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Mapping Medication Journeys: A Data Driven Exploration Of Drug Utilisation Patterns.

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ABSTRACT

Drug utilization studies are important for monitoring the quality of care provided to patients. They can help to identify areas where prescribing, dispensing, and administration of medications can be improved. The World Health Organization (WHO) has established core drug use indicators to assess the degree of rational prescribing. These indicators include the percentage of essential drugs on the formulary, the percentage of encounters with no antibiotic prescribed, and the percentage of encounters with an injection prescribed. The paper concludes that drug utilization studies are an important tool for improving the quality of care. By identifying areas where prescribing, dispensing, and administration of medications can be improved, these studies can help to ensure that patients receive the best possible care.

Keywords: Drug utilization, Prescribing indicators, Prescription audit, Rational Prescribing

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INTRODUCTION

Drug utilisation study evaluation is an important part of patient treatment that also serves as a measure of the quality of care provided. A sensible use of medications is essential for a healthy and efficient health-care system.

However, irrational drug use, which is considered a global threat, is especially frequent in underdeveloped nations due to irrational prescribing, dispensing, and administration [1]. These methods of unethical and irrational prescribing lower the standard of therapy causing broad health risks such as a rise in the incidence of adverse effects, drug interactions, and the emergence of drug resistance, particularly with antimicrobial therapy. According to the World Health Organisation (WHO), more than half of all drugs are prescribed, distributed, or sold incorrectly [2].

Drug utilisation studies are instruments for measuring the prescribing, dispensing, and usage of medications at a specific location. The primary goal of such studies is to promote the judicious use of medications [3].

The WHO established drug use indicators in collaboration with the international network for rational drug use in order to assess the degree of rational prescribing. WHO classifies core drug use indicators into three categories: prescribing indicators, patient care indicators, and quality of care indicators. These are highly standardised indicators that do not require national customisation. Though, the core drug use indicators do not evaluate all aspects of drug utilisation, they do give a basic tool for swiftly and reliably measuring a few essential aspects of medicines usage in health care [4]. To overcome this, it necessitates rigorous methodology, extensive and diverse data sources.

Currently in India, it is necessary to undertake studies on prescribing patterns in each state and use the data generated by such studies to improve the quality of patient care, with the primary goal of promoting rational drug usage [5].

It is especially critical in resource-poor countries like ours to guarantee that limited resources be used as efficiently as possible [6].

This study was designed to assess the drug prescribing practices at our tertiary care centre, a teaching medical college hospital, using the five WHO prescribing indicators [7].

METHODS

A cross-sectional, OPD-based study was carried out in a tertiary care hospital of Dehradun, after taking ethical clearance from the institutional ethics committee (SGRR/IEC/06/21). The study was carried out over a period of 9 months from October 2022 to June 2023. A total of 426 outpatient prescriptions were taken from various pharmacies of the institute, irrespective of patient characteristics and diagnosis.

The study was conducted out in compliance with WHO guidelines.

- Average number of medications prescribed every encounter, indicating the degree of polypharmacy.
- Percentage of medications prescribed by generic name, used to assess the proclivity to prescribe by generic name.
- Percentage of antibiotic-prescribed encounters.
- Percentage of visits where an injection was prescribed in order to assess the general usage of two significant, but often overpriced, pharmacological modalities of treatment.
- Percentage of pharmaceuticals prescribed from the national essential drugs list, which measures how well practices adhere to a national drug policy by prescribing from the national essential drugs list 2022 [8].

The percentage of encounters with an antibiotic prescribed and the percentage of encounters with an injection prescribed were computed by dividing the number of patient interactions during which an antibiotic or an injection is prescribed by the total number of encounters surveyed and multiplying the

result by 100. For the average number of drugs per encounter, combinations were treated as a single drug, whereas for the remaining indicators, combinations were divided into individual substances and counted separately. Doctors' abbreviations or short forms, such as (Paracetamol written as PCM), were considered generic. A multivitamin prescription, such as B-complex, was counted as one.

Descriptive analysis of data was done and presented as percentages using the Microsoft Excel. The data was analysed using SPSS version 28.

RESULTS

A total of 426 case records were reviewed. Among the cases, 237(56%) were male and 189(44%) were females. The mean age of patients was 41 years. (figure 1)

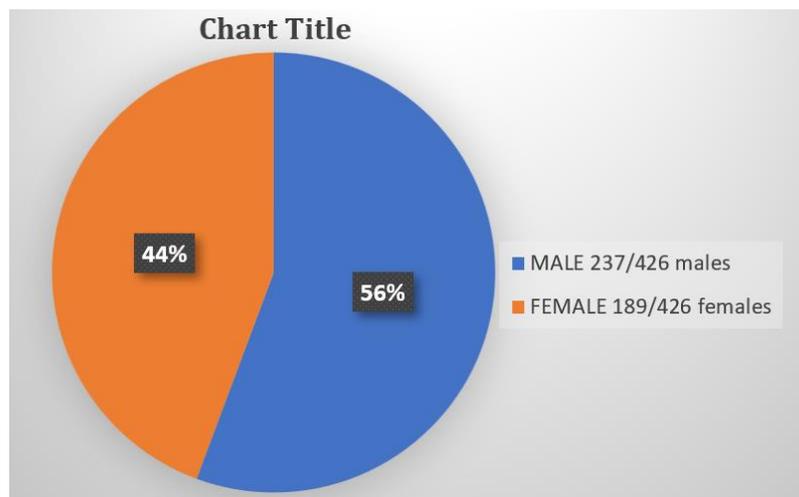


Figure1. Percentage of Males and Females included in the study.

The total number of drugs which were prescribed to the patients was 2139. The average number of drugs per prescription was 4.35, minimum being 1 and maximum being 6.

The prescribing indicators like average number of drugs, drugs prescribed by generic name, essentiality of drug are shown in the Table 1.

S.No	Parameter	Percentage
1	Prescription legible	54.70%
2	Prescribed generic drugs	0.56%
3	Prescribed in capital letters	4%
4	Prescribed without signature	7.6%
5	Prescribed Fixed dose combination	28%
6	Prescribed injections	0.98%

Table 1: Prescribing indicators

Of the total 2139 medicine formulations prescribed, 99.44% (2127) were prescribed by brand names and remaining 0.56% (12) by generic name. 0.98% injectables were prescribed compared to other dosage forms. Among the oral drug formulations, 28% (599) were found to be Fixed drug combinations (FDCs).

68.44% (1464) drugs were included from the National list of essential medicine, 2022. Figure 2 shows the most commonly prescribed classes of drugs .

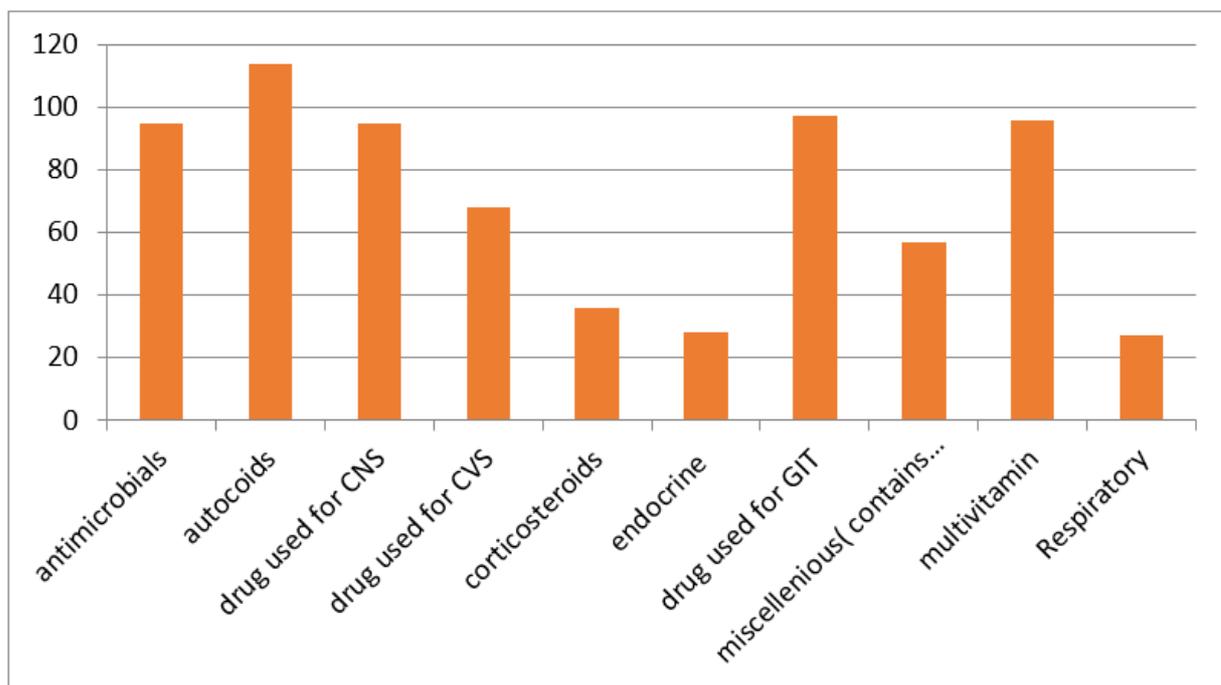


Figure 2: Commonly prescribed classes of drugs

It was also noted that out of 426 prescriptions studied, 288(67.6%) had at least one multivitamin, iron or tonic prescribed.

The top two groups of drugs prescribed were autacooids across various departments and drugs used for gastrointestinal system, followed by multivitamins and antibiotics.

Among the 426 prescriptions, 579(45.30%) were illegible and 96(7.60%) were without signatures of the treating clinician. Only 4% (17) prescriptions were in capital letters.

DISCUSSION

In the present study, on an average 4.35 drugs were prescribed to per patient as compared to 2.3 and 2.22 from Spain and Karnataka respectively. Prakash et al, Ansari et al, and Nazima et al found this number to be 5.86, 5.05 and 3.72 medicines per prescription respectively in their studies [9]. As a result, it is clear that polypharmacy and overprescribing are widespread in India irrespective of region. Several factors can account for this circumstance, including difficulty in diagnosis in a patient presenting with various symptoms, the patient's need for immediate relief, the availability of non-essential and irrational drug combinations, and aggressive medicine prescribing.

The outcomes of our study illustrate the country's ongoing dilemma of irrational drug prescribing. Given that, the vast majority of drug purchase costs are borne out of pocket, the ultimate burden of such prescribing practices lies entirely on the patient. More drugs prescribed simultaneously increase the danger of drug interactions, reduce patient compliance, and raise treatment costs. The use of pharmaceuticals from the essential drug list should be encouraged in order to make the best use of limited financial resources, to ensure acceptable safety, and to meet the majority of the population's health needs. It was a positive observation that 68.4% of the drugs were from the latest essential drug list, although WHO recommends 100% [10].

S.No	WHO Indicators	Findings	WHO standard [6]
1	Average number of drugs per prescription	4.35	1.6 - 1.8
2	Percentage of drugs are prescribed by generic name	0.56%	100%
3	Percentage of encounters with an antibiotic prescribed?	13.3%	20.0 - 26.8%
4	Percentage of encounters with an injection prescribed?	0.98%	13.4 - 24.1%
5	Medicines prescribed are as per NLEM/Formulary	68.4%	100%

Table 2: WHO Core Prescribing Indicators

In this study, only 0.98% of the drugs were prescribed by their generic names. Mohanty BK et al in Rajahmundry observed that generic names were used for 1.42% of the drugs administered. In Karnataka, Chandra et al stated that 13.48% of drugs were prescribed by generic name. The use of generic names for medications reduces misunderstanding and makes therapy more reasonable and cost effective. The Indian pharmaceutical industry is regarded as one of the world’s largest suppliers of generic medications. In the current study, prescriptions for generic pharmaceutical formulations were low, which contradicted the findings of previous studies in which generic formulations were used to varying degrees (37–94%) [11]. The most frequently cited reasons for not prescribing generic medications are

- Lack of belief in the efficacy and bioavailability of generic formulations.
- Prescribers' lack of knowledge regarding the pricing differences between generic and branded medications.
- A lack of information from pharmaceutical manufacturers on the availability of generic formulations [12].
- Tradition, aggressive medicine promotion, availability of FDC.

WHO Core Indicators	Our Findings	Mohanty et al [13]	Ajapuje et al [14]	Chandra et al [15]	Dwivedi et al [16]
Mean No of drugs	4.35	3	3.42	2.85	3.3
Generic names	0.56%	1.42%	5.41%	13.48%	65%
Antibiotics	13.3%	57.24%	78.15%	60%	34%
Injections	0.98%	2.13%	-	4.33%	13%
NLEM	68.4%	6.4%	81.69%	72.91%	82%

Table 3: Comparison of WHO core indicators

Doctors are notorious for their illegible handwriting, which can lead to medication errors, the delivery of incorrect drugs, unpleasant drug responses and failure of treatment. We discovered that 45.30% of doctors had illegible handwriting in our study. In our survey, 7.6% of prescriptions were not signed by the appropriate treating clinicians. This information is necessary to identify the prescribing doctor and authenticate the legitimacy of prescriptions. To avoid such errors, use of capital letters when prescribing medicines is appreciated, for which NMC has also recommended the same¹, though in our study we found only 4% of prescriptions with capital letters.

According to the findings of our study, the percentage of encounters with an antibiotic given was found to be 13.3%. In numerous other trials, the percentage of antibiotic exposures was up to 78.15%. Antibiotics should be used sparingly and only when absolutely necessary. Antibiotic resistance develops as a result of injudicious antibiotic use. Antimicrobial resistance is a global issue that is especially pressing in developing nations where the infectious disease burden is high and the expense of replacing existing medicines with newer, more expensive ones is limited. According to research on resistant illnesses, the

level of resistance has been high so antimicrobial stewardship is crucial to combatting antibiotic resistance, a growing public health threat [17].

Limitations Of The Study

The limitations of our study are that, it's a single centre study and the prescriptions were collected from OPD setting and IPD prescriptions were not taken into account.

CONCLUSION

This drug utilisation study revealed several areas for prescription practice improvement. Addressing these difficulties in the healthcare setting through a multimodal approach that includes educational interventions, guideline formulation, audit and feedback, system-level improvements, and patient education has the potential to improve the quality, safety, and cost-effectiveness of drug utilisation.

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