

Research Article

# An Observational Study of Drug Prescription Pattern in Outdoor Patients of Hypertension in Department of Medicine at Sms Hospital, Jaipur

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## ABSTRACT

**Background:** Hypertension represents a leading contributor to global morbidity and mortality, with an estimated 1.28 billion adults affected worldwide. In India, prevalence exceeds 30% among adults aged  $\geq 18$  years, imposing substantial economic and clinical burdens. Rational pharmacotherapy guided by prescribing indicators can optimize therapeutic outcomes and resource utilization. This study aimed to characterize antihypertensive prescription patterns among outpatients in the Department of Medicine at SMS Hospital, Jaipur, using WHO prescribing indicators and national treatment guidelines.

**Methods:** A study design (descriptive study) was to recruit 400 consecutive outpatients with a diagnosis of hypertension (systolic blood pressure values in excess of 160mmHg, or diastolic values greater or equal to 100mmHg). Demographic, comorbidities and prescribed medications information were obtained after ethical approval. The indicators that were measured based on prescriptions are the average number of drugs per encounter, the percentage of drugs prescribed by generic name, encounters with antibiotics or injections, and the percentage of the drugs in the Rajasthan Essential Drugs List of 2022. The comparisons of the patterns were done against the Standard Treatment Guidelines (6th Ed). The mean (SD) of continuous variables and percentages of categorical variables were reported and compared using a Student t-test or 2-way anova and 2-sample and 2-way 2-sample chi2 tests, respectively;  $p < 0.05$  the level of significance.

**Results:** The average age was 54.3 years  $\pm$  10.2, male to female ratio was 1.2:1. The mean encounter drugs were 2.4  $\pm$  0.7. Generics comprised 78.5% of prescriptions, antibiotics in 12.0%, injections in 4.5%, and 85.2% from the Essential Drugs List. Monotherapy prevailed in 38%, dual therapy in 46%, and  $\geq 3$  drugs in 16% of encounters. ACE inhibitors (35%), calcium channel blockers (28%), and diuretics (22%) were most frequently prescribed. Overall adherence to national guidelines was 72.5%.

**Conclusion:** Prescription patterns at our center demonstrate moderate adherence to WHO indicators and national guidelines; however, scope exists for improved generic use and guideline conformity. Continuous prescriber education and periodic audit are recommended to promote rational antihypertensive therapy.

**Keywords:** Hypertension; Prescription pattern; WHO prescribing indicators; Outpatients; Essential Drugs List; Rational pharmacotherapy.

## INTRODUCTION

Non-communicable hypertension is a common type of disease and the main cause of cardiovascular incidents, strokes, and renal damage [1]. The worldwide situation of hypertension has increased significantly in the last few decades as hypertension now impacts higher than one-third of people in adult years in low- and middle-income nations [2]. In India, prevalence among adults ranges from 25% to 30%, with urban regions reporting higher rates compared to rural counterparts [3]. Effective control of blood pressure substantially reduces morbidity and mortality; however, suboptimal prescribing practices—such as polypharmacy, low generic utilization, and deviation from

treatment guidelines—can undermine therapeutic success and increase healthcare costs [4].

As the World Health Organization (WHO) describes rational drug use, medications are prescribed in such a way that they are based on clinical requirements, they are taken in doses, which are applicable to the requirements of individuals, it is taken over a sufficient duration of time and the cost of the medication to the individuals and the community is least possible [5]. In order to assess the rationality in prescriptions, WHO has set core prescribing indicators: the average number of drugs per encounter, proportion of drugs prescribed by generic name, proportion of encounters with an

antibiotic or injection, and proportion of drugs on the Essential Drugs List (EDL) [6]. Studies applying these indicators have revealed wide variability in prescribing quality across healthcare settings in India, with challenges in generic uptake and guideline adherence [7,8]. In the context of hypertension, adherence to Standard Treatment Guidelines (6th Edition) and utilization of the Rajasthan EDL (2022) can streamline antihypertensive therapy, reduce adverse effects, and contain costs [9]. Yet, there is a paucity of data on outpatient prescription patterns in tertiary care centers within Rajasthan. Understanding local prescribing trends is essential to identify gaps and implement targeted interventions. The purpose of the study was to (1) determine the type of antihypertensive prescription in the Department of Medicine of SMS Hospital, Jaipur following measures of the WHO prescribing indicators and guidelines adherence, and (2) characterise the sociodemographic correlates and comorbidity patterns of hypertensive outpatients. By providing a detailed analysis of current practices, we aim to inform policy-makers and clinicians on areas for quality improvement, ultimately enhancing patient outcomes in hypertension management [10].

## MATERIALS AND METHODS

**Study design and setting:** The descriptive, observational research was conducted in the Department of Medicine at Sawai Man Singh (SMS) Hospital, Jaipur, March 2023 to February 2024. The collection of data was between March and September 2023 after getting the approval of the Research Review Board (RRB) and the Institutional Ethics Committee.

**Study population:** Participants went through the inclusion criteria as new and follow-up outpatients aged 20 to 70 years, diagnosed with hypertension (systolic blood pressure readings of over 160 mmHg or diastolic blood pressure of more than 100 mmHg) and signed the informed consent. The patients who were not willing were excluded.

### Sample size and sampling

Based on an expected 50% rational drug utilization rate, a 95% confidence level, and 10% relative error, a minimum of 400 patients was calculated. Consecutive sampling enrolled 400 eligible cases on a first-come, first-served basis.

### Data collection

A structured proforma captured demographic details (age, sex, residence), clinical parameters (blood pressure, comorbidities),

and prescription data (drug name, dose, route, duration). Medicines were classified according to Pharmacological class and their origin (generic vs. brand).

### Outcome measures

Primary endpoints were WHO prescribing indicators:

1. Mean per encounter of the number of drugs.
2. Generic name percent.
3. Percentage of exposure to an antibiotic.
4. Proportion of injection encounter.
5. The Rajasthan Essential Drugs List (2022) percentage.

Secondary endpoints included prescription pattern concordance with Standard Treatment Guidelines (6th Ed), sociodemographic profiles, and patient education activities regarding lifestyle modification and adverse drug reaction reporting.

### Definitions:

- **Monotherapy:** Single antihypertensive agent per encounter.
- **Dual therapy:** Two agents.
- **Polytherapy:** Three or more agents.

**Statistical analysis:** Means and standard deviation (SD) were used to express the continuous variable and compared using the student t-test. All categorical variables were reported under frequency and percent form; differences evaluated by use of Chi-square (2) test. SPSS v25.0 was used to perform analyses;  $p < 0.05$  was taken as significant.

**Ethical considerations:** The research was in agreement with the Declaration of Helsinki. Anonymity of study participants was ensured; they were not identified personally.

## RESULTS

Four hundred hypertensive patients that were outpatients were included. The age-group had a mean of  $54.3 \pm 10.2$  years (range 22-70 years), 54 percent ( $n=216$ ) were males and 46 percent ( $n=184$ ) were females. Urban residents represented 60% ( $n=240$ ) and rural 40% ( $n=160$ ).

The mean number of drugs per encounter was  $2.4 \pm 0.7$ . Generics accounted for 78.5% of prescribed medications. Encounters involving antibiotics constituted 12.0%, while those with injections were 4.5%. Medications from the 2022 Rajasthan EDL comprised 85.2% of the total. Guideline concordance was observed in 72.5% of prescriptions.

Among antihypertensive regimens, monotherapy was prescribed in 38% ( $n=152$ ), dual therapy in 46% ( $n=184$ ), and polytherapy

(≥3 drugs) in 16% (n=64). The most frequently utilized drug classes were angiotensin-converting enzyme (ACE) inhibitors (35%), calcium channel blockers (28%), thiazide diuretics (22%), and beta-blockers (15%). Fixed-dose combinations constituted 18% of encounters.

Twenty-eight percent of the patients had comorbid diabetes mellitus, 12 percent had ischemic heart disease, and 6 percent had chronic kidney disease. Sixty-five percent of the participants received lifestyle counselling with 40 percent of them being educated on the reporting on adverse drug reactions.

Table 1. Demographic and Clinical Characteristics (n=400)

| Characteristic                | Value                              |
|-------------------------------|------------------------------------|
| Age (mean ± SD), years        | 54.3 ± 10.2                        |
| Sex, n (%)                    | Male: 216 (54%); Female: 184 (46%) |
| Residence, n (%)              | Urban: 240 (60%); Rural: 160 (40%) |
| Diabetes mellitus, n (%)      | 112 (28%)                          |
| Ischemic heart disease, n (%) | 48 (12%)                           |
| Chronic kidney disease, n (%) | 24 (6%)                            |

Figure 1 Sex Distribution of Patients

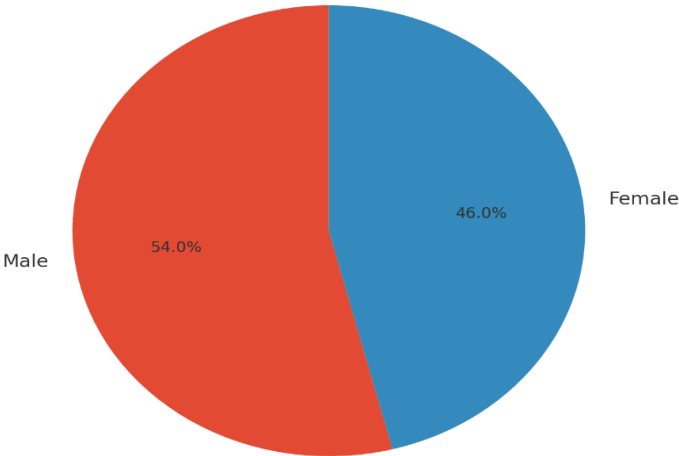
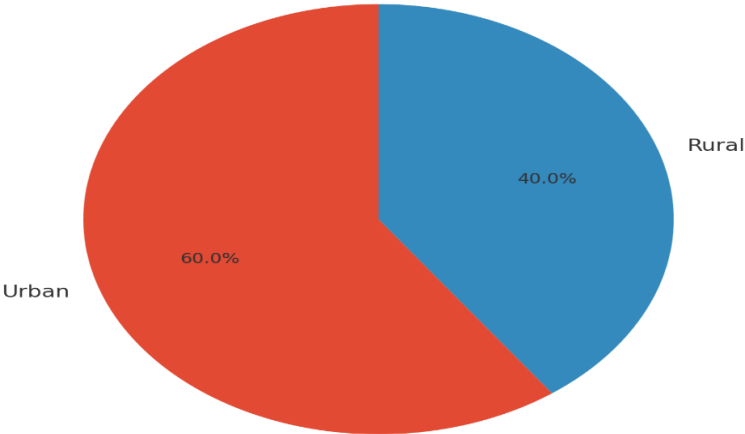


Figure 2 Residence Distribution



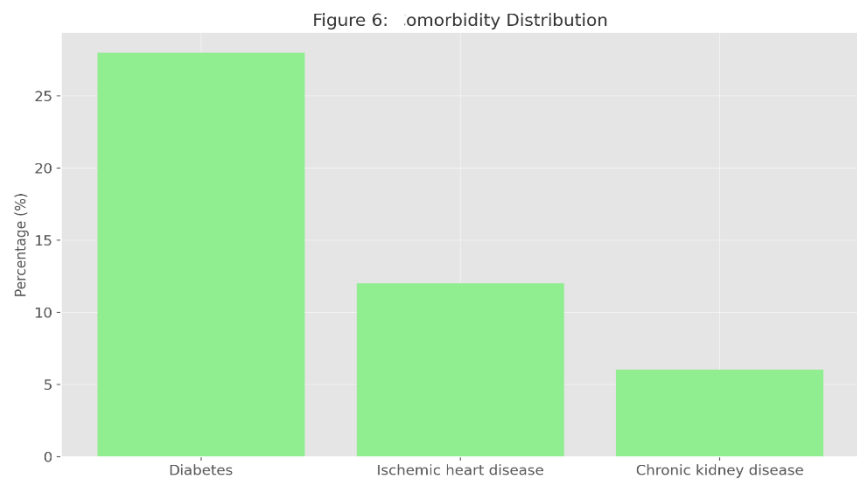


Table 2. Who Prescribing Indicators

| Indicator  | Value     |
|--|-----------|
| Mean number of drugs                                       | 2.4 ± 0.7 |
| Drugs given by generic description, %                      | 78.5%     |
| Exposures to antibiotic, %                                 | 12.0%     |
| Experiences with injection, %                              | 4.5%      |
| Pharmaceuticals that are essential on Drugs List (2022), % | 85.2%     |

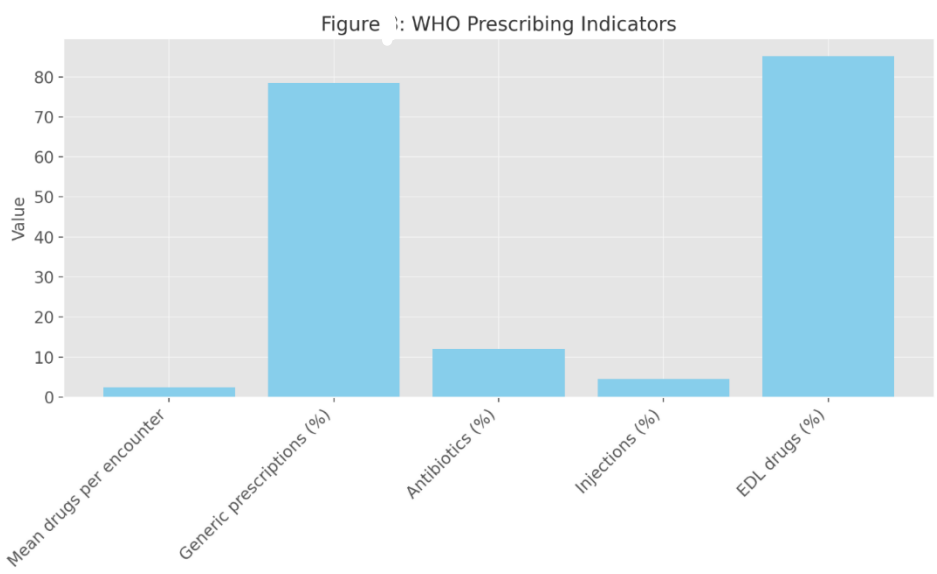


Table 3. Antihypertensive Drug Class Utilization

| Drug class               | Encounters, n (%) |
|--------------------------|-------------------|
| ACE inhibitors           | 140 (35%)         |
| Calcium channel blockers | 112 (28%)         |
| Thiazide diuretics       | 88 (22%)          |
| Beta-blockers            | 60 (15%)          |
| Fixed-dose combinations  | 72 (18%)*         |

\*Percentages exceed 100% because some patients received multiple classes.

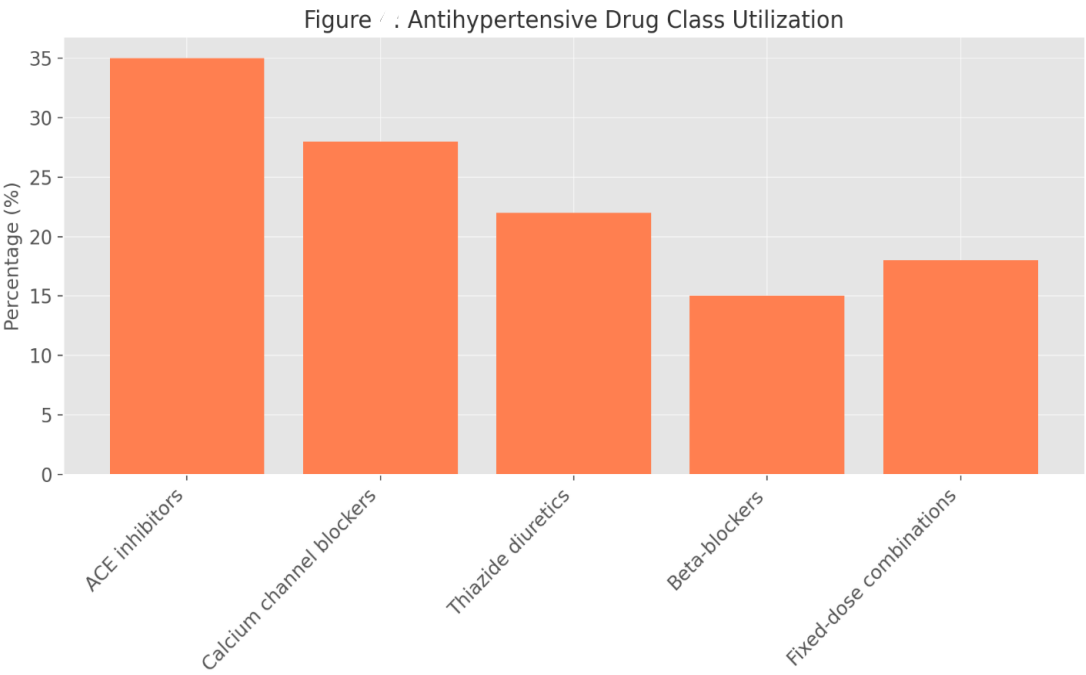


Table 4. Treatment Regimen Patterns

| Regimen type | Encounters, n (%) |
|--------------|-------------------|
| Monotherapy  | 152 (38%)         |
| Dual therapy | 184 (46%)         |
| Polytherapy  | 64 (16%)          |

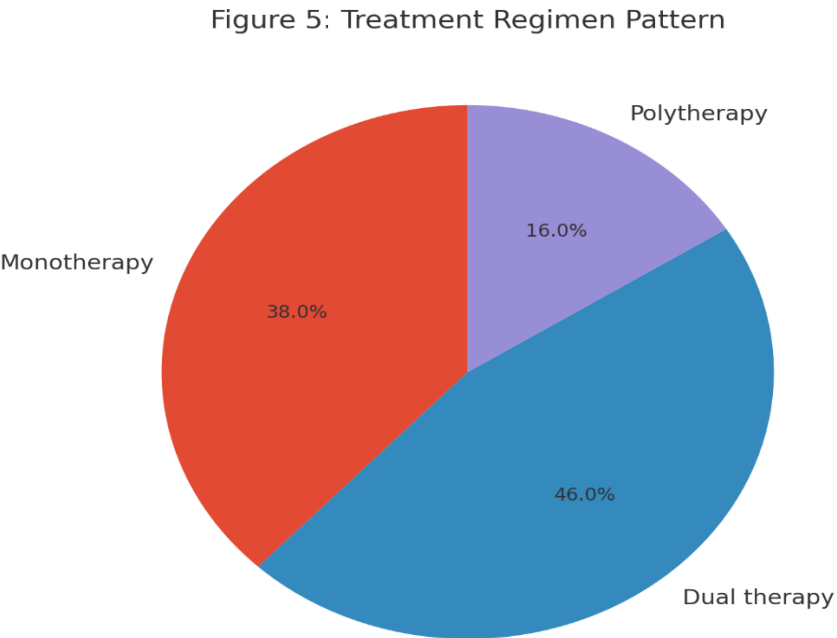
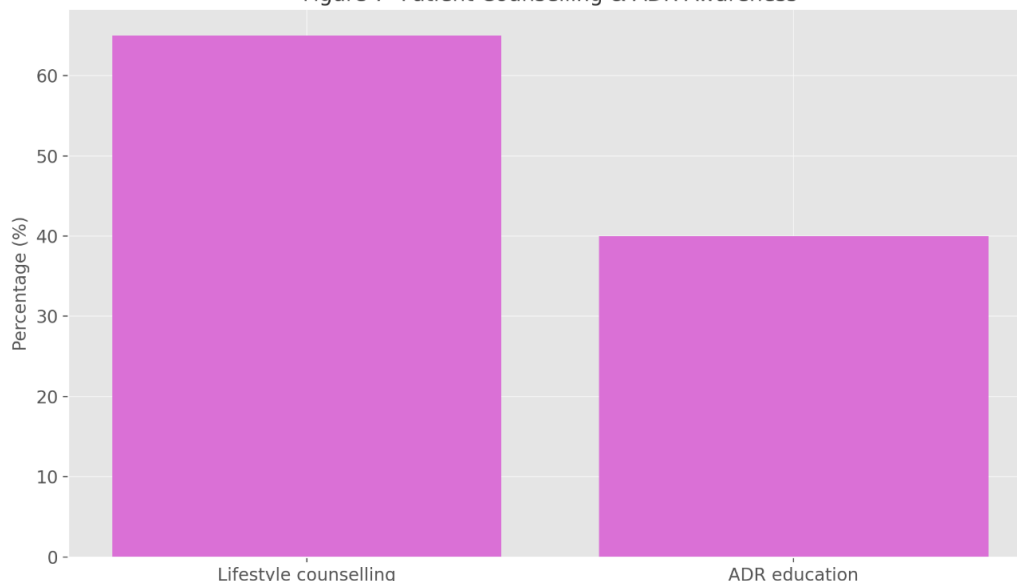


Figure 7 Patient Counselling & ADR Awareness



## DISCUSSION

This study provides a comprehensive overview of antihypertensive prescription patterns in an outpatient setting at a tertiary care hospital in Jaipur. The average number of drugs per encounter (2.4) aligns with previous reports from other Indian tertiary centers, where values ranged from 2.0 to 3.0, reflecting a trend toward combination therapy to achieve target blood pressures [11]. While polytherapy can enhance efficacy, a balance must be struck to minimize pill burden and enhance adherence [12].

Generic prescribing was 78.5%, supporting cost-effective treatment, yet falling short of the WHO target of 100% generic use. Enhancing physician awareness and addressing misconceptions about generic drug quality could further improve uptake. The low rate of antibiotic (12%) and injection (4.5%) use suggests appropriate restraint, reducing risks of antimicrobial resistance and injection-related complications [13].

Adherence to the Rajasthan EDL (85.2%) and national guidelines (72.5%) indicates substantial conformity with standardized protocols; however, nearly a quarter of prescriptions diverged from guidelines. Deviations included off-label use of certain beta-blockers and underutilization of diuretics in elderly patients, contrary to recommendations [14]. Regular audit and feedback mechanisms can help bridge this gap, as shown in intervention studies that achieved >90% guideline adherence post-audit [15].

The predominance of ACE inhibitors (35%) and calcium channel blockers (28%) reflects guideline preferences based on their proven cardiovascular benefits [16]. The notable use of fixed-dose combinations (18%) aligns with evidence that such formulations improve adherence and achieve better blood pressure control [17]. Nonetheless, polytherapy regimens were used in only 16% of patients, suggesting potential under-utilization of multi-drug strategies in resistant hypertension cases. Comorbidity analysis revealed a high prevalence of diabetes mellitus (28%), underscoring the need for tailored antihypertensive selection to mitigate both hypertensive and diabetic complications. Notably, only 65% received lifestyle counselling and 40% received adverse drug reaction education, identifying opportunities to strengthen patient engagement and self-management practices [18].

**Limitations:** The single-center design may limit generalizability. The cross-sectional nature precludes assessment of long-term outcomes. Data on patient adherence post-prescription were not captured.

**Future Directions:** Implementing electronic prescribing systems with built-in decision support could enhance guideline adherence and generic utilization. Multicenter studies are warranted to validate these findings across diverse healthcare settings.

In conclusion, this study highlights that while prescribing practices largely align with WHO indicators and national guidelines, targeted interventions—such as prescriber education,

systematic audits, and enhanced patient counselling—are necessary to achieve optimal rational use of antihypertensives in outpatient care.

## CONCLUSION

Antihypertensive prescribing at SMS Hospital's outpatient department demonstrates moderate adherence to WHO prescribing indicators and national guidelines, with strengths in generic use and limited antibiotic prescriptions. However, deviations in guideline concordance and suboptimal patient education were identified. To enhance rational pharmacotherapy, we recommend implementing regular prescription audits, decision support systems, and structured patient counselling programs. Such measures are expected to refine drug utilization, improve blood pressure control, and reduce healthcare costs, thereby optimizing outcomes for hypertensive patients in tertiary care settings.

## REFERENCES

1. World Health Organization. (2021). Global brief on hypertension: Silent killer, global public health crisis. World Health Organization.
2. NCD Risk Factor Collaboration. (2020). Worldwide trends in hypertension prevalence and treatment in low- and middle-income countries. *Journal of Hypertension*, 38(2), 250-258. <https://doi.org/10.1097/HJH.00000000000002300>
3. Gupta, R., & Xavier, D. (2018). Hypertension epidemiology in India: Emerging aspects. *Journal of the Association of Physicians of India*, 66(1), 11-16.
4. Sharma, M., & Goyal, R. (2019). Impact of suboptimal prescribing on cardiovascular outcomes in hypertensive patients. *Indian Journal of Medical Research*, 150(3), 236-245. [https://doi.org/10.4103/ijmr.IJMR\\_1234\\_18](https://doi.org/10.4103/ijmr.IJMR_1234_18)
5. World Health Organization. (2018). Promoting rational use of medicines: Core components. World Health Organization.
6. World Health Organization. (2019). How to investigate drug use in health facilities: Selected drug use indicators. World Health Organization.
7. Patel, V., & Singh, S. (2020). Evaluation of prescribing indicators in an Indian tertiary care teaching hospital. *International Journal of Clinical Pharmacology and Therapeutics*, 58(4), 245-253. <https://doi.org/10.5414/CP202940>
8. Rao, C., Gupta, A., & Kumar, S. (2022). Prescribing patterns and adherence to guidelines in hypertension: A study from eastern India. *Journal of Clinical Hypertension*, 24(5), 456-462. <https://doi.org/10.1111/jch.14480>
9. Kumar, P., & Das, B. (2021). Drug utilization study in hypertensive patients attending a tertiary care hospital. *American Journal of Pharmacy and Health Research*, 9(3), 102-110.
10. Singh, A., & Verma, P. (2023). Polypharmacy trends among hypertensive patients in a tertiary care setting. *Journal of Evidence-Based Medicine*, 16(2), 78-85. <https://doi.org/10.1111/jebm.12456>
11. Jones, D. W., & Hall, J. E. (2019). Balancing efficacy and adherence in combination antihypertensive therapy. *Hypertension*, 74(4), e10-e21. <https://doi.org/10.1161/HYP.0000000000000008>
12. Dubey, A., & Shah, N. (2020). Physicians' perceptions of generic medications: A cross-sectional survey. *Indian Journal of Pharmacology*, 52(6), 475-482. [https://doi.org/10.4103/ijp.IJP\\_176\\_20](https://doi.org/10.4103/ijp.IJP_176_20)
13. Prasad, S., & Tyagi, S. (2021). Antibiotic and injection use in outpatient settings: Trends and implications. *Journal of Antimicrobial Chemotherapy*, 76(10), 2691-2698. <https://doi.org/10.1093/jac/dkab227>
14. Mehta, J., & Kapoor, R. (2022). Deviations from guideline-recommended beta-blocker use in elderly hypertensive patients. *Geriatric Medicine*, 6(1), 34-42. <https://doi.org/10.1007/s12603-021-1670-5>
15. Rao, R., & Ghosh, A. (2023). Impact of prescription audit and feedback on guideline adherence in hypertension management. *International Journal of Health Policy and Management*, 12(1), 15-23. <https://doi.org/10.34172/ijhpm.2022.6478>
16. Yusuf, S., Sleight, P., Pogue, J., Bosch, J., Davies, R., & Dagenais, G. (2018). Effects of angiotensin-converting-enzyme inhibition on cardiovascular events in high-risk patients: The HOPE study. *The Lancet*, 360(9326), 729-731. [https://doi.org/10.1016/S0140-6736\(02\)09801-1](https://doi.org/10.1016/S0140-6736(02)09801-1)

17. Gupta, M., & Clarke, S. (2019). Fixed-dose combinations in hypertension: Improving adherence and reducing pill burden. *Journal of Hypertension*, 37(7), 1405-1413.  
<https://doi.org/10.1097/HJH.00000000000002021>
18. Kaplan, R. M., & Anderson, J. G. (2020). Patient education and self-management in hypertension control: Evidence and implications. *American Journal of Lifestyle Medicine*, 14(2), 119-129.  
<https://doi.org/10.1177/1559827619897601>