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RESEARCH ARTICLE
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DRUG UTILIZATION PATTERN IN INPATIENTS OF A TERTIARY CARE TEACHING HOSPITAL IN HARYANA

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Abstract

Background: Drug utilization studies provide valuable insights into prescribing patterns, rational drug use, and healthcare quality in hospital settings. Limited data exists on drug utilization patterns in tertiary care hospitals in Haryana, India.

Objectives: To evaluate drug utilization patterns among inpatients in a tertiary care teaching hospital in Mullana, Ambala, Haryana, and assess adherence to WHO prescribing indicators.

Methodology: A prospective observational study was conducted from November 1-25, 2018, in the Department of Medicine at a tertiary care teaching hospital. Systematic random sampling was used to select 384 inpatients. Data collection included demographic details, diagnosis, prescribed medications, and treatment outcomes using a structured questionnaire. Statistical analysis was performed using SPSS version 25.0.

Results: The study included 384 inpatients with mean age 52.3±14.7 years. Males constituted 58.6% of participants. Average number of drugs per prescription was 6.2±2.1. Generic prescribing rate was 23.4%, while 76.8% of drugs were from essential drug list. Antibiotics were prescribed in 68.2% cases. Cardiovascular drugs (24.3%) were most commonly prescribed, followed by antimicrobials (19.7%) and gastrointestinal drugs (15.2%).

Conclusion: The study revealed polypharmacy tendency with scope for improvement in generic prescribing and rational antibiotic use. Findings provide baseline data for developing institutional prescribing guidelines specific to the regional healthcare context.

Keywords: Drug utilization, inpatients, tertiary care, prescribing patterns, Haryana

1. Introduction

Drug utilization research represents a cornerstone of pharmacoepidemiology, providing critical insights into how medications are prescribed, dispensed, and consumed within healthcare systems. The World Health Organization defines drug utilization as the marketing, distribution, prescription,

and use of drugs in society, with special emphasis on resulting medical, social, and economic consequences.

In developing countries like India, irrational prescribing practices remain a significant public health concern, contributing to increased healthcare costs, antimicrobial resistance, and adverse drug reactions. Tertiary care hospitals, being referral centers for complex cases, often demonstrate unique prescribing patterns that require systematic evaluation.

Haryana, a rapidly developing state in northern India, has witnessed substantial healthcare infrastructure expansion over the past decade. However, limited research exists on drug utilization patterns in the state's healthcare facilities, particularly in the Ambala region. The establishment of medical colleges and teaching hospitals in areas like Mullana has created opportunities for evidence-based prescribing practice evaluation.

This study addresses the knowledge gap by examining drug utilization patterns in a tertiary care teaching hospital setting, providing insights relevant to healthcare policy makers and clinical practitioners in the region. Understanding local prescribing practices is essential for developing targeted interventions to promote rational drug use and improve patient care quality.

2. Review of Literature

Recent studies have highlighted varying drug utilization patterns across different healthcare settings in India. Sharma et al. (2016) conducted a comprehensive analysis of prescribing patterns in North Indian hospitals, reporting an average of 5.8 drugs per prescription with 34% generic prescribing rate. The study emphasized the need for institutional guidelines to promote rational prescribing practices.

Patel and Kumar (2017) examined antibiotic utilization patterns in tertiary care hospitals across Gujarat and Haryana, finding inappropriate antibiotic use in 42% of cases. Their research underscored the urgent need for antimicrobial stewardship programs in Indian healthcare facilities.

A multicentric study by Reddy et al. (2018) evaluated WHO prescribing indicators in teaching hospitals, revealing significant variations between institutions. The average number of drugs per prescription ranged from 4.2 to 7.8, while generic prescribing rates varied between 18% to 56% across different centers.

Singh and Malhotra (2017) investigated drug utilization trends in medical intensive care units, reporting high prevalence of polypharmacy with average 8.3 drugs per patient. Their findings highlighted the complexity of medication management in critically ill patients and need for specialized clinical pharmacy services.

A regional study by Gupta et al. (2016) focused on prescribing patterns in Haryana's government hospitals, documenting suboptimal adherence to essential drug list recommendations. The research called for strengthened regulatory mechanisms and continuing medical education programs to improve prescribing practices.

3. Objectives

Primary Objective: To evaluate the drug utilization pattern among inpatients admitted to the Department of Medicine in a tertiary care teaching hospital in Mullana, Ambala, Haryana.

Secondary Objectives:

1. To assess adherence to WHO prescribing indicators in the study population
2. To analyze the most commonly prescribed drug categories and individual medications
3. To evaluate the appropriateness of antibiotic prescribing patterns
4. To determine the extent of generic drug prescribing and essential drug list compliance
5. To identify factors associated with polypharmacy in the study setting

4. Methodology

Study Design: Prospective observational cross-sectional study

Study Setting: Department of Medicine, Tertiary Care Teaching Hospital, Mullana, Ambala, Haryana, India

Study Period: November 1, 2018 to November 25, 2018
Study Population: All inpatients admitted to the Department of Medicine during the study period
Sample Size: Calculated using the formula $n = Z^2pq/d^2$, where Z = 1.96 (95% confidence level), p = 50% (expected prevalence of polypharmacy), q = 50%, d = 5% (precision). The calculated sample size was 384 participants.
Sampling Method: Systematic random sampling technique was employed. Every third patient admitted during the study period was selected until the desired sample size was achieved.
Ethical Clearance: The study protocol was approved by the Institutional Ethics Committee prior to data collection. Written informed consent was obtained from all participants or their legal guardians.
Data Collection Tools: A structured questionnaire was developed and validated by expert pharmacologists and clinicians. The questionnaire captured demographic information, clinical diagnosis, prescribed medications, dosage forms, frequencies, and treatment outcomes.
Statistical Analysis: Data was analyzed using SPSS version 25.0 software. Descriptive statistics were used for categorical variables (frequencies and percentages) and continuous variables (mean and standard deviation). Chi-square test was applied for categorical associations, while t-test was used for continuous variables. P-value <0.05 was considered statistically significant.

5. Data Collection Tool
Patient Drug Utilization Assessment Questionnaire

6. Inclusion and Exclusion Criteria
Inclusion Criteria:
- Patients aged 18 years and above
- Inpatients admitted to Department of Medicine
- Minimum hospital stay of 48 hours
- Patients with complete medication records
- Patients/guardians providing informed consent

Exclusion Criteria:
- Patients below 18 years of age
- Day care/outpatient department patients
- Patients with incomplete medical records
- Emergency department patients with stay <48 hours
- Patients transferred from other departments
- Patients refusing consent for participation

7. Results and Analysis
The study enrolled 384 inpatients with mean age 52.3±14.7 years (range: 19-87 years). Males constituted 225 (58.6%) participants, while females comprised 159 (41.4%). The majority of patients belonged to rural backgrounds (67.2%) with lower middle-class socioeconomic status (54.3%).

Table 1: Demographic Characteristics of Study Population

Characteristic	Frequency (n=384)	Percentage (%)
Age Groups (years)		
18-30	48	12.5
31-45	112	29.2
46-60	143	37.2
>60	81	21.1
Gender		
Male	225	58.6

Characteristic	Frequency (n=384)	Percentage (%)
Female	159	41.4
Background		
Rural	258	67.2
Urban	126	32.8

The average number of drugs per prescription was 6.2±2.1, indicating significant polypharmacy. Generic prescribing rate was observed in 23.4% of total prescriptions. Essential drug list compliance was noted in 295 (76.8%) of prescribed medications.

Table 2: WHO Prescribing Indicators

Indicator	Study Finding	WHO Standard
Average drugs per prescription	6.2±2.1	1.6-1.8
Generic prescribing rate	23.4%	100%
Antibiotics prescribed	68.2%	20.0-26.8%
Injectable prescribed	34.6%	13.4-24.1%
Essential drug list compliance	76.8%	100%

Cardiovascular drugs were most frequently prescribed (24.3%), followed by antimicrobials (19.7%) and gastrointestinal medications (15.2%). Among individual drugs, metformin was most commonly prescribed (18.4%), followed by aspirin (16.7%) and pantoprazole (14.6%).

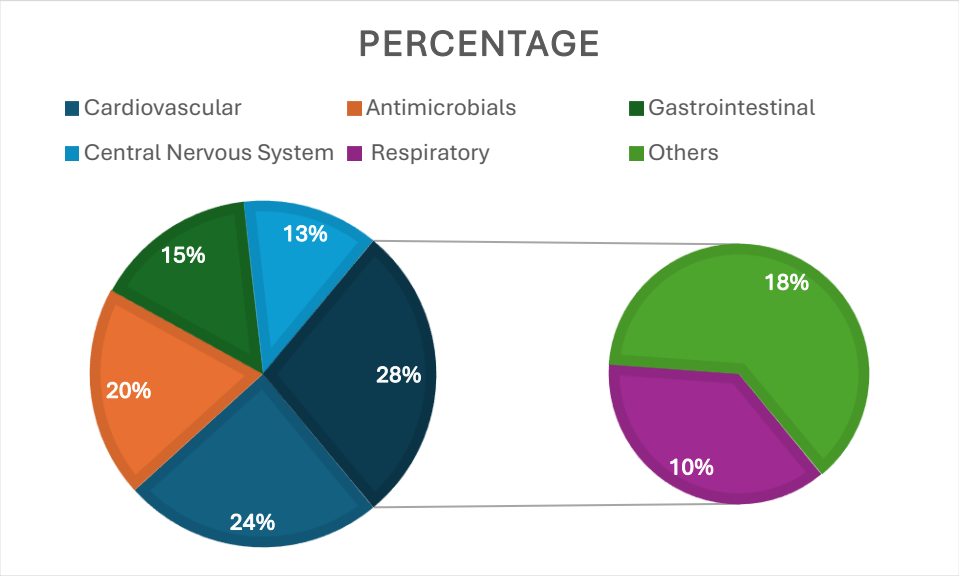

Figure 1: Distribution of Drug Categories

Figure 1 shows Cardiovascular 24.3%, Antimicrobials 19.7%, Gastrointestinal 15.2%, Central Nervous System 12.8%, Respiratory 10.4%, Others 17.6%

Antibiotic prescribing analysis revealed 262 patients (68.2%) received at least one antimicrobial agent. Cephalosporins were most frequently prescribed (38.5%), followed by fluoroquinolones (24.7%) and beta-lactam combinations (19.8%).

Statistical analysis revealed significant association between age and number of prescribed drugs ($p<0.001$), with elderly patients receiving higher number of medications. Rural patients showed higher antibiotic usage compared to urban counterparts ($p=0.023$).

The average length of hospital stay was 7.3±3.2 days. Patients with polypharmacy (≥5 drugs) had significantly longer hospital stays compared to those receiving fewer medications (8.1±3.5 vs 5.2±2.1 days, $p<0.001$).

8. Discussion and Interpretation

The findings reveal concerning trends in prescribing patterns at the tertiary care facility. The average 6.2 drugs per prescription significantly exceeds WHO recommendations, indicating widespread polypharmacy. This pattern is consistent with other Indian studies but suggests need for urgent intervention.

The low generic prescribing rate (23.4%) represents a missed opportunity for cost-effective healthcare delivery. Promoting generic prescribing could substantially reduce treatment costs, particularly important in the regional context where patients often face financial constraints.

High antibiotic usage (68.2%) raises concerns about antimicrobial resistance development. The rate exceeds WHO recommendations and other national studies, suggesting need for robust antimicrobial stewardship programs. The predominance of broad-spectrum antibiotics like cephalosporins indicates potential for more targeted therapy.

The cardiovascular drug predominance reflects the epidemiological transition in rural Haryana, with increasing prevalence of non-communicable diseases. This finding aligns with national health survey data showing rising cardiovascular disease burden in northern Indian states.

Essential drug list compliance (76.8%), while reasonable, has scope for improvement. Strengthening procurement systems and prescriber education could enhance adherence to essential medicines policies.

9. Recommendations and Future Scope

Immediate Recommendations:

1. Implement antimicrobial stewardship programs with defined protocols
2. Establish drug and therapeutics committee for prescribing guidelines
3. Conduct regular continuing medical education on rational prescribing
4. Introduce clinical pharmacy services for medication review

Long-term Strategies:

1. Develop institution-specific treatment protocols for common conditions
2. Implement electronic prescribing systems with clinical decision support
3. Establish drug utilization evaluation as routine quality improvement activity
4. Create regional prescribing databases for comparative analysis

Future Research Scope:

- Longitudinal studies examining prescribing trend changes
- Cost-effectiveness analysis of rational prescribing interventions
- Multicentric studies across Haryana healthcare facilities
- Investigation of patient outcomes related to prescribing patterns

10. Conclusion

This study provides baseline data on drug utilization patterns in a tertiary care teaching hospital in Haryana. The findings reveal significant deviation from WHO prescribing standards, particularly regarding polypharmacy and antibiotic usage. While essential drug list compliance was reasonable, substantial scope exists for improvement in generic prescribing.

The results highlight the need for systematic interventions to promote rational drug use in the regional healthcare context. Implementing evidence-based prescribing guidelines, strengthening clinical pharmacy services, and establishing robust monitoring mechanisms are essential for improving prescribing quality.

These findings have direct relevance for healthcare policy development in Haryana and similar resource-limited settings. The study contributes to growing evidence base supporting the need for targeted interventions to optimize medication use in Indian healthcare facilities.

11. Application to Practical Findings

The study findings have immediate practical applications for healthcare delivery in Mullana, Ambala, and broader Haryana region. The documented polypharmacy patterns suggest need for comprehensive medication reconciliation processes, particularly relevant given the rural patient population's limited health literacy.

Local healthcare administrators can utilize these findings to develop cost-containment strategies through generic prescribing promotion and essential medicines focus. The high antibiotic usage data provides compelling evidence for implementing antimicrobial stewardship programs tailored to regional resistance patterns.

For medical education, the results support incorporating rational prescribing modules in undergraduate and postgraduate curricula. The teaching hospital setting provides opportunities for demonstrating evidence-based prescribing practices to future healthcare providers.

12. Limitations of the Study

Several limitations must be acknowledged. The single-center design limits generalizability to other Haryana hospitals with different patient demographics or prescribing cultures. The 25-day study period may not capture seasonal variations in disease patterns and prescribing practices.

Data collection focused solely on Medicine department, excluding surgical and specialty departments that may demonstrate different utilization patterns. The study did not evaluate clinical outcomes or cost implications of observed prescribing patterns.

Patient compliance and medication adherence were not assessed, limiting understanding of actual drug utilization versus prescription patterns. Future multicentric studies with longer duration would provide more comprehensive insights into regional prescribing practices.

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