Original Research Article

A prospective observational study to monitor the prescription pattern of anti-hypertensive drugs in a tertiary care hospital in Kashmir, India

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ABSTRACT

Background: Hypertension remains a formidable public health challenge in India, with a staggering prevalence of 29.8% in the adult population. The situation in Kashmir is particularly concerning, with hypertension prevalence reported to be as high as 45.2% in some studies.

Methods: This comprehensive study meticulously analyzed the prescription patterns of antihypertensive drugs in the general medicine outpatient department of a tertiary care hospital in Kashmir, India. A rigorous prospective observational study was conducted over six months, involving 150 hypertensive patients.

Results: The study revealed that angiotensin receptor blockers (ARBs), particularly telmisartan and losartan, were the most frequently prescribed class of antihypertensive drugs (40.7%), followed closely by calcium channel blockers (CCBs) such as amlodipine and cilnidipine (28.7%). ACE Inhibitors like ramipril and enalapril (14.7%), beta blockers including metoprolol and atenolol (10.0%), and diuretics such as hydrochlorothiazide and chlorthalidone (6.0%) were also prescribed. Monotherapy was the preferred approach in 65.3% of cases, while 34.7% received combination therapy. The study found significant associations between comorbidities and specific drug choices, with ARBs being more commonly prescribed in diabetic patients (p=0.003) and CCBs alone and with combination of ACE inhibitors and ARB's in patients with coronary artery disease (p=0.041).

Conclusions: This research provided invaluable insights into current prescribing trends and adherence to hypertension treatment guidelines in the region, offering a foundation for future healthcare policy and practice improvements. The findings underscore the need for personalized treatment approaches and continuous medical education to ensure optimal hypertension management in this high-prevalence region.

Keywords: Antihypertensive drugs, Tertiary care, Observational study, Prescription pattern, Kashmir

INTRODUCTION

Hypertension remains a formidable public health challenge in India, with a staggering prevalence of 29.8% in the adult population. The situation in Kashmir is particularly concerning, with hypertension prevalence reported to be as high as 45.2% in some studies.[1] This alarming statistics underscores the critical importance of understanding and optimizing the prescription patterns of antihypertensive drugs in this region.[2]

Hypertension, often referred to as the "silent killer", is a prevalent and significant public health challenge that affects millions of individuals globally.[3] Characterized by persistently elevated blood pressure, hypertension is a major risk factor for cardiovascular diseases, stroke, and renal failure, contributing to substantial morbidity and mortality.[4] The World Health Organization (WHO) estimates that nearly 1.13 billion people worldwide are living with hypertension, with many unaware of their condition.[5]

The management of hypertension has evolved considerably over the years, driven by advancements in pharmacotherapy and a deeper understanding of the disease's pathophysiology.[6] Current clinical guidelines emphasize a personalized approach to treatment, advocating for the use of various antihypertensive agents tailored to individual patient profiles, including age, comorbidities, and specific risk factors. This multifaceted approach aims not only to achieve optimal blood pressure control but also to minimize the risk of adverse effects associated with antihypertensive medications.[7]

Despite the availability of effective treatment options, the prescription patterns of antihypertensive drugs can vary widely among healthcare providers and institutions.[8] Factors influencing these patterns include regional prescribing habits, the availability of medications, and adherence to clinical guidelines.[9] Understanding these patterns is crucial for identifying gaps in care and ensuring that patients receive evidence-based treatment that aligns with their clinical needs.[10]

In tertiary care settings, where patients often present with complex health issues, monitoring prescription practices becomes even more critical.[11] Analyzing the types of antihypertensive medications prescribed can provide insights into the effectiveness of current treatment strategies and highlight areas for improvement in hypertension management.[12] By fostering a better understanding of these prescription patterns, healthcare providers can enhance patient outcomes, improve adherence to treatment, and ultimately reduce the burden of hypertension-related complications in the population.

Aims and objectives

The aim of the study was to monitor the prescription pattern of anti-hypertensive drugs prescribed in a tertiary care hospital in Kashmir India.

METHODS

Study design

A meticulously planned prospective observational study was conducted in the general medicine outpatient department of Shri Maharaja Hari Singh Hospital, Srinagar, Jammu and Kashmir, India. The study spanned six months, from January 2024 to June 2024, ensuring a comprehensive capture of prescription patterns across different seasons and patient demographics.

Sample characteristics

Total participants were 150 hypertensive patients. Sampling technique employed was systematic random sampling. Data collection period was six months.

A prospective observational study was carried out in patients attending the outpatient department in a tertiary

care hospital. The study was conducted for a period of 6 months. Demographic data and complete prescription details were recorded in the structured case record form.

Inclusion criteria

All newly diagnosed and old patients receiving anti-hypertensive medications of age >18 years of either sex were included in the study and patients who gave voluntary consent for the study.

Exclusion criteria

Pregnant and lactating females were excluded.

Data collection

Data was meticulously collected using a structured proforma, which was developed and validated through a pilot study. The proforma captured: comprehensive demographic details, detailed medical history, including duration of hypertension, comorbidities and their management, complete prescription details, including drug names, doses, and frequencies, any reported adverse effects or reasons for medication changes.

To ensure accuracy, data was collected through direct patient interviews, thorough review of medical records, and consultation with treating physicians when necessary.

Ethical considerations

The study protocol was approved by the institutional ethics committee. Informed consent was obtained from all participants, and strict confidentiality of patient data was maintained throughout the study.

Statistical analysis

Data was analyzed using SPSS version 25.0. Descriptive statistics were used to present demographic data and prescription patterns. Chi-square tests were employed to assess associations between patient characteristics and prescription patterns. A p value <0.05 was considered statistically significant.

RESULTS

Demographic characteristics

Table 1 presents the comprehensive demographic characteristics of the study population.

Prescription patterns

Table 2 provides a detailed distribution of antihypertensive drug classes prescribed.

Table 1: Demographic characteristics of study population.

Characteristic	Number (n=150)	Percentage
Gender		
Male	82	54.7
Female	68	45.3
Age group (in years)		
18-40	23	15.3
41-60	76	50.7
>60	51	34.0

Table 2: Distribution of antihypertensive drug classes.

Drug class	Number of prescriptions	%	Specific drugs
ARBs	61	40.7	Telmisartan, losartan
CCBs	43	28.7	Amlodipine, cilnidipine
ACE inhibitors	22	14.7	Ramipril, enalapril
Beta blockers	15	10.0	Metoprolol, atenolol
Diuretics	9	6.0	Hydrochlorothiazide, chlorthalidone

Monotherapy versus combination therapy

Table 3 presents the comprehensive distribution of monotherapy and combination therapy prescriptions.

Table 3: Distribution of monotherapy and combination therapy.

Therapy type	Number of prescriptions	Percentage
Monotherapy	98	65.3
Dual therapy	41	27.3
Triple therapy	11	7.3

Most common drug combinations

Table 4 shows the most frequently prescribed drug combinations in detail.

Table 4: Most common drug combinations.

Drug combination	Number of prescriptions	Percentage
ARB + CCB	22	14.7
ACE-I + CCB	12	8.0
ARB + diuretic	7	4.7
BB + CCB	5	3.3
Others	6	4.0

Table 5: Antihypertensive drug classes by age group.

Drug Class	18-40 years (%)	41-60 years (%)	>60 years (%)
ARBs	43.5	42.1	37.3
CCBs	26.1	28.9	29.4
ACE inhibitors	17.4	14.5	13.7
Beta blockers	8.7	9.2	11.8
Diuretics	4.3	5.3	7.8

Prescription patterns based on gender

Table 7 illustrates the distribution of antihypertensive drug classes between male and female patients.

Table 6: Comparison of ARB use in patients with and without diabetes.

Patient group	ARB use (%)	P value
With diabetes	55.6	0.003
Without diabetes	34.3	

The p value indicates a statistically significant higher use of ARBs in patients with diabetes, aligning with guideline recommendations.

Table 7: Comparison of CCB use in patients with and without CAD.

Patient group	CCB use (%)	P value
With CAD	42.9	0.041
Without CAD	26.4	

The p value suggests a statistically significant higher use of CCBs in patients with CAD, possibly reflecting the antianginal properties of these drugs.

DISCUSSION

The findings of this study provide crucial insights into the prescription patterns of antihypertensive drugs in Kashmir, a region with a notably high prevalence of hypertension. The predominance of ARBs (40.7%) in the prescription pattern aligns with current international guidelines, which recommend ARBs as a first-line treatment due to their efficacy and favorable side effect profile. The high usage of ARBs, particularly telmisartan and losartan, may be attributed to their proven benefits in reducing cardiovascular events and their renoprotective effects, which are particularly relevant in a population with a high prevalence of diabetes and chronic kidney disease.

The second most prescribed class, CCBs (28.7%), with amlodipine and cilnidipine being the most common, reflects their effectiveness in blood pressure control and their beneficial effects in specific patient groups, such as the elderly and those with isolated systolic hypertension.

The preference for these two drug classes (ARBs and CCBs) is consistent with the findings of the ACCOMPLISH trial, which demonstrated superior outcomes with the combination of an ARB or ACE inhibitor with a CCB compared to other combinations.[14]

The lower prescription rates of ACE inhibitors (14.7%) compared to ARBs may be due to the higher incidence of adverse effects such as cough associated with ACE inhibitors. However, the continued use of ACE inhibitors, primarily ramipril and enalapril, indicates their importance in specific patient populations, particularly those with heart failure or post-myocardial infarction.

The relatively low prescription rates of beta-blockers (10.0%) and diuretics (6.0%) are noteworthy. While this pattern deviates from some older guidelines, it aligns with more recent recommendations that suggest these classes may not be the optimal first-line choices for uncomplicated hypertension. The specific use of metoprolol and atenolol among beta-blockers, and hydrochlorothiazide and chlorthalidone among diuretics, suggests targeted use in patients with specific comorbidities or risk factors (diuretics were used with proper monitoring in CKD patients).

The preference for monotherapy (65.3%) over combination therapy (34.7%) in this study population is an interesting finding. While this approach may simplify treatment regimens and potentially improve adherence, it contrasts with some current guidelines that recommend initiating treatment with combination therapy in many patients.[15] This discrepancy highlights the need for continued medical education and potential reassessment of local treatment strategies.

The observed associations between comorbidities and drug choices, such as the higher use of ARBs in diabetic patients (p=0.003) and CCBs (not only CCB's, ACE inhibitors and ARB's as well) in patients with coronary artery disease (p=0.041), demonstrate a commendable application of evidence-based medicine. These choices reflect an understanding of the specific benefits of these drug classes in these patient populations, such as the renoprotective effects of ARBs in diabetes and the antianginal properties of CCBs.

The age-based prescription patterns reveal a nuanced approach to hypertension management. The slightly lower use of ARBs and higher use of CCBs and diuretics in the elderly aligns with guidelines that recommend considering age-related changes in pharmacokinetics and pharmacodynamics. However, the relatively consistent use of ACE inhibitors across age groups suggests that individual patient factors may be prioritized over age alone in treatment decisions.

The gender-based differences in prescription patterns, while not statistically significant, hint at potential areas for further investigation. The slightly higher use of ARBs in males and CCBs in females may reflect gender-specific responses to these medications or differences in comorbidity profiles between genders.

CONCLUSION

This study provided a comprehensive overview of antihypertensive prescription patterns in a high-prevalence region of Kashmir, India. The findings reveal a preference for ARBs and CCBs, aligning with current international guidelines and reflecting an evidence-based approach to hypertension management. The observed associations between drug choices and patient characteristics, including comorbidities, age, and gender, underscore the importance of personalized treatment strategies.

However, the study highlighted a concerning aspect: the relatively low use of combination therapy. Current hypertension management guidelines, such as those from the American College of Cardiology (ACC) and the American Heart Association (AHA), recommend combination therapy as a more effective strategy than monotherapy for many patients, particularly those with stage 2 hypertension or those with additional risk factors. Combination therapy can lead to improved blood pressure control, reduced side effects, and enhanced adherence to treatment regimens due to lower pill burden. Therefore, it is essential to evaluate the roles of beta-blockers and diuretics in the local context to optimize treatment strategies.

These findings can serve as a foundation for targeted interventions, including continuing medical education programs and the development of local guidelines that consider the specific needs and characteristics of the Kashmiri population. Future research should focus on long-term outcomes associated with these prescription patterns, patient adherence to different regimens, and the cost-effectiveness of various treatment strategies in this specific population. Additionally, qualitative studies exploring prescriber decision-making processes could provide valuable insights into the factors influencing drug choices.

While the current prescription patterns demonstrate a thoughtful approach to hypertension management, there is significant room for optimization. By leveraging these findings, healthcare providers and policymakers can work towards enhancing hypertension control in Kashmir, potentially reducing the burden of cardiovascular disease in this high-risk population. Continuous monitoring, evaluation, and adaptation of prescription practices will be crucial in achieving optimal outcomes in hypertension management.

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