) with increased frequency of dose and 4 (22.22%) prescription with over dose. The results reveal continuous monitoring of the prescribing of antihypertensive agents by the clinical pharmacist is necessary to resolve the issues of inappropriateness and enhancement of rational prescribing. The clinical pharmacist has the greater responsibility in monitoring of hypertensive patients with other co-morbid conditions.

Keywords: Hypertension, Rationality, Appropriateness, Comorbid diseases, JNC-7 guidelines

INTRODUCTION

Hypertension is the most common chronic medical condition and leading contributor to the global burden of diseases. Hypertension is also commonly associated with diabetes and chronic renal failure. It is estimated that worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025[1]. In India, hypertension in the general population is largely undetected and the available data on the topic is merely the tip on an iceberg. Pooling of epidemiological studies shows that hypertension is present in 25% urban and 10% rural subjects in India [2]. The estimated total number of people with hypertension in India during 2000 was 60.4 million males and 57.8 million females and projected to increase to 107.3 million and 106.2 million respectively in 2025[3].

To treat hypertension associated with these comorbid conditions various guidelines are available. They are aimed to provide indications for clinical practice based on rigorous scientific evidence. Physicians are not completely adhering to standard guidelines while treating hypertension with co-morbid conditions [4]. It is evident that prescribing guidelines should be followed for better health outcome and improvement in quality of life of patients suffering from hypertension with co-morbidities. Rational prescribing practices reduce morbidity and decrease the economic burden in their cost of illness. The clinical pharmacist can be effectively employed for rational use of medication in hypertensive population on routine basis in the present. The objective of the study is to determine the appropriateness and rationality of anti-hypertensive drugs in the hypertensive patients with other co-morbid diseases.

MATERIALS AND METHODS

A prospective – observational study on appropriate & rational drug use in hypertensive patients with other co morbid diseases was carried out in a 750 bedded multi-specialty hospital located at South India. The study was carried out after obtaining the consent from the hospital authorities and the authors were allowed to utilize the hospital facilities to make a follow up of the cases.

Inclusion Criteria

- Patients above 18 years old.
- Patients taking anti-hypertensive medication.
- Patients having the following co – morbidities along with hypertension: diabetes mellitus, asthma, cardiovascular disease, thyroid disease, kidney disease, dyslipidaemia and liver disease.
- Patients who has given consent.

Exclusion Criteria

- Patients who are not willing to participate in the study
- Patients with insufficient data in their records.

Regular ward rounds were carried out in all the wards of General medicine. Each patient's medication profile was reviewed. Patients who met the inclusion criteria were briefed on the project with the help of patient information form and if they were willing to participate in the study their consent were obtained. The data from medical chart were recorded in customized data entry form. The data was analysed to describe appropriateness & rational drug use of antihypertensive drugs in the study population. The JNC-7 guideline was utilized to assess the appropriateness and rationality of the prescription.

RESULTS AND DISCUSSION

A total of 253 patients were admitted in the study site during the study period, among them 97 (38.34%) patients were found to be suffering from hypertension along with other co-morbid diseases and were included in the study as per inclusion criteria. The gender categorization of the study group reveals that 61 (62.89%) were males and 36 (37.11%) were females. The study result reveals that prevalence rate of hypertension in female population was lower than that of male populations. A similar study conducted by Samiksha et al 2016^[5] reported that prevalence of hypertension is more among males than females.

The study group was categorized into various age groups [**Table No: 1**]. It was found that majority of patients (30.93%) were in the age group of 60-69 years followed by (29.91%) 50-59 years. A study conducted by Prabakaran J et al 2013^[6] reported prevalence rates of hypertension among the people above 40 years of age has increased. Our

study also reveals that majority of patients were 40 years and above. The analysis of risk factors associated with hypertension shows that 33 (34.02%) patients were smokers, 30 (34.39%) patients were alcoholics and 36 (37.11%) patients were found to be with BMI >30.

The systolic blood pressure of patients recorded were analysed, 30 (30.93%) patients were having systolic blood pressure >140mm/Hg followed by 26 (26.80%) patients had systolic blood pressure of 130-140 mm/Hg, 24 (24.74%) patients were having 120-130 and 17 (17.52%) patients had <120 mm/Hg [Table No: 2]. The results reveals still significant number of patients have not achieved systolic blood pressure under control.

The co-morbid conditions of the hypertensive patients were analysed. The results reveal that the 55 (33.95%) of the study population was suffering from DM followed by 21 (12.96%) with renal disease, 16 (9.88%) with Ischemic heart disease, 10 (6.17%) with Congestive heart failure and 8 (4.94%) with Hyperlipidemia. A similar study conducted by Monika et al 2010 [7] also reported that most common co-morbid condition among hypertensive population was diabetes. This report correlates with our study result.

The total number of antihypertensive agents utilized varies according to condition and co-morbid diseases of the individual patient. The number of antihypertensive agents prescribed per patient was analyzed, the result reveals that monotherapy was more widely prescribed in 50 (51.55%) patients, followed by 27 (21.83%) were prescribed with dual drug therapy and 20 (20.62%) were prescribed with triple drug therapy. A study done by Etuk E et al 2008 [8] reported that 80% in their study group were on monotherapy [Table No: 3]. Prescribing single drug will significantly reduce the risk associated with multiple drug use and decrease the cost of therapy.

The total numbers of antihypertensive drugs prescribed for the study population were found to be 156. Various classes of antihypertensive agents prescribed were categorized, it was found that β -blockers were the most commonly prescribed in 41 (26.28%) patients, followed by CCB I (Dihydropyridines) in 33 (21.15%) patients, diuretics in 26 (16.67%) patients, ARB in 26 (16.67%) patients, ACE inhibitors in 23 (14.74%) patients, α blockers in 4 (2.56%) patients and CCB II (Benzothiazepines) in 3 (1.92%) patients [Table No:

4]. Similar study done by Etuk E et al 2008 [8] reported beta blockers were most frequently used class of antihypertensive drugs followed by CCBs in their study population.

Antihypertensive drugs prescribed were analyzed, the results reveals that the most commonly prescribed drugs were amlodipine and ramipril in 23 (14.74%) patients followed by telmisartan in 21 (13.46%), metoprolol in 21 (13.46%), spironolactone in 16 (10.26%), nebivolol in 11 (7.05%), cilnidipine in 10 (6.41%), hydrochlorothiazide in 10 (6.41%), atenolol in 5 (3.21%), prazosin in 4 (2.56%), losartan in 4 (2.56%), diltiazem in 3 (1.92%), carvediol in 2 (1.28%) and irbesartan in 1 (0.64%) [Table No: 5]. A similar study done by Krishna M et al 2015^[9] reported that amlodipine was the most commonly prescribed antihypertensive drug.

Hypertensive patients with other co-morbid conditions are more prone to adverse events due to multiple drug therapy. Thus appropriate prescription of antihypertensive drugs is essential in patients with other major co-morbid disease conditions. The total number of 156 antihypertensive drugs prescribed in the study population was analyzed for its appropriateness, in which 127 (81.41%) drugs prescribed were found to be appropriate and 29 (18.59%) drugs prescribed were found to be inappropriate. Our study results correlates with the study conducted by Shirley J et al 2013^[10] which reported that 79.56% antihypertensive drugs prescribed were found to be appropriate. The higher degree of appropriate use of antihypertensive agents in our study site ensures the patient safety. The inappropriate prescriptions were analyzed further to find the reason and management of inappropriateness. The results reveals contraindicated co-morbid conditions was the reason for inappropriateness and it was found that 11 (37.93%) drugs of ACE inhibitors were found to be contraindicated in renal failure patients, 9 (31.03%) diuretics were contraindicated in dyslipidaemic patients, 6 (20.69%) beta blockers were contraindicated in asthmatics and 3 (10.34%) ARB's were contraindicated in patients with renal failure & hyperkalemia. [Table No: 6]. Necessary interventions were made with physician to use alternates instead of inappropriate drugs.

Rational prescribing requires consideration to dose, duration and interaction with other medications. Thus the rationality of

antihypertensive drugs prescribed was analyzed, it was found that 138 (88.46%) drugs prescribed were found to be rational and 18 (11.54%) drugs prescribed were irrational. A similar study conducted by Mirza et al 2014 [11] reported that the rationality of antihypertensive was found to be 69.23%. The reasons of irrationality was categorized and it was found that 8 (44.44%) prescriptions were containing drugs from same class, 6 (33.33%) prescriptions with increased

frequency of dose and 4 (22.22%) prescriptions with over dose of the drugs [Table No: 7]. The irrational prescription must be avoided in order to prevent potential risk associated with the irrational drug use. Rational prescribing of antihypertensive drugs will ensure patient safety and cost effective treatment. The irrational prescriptions were corrected by proper interventions for dose adjustment, right frequency and deletion of repeated drug from same class.

Table no: 1 Age distribution of study population

Sl. No	Age(years)	No. of Patients (N=97)	Percentage (%)
1	19-29	3	3.09
2	30-39	2	2.06
3	40-49	12	12.37
4	50-59	29	29.91
5	60-69	30	30.93
6	70-79	15	15.46
7	80-89	6	6.18

Table no: 2 Blood pressure categorization (SYSTOLIC BP)

Sl. No	Systolic BP	No. of Patients	Percentage (%)
1	<120	17	17.52
2	120-130	24	24.74
3	130-140	26	26.80
4	>140	30	30.93

Table no: 3 Pharmacotherapy of the patients included in this study

Sl. No	Type of therapy	No. of patients (N=97)	Percentage (%)
1	Mono therapy	50	51.55
2	Dual Therapy	27	21.83
3	More than two drugs	20	20.62

Table no: 4 Class of antihypertensive agents

Drug class	No. of drugs (N=156)	Percentage (%)
β blockers	41	26.28
CCBI	33	21.15
Diuretics	26	16.67
ARBs	26	16.67
ACE inhibitors	23	14.74
α blockers	4	2.56
CCBII	3	1.92

Table no: 5 Prescribing patterns of antihypertensive agents

Class of drugs	Name of drugs	No. of Drugs (N=156)	Percentage (%)
β Blockers	Metoprolol	21	13.46
	Nebivolol	11	7.05
	Atenolol	5	3.21
	Carvediol	2	1.28
	Propranolol	2	1.28
CCB	Amlodipine	23	14.74
	Cilnidipine	10	6.41
	Diltiazem	3	1.92
Diuretics	Spironolactone	16	10.26
	Hydrochlorothiazide	10	6.41
Angiotensin II receptor blockers (ARBs)	Telmisartan	21	13.46
	Losartan	4	2.56
	Irbesartan	1	0.64
Angiotensin converting enzyme (ACE) inhibitors	Ramipril	23	14.74
α Blockers	Prazosin	4	2.56

Table no: 6 Inappropriate drugs

Sl. No	Class of inappropriate drugs	Drug contraindications	No. of Drugs (N=29)	Percentage (%)
1	ACEIS	Renal failure	11	37.93
2	Diuretics	Dyslipidaemia	9	31.03
3	β Blockers	Asthma & COPD	6	20.69
4	ARBS	Renal failure & Hyperkalemia	3	10.34

Table no: 7 Irrationality of antihypertensive drugs

Sl. No	Irrationality	No. of Drugs	Percentage (%)
1	Drugs from same class	8	44.44
2	Increased frequency	6	33.33
3	Over dose	4	22.22

CONCLUSION

In the present study, the inappropriate drug use was found to be less prevalent. Majority of the patients under the study were receiving monotherapy for hypertension as recommended by JNC-7 guidelines. Monotherapy will safeguard the patients from various adverse drug related events. The results show β blockers are majorly prescribed at study site when compared with other class of antihypertensives. The β blockers are not the first drug of choice as per the guidelines and there are risks associated with their use. The regular monitoring of the patients outweighs the risks

associated with the β blockers and diuretics utilization. The rational prescribing was observed in majority of cases, but still some irrational prescription of overdose and wrong frequency were identified. The continuous monitoring of the prescribing of antihypertensives agents by the clinical pharmacist can resolve the issues of inappropriateness and enhances the rational prescribing. The clinical pharmacist has the greater responsibility in monitoring of hypertensive patients with other comorbid conditions.

Acknowledgement

The authors are grateful to the authorities of Sri Ramakrishna Hospital, Physicians of the study department and Department of Pharmacy Practice,

College of Pharmacy, SRIPMS, Coimbatore for providing the necessary facilities to undertake the current work. We also extend our gratitude to the Tamil Nadu Pharmaceutical Welfare Trust, Chennai, for awarding third rank scholarship.

REFERENCES

- [1]. Nitin Kothari et al. Adherence To JNC-VII and WHO-ISH guidelines of antihypertensive medications prescribed to hypertensive patients with co-morbid conditions, *Indian J Physiol Pharmacol* 59(1), 2015, 48–56.
- [2]. Blood pressure lowering treatment trials collaboration. Effects of ACE inhibitors, calcium antagonists, and other blood-pressure lowering drugs: results of prospectively designed overviews of randomized trials. *Lancet*; 355, 2000, 1955-64.
- [3]. Gupta R. Trends in hypertension in India. *J Hum Hypertension* 18, 2004, 73-8.
- [4]. Pyarelal et al. A Study of prescription pattern of antihypertensive drugs in a tertiary Care teaching hospital , *Indian Journal of Basic and Applied Medical Research*; June 4(3), 2015, 584-8.
- [5]. Samiksha Agarwal et al. Study of prescribing trends of anti-hypertensive drugs in a hospital at Jaipur, *Journal of Chemical and Pharmaceutical Research*, 8(2), 2016, 479-83.
- [6]. Prabakaran J, et al. Prevalence of Hypertension among Urban Adult Population (25-64 years) of Nellore, *International Journal of Integrative Medical Sciences*, 2013, 246-59.
- [7]. Monika G, Grassi G. management of essential hypertension. *British Medicine bulletin* 2010, 1-11.
- [8]. Etuk E, Isezuo SA, Chika A, Akuche J, Ali M. Prescription pattern of anti-hypertensive drugs in a tertiary health institution in Nigeria, *African journal of medicine*, 7(3), 2008, 128-32.
- [9]. Murti K, Khan M A, Dey A, Sethi MK, Das P, Pandey K. Prescription Pattern of Anti-Hypertensive Drugs in Adherence to JNC-7 Guidelines, *American Journal of Pharmacology and Toxicology*, 10(1), 2015, 27-31.
- [10]. Shirley Jaharlal et al. prescribing pattern of anti – hypertensive agents in OPD patients and comparison with Indian guidelines, *International Journal of Pharmacy*, 2013, 121-27.
- [11]. Mirza et al. a study on drug prescribing pattern in hypertensive patients in a Tertiary Care Teaching Hospital at Dehradun, Uttarakhand, *International Journal of Medical Science and Public Health* 3(8), 2014, 922-26.

How to cite this article: Shivashankar Velu, Alfatih Khalil, Pheba Susan Thomas. Study on appropriate and rational drug use in hypertensive patients with other comorbid diseases. *Int J of Allied Med Sci and Clin Res* 2016; 4(4): 647-652.

Source of Support: Nil. **Conflict of Interest:** None declared.