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Original Research Article

Drug Utilization Study in Patients of Hypertension Attending Medicine OPD in a Tertiary Care Set Up

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Abstract

Background: Hypertension is one of the major public health issues in India, contributing significantly to cardiovascular morbidity and mortality. Early diagnosis, lifestyle modifications and rational prescribing are critical to reduce the burden.

Objective: To analyse the prescribing patterns of antihypertensive drugs among patients attending the medicine outpatient department of a tertiary care hospital and to assess the adherence to standard treatment guidelines.

Methods: A retrospective, cross-sectional observational study was conducted over six months at Jagannath Gupta Institute of Medical Sciences and Hospital, Kolkata. Prescriptions containing at least one antihypertensive medication were reviewed and analysed using descriptive statistics.

Results: Of the 111 patients 59.5% were male and 66.5% resided in urban areas. Positive family history of hypertension was noted in 75.9% of cases. Smoking (87.3%) and alcohol consumption (59.2%) were common lifestyle factors. Monotherapy was prescribed in 85.5% of cases with fixed-dose combinations (FDCs) used in 90% of combination therapies. Generic prescribing was observed in 78.8% of prescriptions. End-organ damage was documented in 8.5% of cases.

Conclusion: The study demonstrates a positive trend towards rational antihypertensive prescribing with a preference for monotherapy, FDCs and generic drugs. However, high rates of lifestyle risk factors and end-organ damage emphasize the need for comprehensive hypertension management strategies which includes early screening, patient education and strict adherence to treatment protocols.

Keyword: Hypertension, OPD, Antihypertensive drugs.

Introduction

Hypertension, commonly referred to as high blood pressure, is a major global public health problem. It is contributing significantly to the burden of cardiovascular morbidity and mortality. According to the World Health Organization (WHO), hypertension is one of the leading causes of premature death worldwide and a key modifiable risk factor for noncommunicable diseases (NCDs) such as stroke, ischemic heart disease, heart failure, and chronic kidney disease [1]. In South Asia, it is considered the third most important risk factor contributing to the disease burden [2]. In Indian scenario, hypertension imposes a substantial burden on the healthcare system. It is directly responsible for approximately 57% of all stroke related deaths and 24% of deaths due to coronary artery disease [3]. The prevalence in adult population in India ranges between 25% and 30%, with urban areas showing higher rates over rural [4]. Despite being largely asymptomatic in early stages, sustained elevation of blood pressure is associated with serious complications including myocardial

infarction, cerebrovascular accidents, arrhythmias, vascular dementia, progressive renal impairment and ocular complications such as hypertensive retinopathy [5]. To combat this growing burden of NCDs the Government of India launched National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) in 2010.

The program aims to reduce premature mortality due to NCDs by promoting early diagnosis, lifestyle modification and standardized treatment practices. The goal is to reduce hypertension-related premature deaths by 25% by 2025 in line with global targets [6]. The aetiology of hypertension is multifactorial. It involves both modifiable and non-modifiable risk factors. Non-modifiable factors are age, genetic predisposition and family history of premature coronary artery disease (CAD), chronic kidney disease (CKD) or stroke, which are associated with significant morbidity and mortality. Modifiable factors include poor dietary habits, sedentary lifestyle, obesity, tobacco use, alcohol consumption and psychosocial stress which are often influenced by an individual's socioeconomic background [7]. Therefore, targeting these modifiable factors help in the prevention and effective management of hypertension in the vulnerable populations. Drug utilization studies (DUS) serve as an essential tool for evaluating the prescribing patterns, rationality and cost-effectiveness of pharmacotherapy in real-world clinical settings. These studies help to identify the gaps in adherence to clinical guidelines. It also provides insights into the rational use of medications [8]. By assessing the utilization of antihypertensive drugs and correlating them with patient demographics and socioeconomic profiles, healthcare professionals can improve therapeutic strategies and formulate targeted interventions. The present study aims to analyse the pattern of antihypertensive drug utilization among patients attending the medicine outpatient department (OPD) of a tertiary care hospital. The findings of this study will be evaluated in the context of standard treatment guidelines to assess rational prescribing practices and identify areas for improvement in management of hypertension.

Hypertension emerged as one of the most prevalent non-communicable diseases in India and significantly contributing to country's cardiovascular disease burden. With a growing number of individuals diagnosed at a younger age and a large segment remaining undiagnosed or inadequately treated, there is a pressing need to evaluate antihypertensive drug prescribing practices in clinical settings across the country. According to the ICMR-INDIAB study, nearly one in four adults in India suffers from hypertension, but only half are aware of their condition and, among them, just one-third achieve and sustain optimum blood pressure control [9] over the years which is essential as hypertension is a lifelong disorder. As per WHO criteria, hypertension is diagnosed based on persistently elevated systolic and/or diastolic blood pressure. In India, coexistence of diabetes is very common and it further complicates long-term control of hypertension, particularly in patients with or without chronic kidney disease (CKD).

This treatment gap often arises due to irrational drug prescribing, under-prescription, over-reliance on monotherapy and lack of adherence to the standard treatment guidelines. Several other Indian studies have been reported inconsistent prescribing trends of antihypertensive drugs. The cross-sectional study done by Saxena et al., it was observed that calcium channel blockers (CCBs) and angiotensin receptor blockers (ARBs) were the most commonly prescribed drug classes in India followed by beta-blockers and angiotensin converting enzyme (ACE) inhibitors. However, according to current international guidelines, thiazide-type diuretics (such as Chlorthalidone) with or without CCBs are recommended as first-line oral antihypertensive therapy. Beta blockers are generally reserved as second-line agents, as they do not improve long-term cardiovascular outcomes. ACE inhibitors and ARBs are particularly useful in patients with coexisting conditions such as heart failure, diabetes, or CKD. Despite evidence supporting the use of fixed-dose combinations (FDCs) to improve adherence, their utilization in India remains low even though both national and international guidelines [10] recommend them. Kumar et al. evaluated prescriptions in a tertiary care hospital and results showed that the majority of the antihypertensive drugs were prescribed by brand names and relatively small proportion of drugs were from the National List of Essential Medicines (NLEM) of India [11]. This practice not only increases the economic burden on patients but also affects the treatment continuity, specifically in rural area and in resource-limited settings. Kaur et al. emphasize the importance of monitoring and evaluating the rationality of prescriptions.

They concluded that many antihypertensive drugs were prescribed without adherence to stepwise escalation therapy and documentation of the adverse drug reactions (ADRs) was also often neglected in outpatient records [12]. Another major challenge in the Indian context is non-adherence to prescribed therapy. A systematic review and meta - analysis done by Patil et al. showed that factors like lack of awareness, medication cost and complex dosing schedules are significant barriers for drug adherence. Community-based education and simplified regimens could improve patient

compliance and overall outcomes [13]. Kaur et al. demonstrated that community awareness, trained health workers and periodic screening camps can significantly impact hypertension detection and long-term blood pressure control [14]. These studies collectively highlight the importance of continuous evaluation of prescribing patterns, patient behaviour and system level interventions to enhance the rational use of antihypertensive drugs in India. In light of these findings, continuous monitoring of drug usage patterns through observational and retrospective studies is crucial. Such studies can guide institutional policies, promote rational drug use and help to align prescription practices with national standards for optimal hypertension management.

Materials and Methods

Study Design and Duration: The study was a retrospective, cross-sectional observational study conducted over a period of six months in the Department of Pharmacology at Jagannath Gupta Institute of Medical Sciences and Hospital, Budge Budge, Kolkata, West Bengal. Prior to the commencement of the study, ethical clearance was taken and administrative approval was obtained from the Medical Superintendent of the institute.

Study Population: Patients attending the medicine OPD at Jagannath Gupta Institute of Medical Sciences and Hospitals were included in the study period. The hospital inpatient number (IP No.) was noted for each selected case, and the corresponding medical records were retrieved from the medical records section to obtain the comprehensive clinical information of the patient. Prescriptions were reviewed, and those containing at least one antihypertensive medication were identified. Data on patient follow-ups were obtained primarily through review of outpatient records during scheduled clinic visits. In cases where patients missed appointments, follow-up information was collected telephonically when available. Information on coexisting conditions such as obesity and hypercholesterolemia was not systematically captured in this study, which we recognize as a limitation. These comorbidities are common in hypertensive patients and may influence prescribing patterns as well as overall cardiovascular risk.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients with a confirmed diagnosis of hypertension.
- Prescriptions containing at least one antihypertensive medication.

Exclusion Criteria

- Patients below 18 years of age.
- Non-hypertensive individuals. (Identified based on medical records indicating no prior diagnosis of hypertension or normal blood pressure readings during the review period)
- Pregnant and lactating women.
- Prescriptions with incomplete information or absence of antihypertensive medications.

Data Management and Analysis: The collected data were compiled in Microsoft Excel and analysed using descriptive statistical methods. This analysis focused on evaluating the prescribing trends and patterns of antihypertensive medications among the study population. The results were expressed as frequencies, percentages, and where appropriate, mean ± standard deviation.

Results

A total of 111 prescriptions were collected and critically analysed during the study period and we observed several trends in the demographic and therapeutic profiles.

Among the study population greater proportion of patients were male (59.5%) compared to female (40.5%) which consistent with previous studies that suggest a higher prevalence of hypertension among males, especially in middle-aged groups [7]. Additionally, a larger percentage of patients were from urban areas (66.5%) (Figure 1) which reflect the impact of urban lifestyle factors such as sedentary behaviour, stress and dietary changes on the prevalence of hypertension [15].

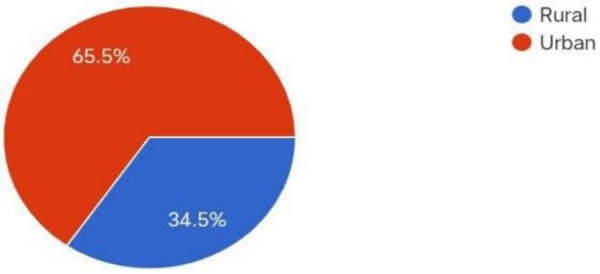

Figure 1: Distribution of study population by residence (Urban vs. Rural)

75.9% of the patients had a positive family history of hypertension, suggesting a significant genetic predisposition. The majority of patients (79.3%) were follow-up cases (Figure 2), reinforcing the chronic nature of hypertension, which necessitates ongoing monitoring and medication adherence.

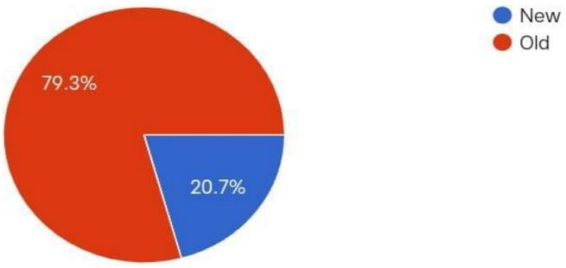

Figure 2: Proportion of new vs. follow-up cases

Lifestyle factors appeared to have a strong association with hypertension. For the purpose of this study, regular exercise was defined as engaging in at least 30 minutes of moderate-intensity physical activity on five or more days per week. 87.3% of patients reported smoking and 59.2% reported alcohol consumption (Figure 3). Dietary habits revealed that a substantial majority (84.5%) of patients were non-vegetarians compared to 15.5% vegetarians (Figure 4).

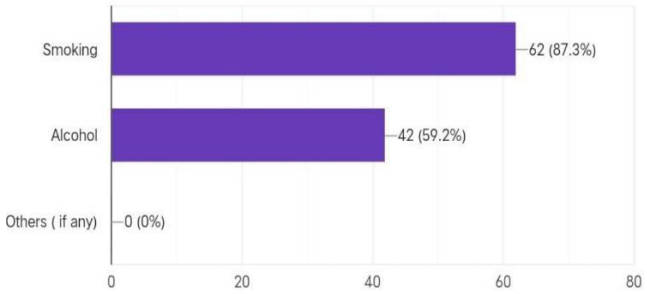

Figure 3: Smoking and alcohol use among the study population

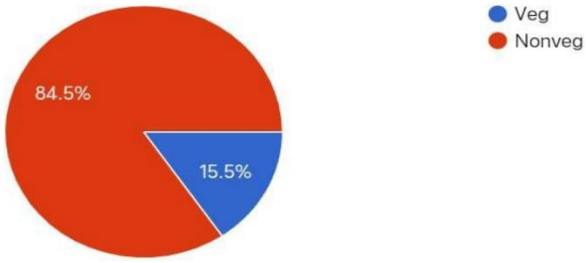

Figure 4: Dietary patterns of the study population

In terms of drug utilization patterns, monotherapy was observed in 85.5% of prescriptions, while combination therapy was prescribed in the remaining cases (Figure 6), consistent with guidelines recommending initial monotherapy for most patients with mild to moderate hypertension.

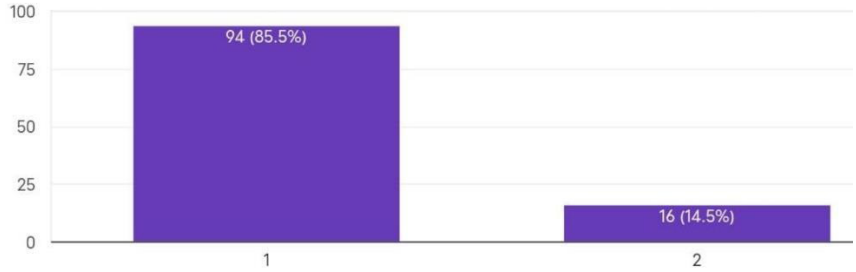

Figure 5: Monotherapy vs. combination therapy among prescriptions

Furthermore, 78.8% of drugs were prescribed using their generic names, reflecting a positive trend toward rational and cost-effective prescribing practices which are particularly important in resource-limited settings. Assessment of treatment-related outcomes revealed that end organ damage was reported in 8.5% of cases, based on 106 completed responses (Figure 6) emphasizing the need for early intervention and optimum blood pressure control to prevent irreversible complications [16].

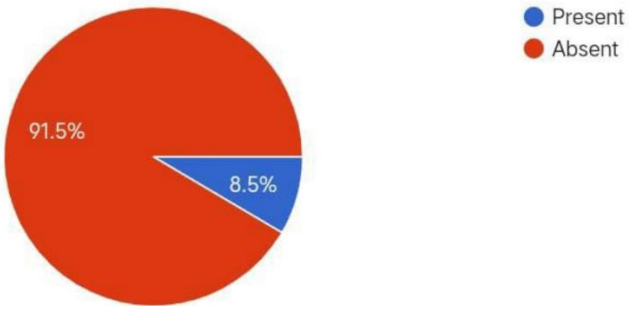

Figure 6: Occurrence of end-organ damage in study population

Discussion

The demographic findings indicate that hypertension is more common among males and urban populations, which aligns with earlier studies linking urban lifestyle changes, stress and dietary habits to increased cardiovascular risk. The high proportion of patients with a positive family history suggests the role of genetic predisposition, consistent with evidence that hypertension risk is elevated among first-degree relatives of affected individuals. The observations also align with the findings of Jafar et al., who highlighted that long-term follow-up and regular treatment are crucial in preventing hypertensive complications [17].

The high prevalence of smoking, alcohol consumption and non-vegetarian diets emphasizes the need for comprehensive lifestyle interventions. These findings are consistent with literature suggesting that non-vegetarian diets, particularly those rich in red meat and high sodium content and both smoking and alcohol use are independent risk factors for elevated blood pressure and cardiovascular events [18-20].

The prescribing trends observed in this study were in line with established clinical guidelines, which recommend monotherapy for mild cases and combination therapy for patients with uncontrolled hypertension or coexisting conditions such as diabetes. When combination therapy was used, sub-maximal doses of two agents were typically preferred to achieve better blood pressure control with fewer adverse effects, recognizing that antihypertensive therapy is usually life-long. Among these, Fixed Dose Combinations (FDCs) were utilized in 90% of instances to enhance adherence and convenience. In diabetic hypertensives, angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) were frequently initiated early, even when blood pressure was within normal limits, for their established renoprotective effects.

Combination therapy using sub-maximal doses of two anti-hypertensives is recommended to improve blood pressure control while minimizing adverse effects, especially for long-term management. Current guidelines also advise ACE inhibitors or ARBs for diabetic patients with albuminuria or chronic kidney disease even when blood pressure is

not overtly elevated, owing to their renoprotective effects [21-22].

Finally, the presence of end-organ damage in a subset of patients underlines the importance of early diagnosis, regular follow-up and strict adherence to both pharmacological and lifestyle interventions to prevent long-term complications.

Conclusion

Our study highlights the importance of continuous evaluation of prescribing patterns in hypertension management. The predominance of male and urban patients, high prevalence of addiction, non-vegetarian diet and family history are the key contributors suggest the need for a multidimensional approach involving lifestyle modification, patient education and early screening. Therapeutically the preference for monotherapy, generic drugs and FDCs aligns well with national guidelines and supports rational prescribing practices.

However the end-organ damage was assessed using documented clinical findings and investigations during the study period and the observed incidence emphasizes the importance of timely diagnosis, regular follow-up and strict adherence to treatment protocols. Regular drug utilization studies like ours can provide valuable insights for optimizing hypertension management in tertiary care settings and improving patient outcomes.

Study Limitations

This study was conducted in a single tertiary care hospital, which limits the generalizability of its findings to other healthcare settings. As a retrospective cross-sectional analysis based on prescription records, it was dependent on the accuracy and completeness of documentation and patient adherence to prescribed therapy could not be assessed. The relatively small sample size and limited follow-up duration restricted the ability to capture broader trends in antihypertensive drug utilization. Incorporating simple statistical analyses such as comparing baseline and last readings could have provided additional insights. Furthermore, the study did not evaluate long-term outcomes including adverse drug reactions, acute events, hospitalizations, loss to follow-up or mortality which may be clinically and statistically significant. Future multi-centric, prospective studies with larger sample sizes, extended follow-up and structured systems for patient tracking are recommended to validate and expand upon these findings.

Authors Contribution

Dr. Pradipta Das, Dr. Payodhi Dhar, Dr. Jaideep Bhaduri, Dr. Sugandha Garg, Dr. Paramita Bhattacharya (Pal) contributed to the conceptualization, study design and data collection. Madhurima Goswami was responsible for compiling, data analysis, writing and editing the manuscript. All authors reviewed and approved the final version of the manuscript.

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