



Prescription Analysis And Drug Utilization Pattern in Out Patient Department of Hospital Pharmacy at a Tertiary Care Teaching Hospital

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SUMMARY

Introduction: A prescription audit is a quality improvement procedure that aims to enhance patient care and is a component of the comprehensive clinical audit.

Aim: This study was conducted to audit the quality of outpatient department [OPD] prescriptions at an urban government hospital and to analyse the gap between the medicines prescribed and the effective utilization of alternative preparations available in the hospital and the resulting cost burden on the patients.

Material and Methods: An observational study was carried out in a government hospital in Pune wherein 1000 prescriptions were collected randomly from patients visiting the hospital pharmacy irrespective of diagnosis over a period of 10 days in January 2023 and May 2023. The prescriptions were analyzed for medical components and drug use indicators and instances where NSAIDs, multivitamins, antidyspeptics and brand names were prescribed along with their dosing. The data obtained was summed up and analyzed using MS-Excel.

Results: Around 36.3% prescriptions had diagnosis mentioned in them, 77.9% prescriptions had ≥ 3 drugs, 49% had fixed dose combinations (FDCs), 43.4% had multivitamins, while 51.8% had antidyspeptics. NSAIDs and paracetamol were prescribed to 45.10% patients. Ten percent prescriptions had drugs that were prescribed from outside, but their substitute was available in the hospital pharmacy.

Conclusion: Our study highlights the need of scrutiny of prescriptions by senior consultants in terms of dosing and brand names so that drugs can be utilized appropriately. Sharing of inventory with prescribers and orientation with regard to use of available substitutes may be helpful in reducing out of pocket expenditure. Frequently prescribed drugs can be added in the inventory to reduce the cost burden on patients.

Keywords: Core Indicators, Drug Utilization, Drug Inventory

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INTRODUCTION

Prescription audit was conducted for the 1st time in 1854 by Florence Nightingale with the aim of preventing post-surgical mortality [1]. Auditing, as we know, is a basic method for measuring and monitoring what we do in comparison to a reference standard. A prescription audit has been conducted in multiple clinical settings like out-patient departments, in-patient departments, and hospital pharmacies, amongst others, for specific diseases and for individual drugs as well, in an attempt to understand the areas for improvement in the services being provided to the patient and also to understand the approach and awareness of physicians towards the effective utilization of the available resources [2].

A prescription is a medico-legal document that is written by an authorized person and gives instructions to the pharmacist for dispensing the medicines correctly. Therefore, a prescription projects the quality of healthcare services that a patient receives [3].

In the 1990s, WHO collaborated with the International Network of Rational Use of Drugs (INRUD) to establish a set of indicators to assess the performance of healthcare institutions in terms of drug usage [4]. These drug use indicators were developed to be used as measures of performance in three general areas related to the rational use of drugs:

- a. prescribing indicators.
- b. patient care indicators.
- c. facility indicators. [5]

While a prescription is reflective of multiple parameters of healthcare, this study was conducted with the aim of auditing the quality of outpatient department (OPD) prescriptions at an urban government hospital and to analyse the gap between the medicines prescribed and the availability of the original medication or substitutable alternative preparations in the hospital as well as effective utilization of these substitutes and the resultant cost burden on the patients.

Regardless of the health system, the WHO encourages the use of low-cost medicine whenever possible [6]. The Medical Council of India (MCI) revised clause 1.5 of the Medical Council of India: Professional Conduct, Etiquette, and Ethics in September 2016, which is concerned with the use of generic names of drugs by doctors [7]. It states that 'every physician should, as far as possible, prescribe drugs

with generic names legibly and preferably in capital letters, and he or she shall ensure that there is a rational prescription and use of drugs' [7].

Even though the government has tried to reinforce and encourage the use of generic medicines and a good percentage of physicians have knowledge regarding generic medicines, studies have reported that there is a gap between knowledge and perception toward generic and brand drugs [8-11]. Thus, regular audits not only keep a check on the prescribing behaviour of physicians but also serve as a reminder to them, which might help to increase their adherence to a set of standards like the essential medicines list (EML) of the hospital and also lessen the economic burden of healthcare.

MATERIAL AND METHODS

It was an academic cross-sectional, observational study which was carried out in the hospital pharmacy of a tertiary care teaching hospital in Pune. The study protocol was approved by the Institutional Ethics Committee (Ethics Committee Approval No.: BJGMC/IEC/Pharmac/ND-Dept. 0123021-021) before commencing the study. After approval, prescriptions were collected from the general pharmacy of the Outpatient Department throughout a 10-day period, 5 days each in January 2023 and May 2023. The prescriptions were collected randomly from the patients visiting the hospital pharmacy regardless of the diagnosis or the department from which the patient received consultation. Total 1000 prescriptions were collected during the study period. Prescriptions of patients admitted for day care procedures, prescriptions from obstetric and psychiatric OPD were excluded from the study, since these departments had a separate pharmacy from which the respective patients obtain their medicines.

Prescriptions of the patients who satisfied the study criteria were collected and reviewed for demographic details (name, age, gender), diagnosis; three drug prescribing indicators namely (a) average number of drugs per encounter, (b) percentage of prescriptions having drugs by generic names and (c) percentage of encounters with an antibiotic (antimicrobial); number of FDCs per prescription; number of antimicrobials per prescription along with its duration; percentage

of encounters with multivitamins and antidyspeptics along with their dosing and duration of antidyspeptics; encounters where NSAIDs and paracetamol were prescribed; percentage of prescriptions with drugs which were not available in the pharmacy but their substitutes were available and percentage of prescriptions where the substitutes were not available as well.

The data was then recorded in the case record form and was later on entered into Microsoft Excel 2019. Data was analyzed using MS-Excel and results were expressed as mean and percentages.

RESULTS

1000 prescriptions were collected from the patients visiting hospital OPD pharmacy and analyzed. The demographic profiles of the patients showed that the age group of the study population ranged between 15 days to 97 years. Out of the 1000 prescriptions, age was not specified in 2.6% prescriptions. The proportion of females (54.90%) was higher than males (44.20%).

Diagnosis was mentioned only in 36.30% prescriptions while 63.70% prescriptions had no diagnosis mentioned in them.

The average number of drugs per encounter was found to be 3.76. When the number of drugs per prescription were categorized into <3, 3-5 and >5 drugs per prescription for analysis (Figure 1), it was observed that 64.60% prescriptions had 3-5 drugs.

Furthermore, in 60.60% prescriptions, drugs had been prescribed only by generic names while in 39.40% prescriptions, some drugs had been prescribed by brand names (Figure 2).

70.50% prescriptions did not contain any antimicrobial agent, 24.50% cases had 1, 4.90% had 2 and 0.10% prescriptions had 3 antimicrobials, as depicted in Figure 3. The duration for which antimicrobials were prescribed ranged between 2 days to 30 days. It was prescribed for 2-5 days in 105 prescriptions, 6-15 days in 111 cases and 16-30 days to 3 patients. The duration of antimicrobials was not mentioned in 75 prescriptions.

No fixed dose combination drugs were prescribed in 51% prescriptions, while the number of fixed dose combinations per prescriptions ranged between 1 in 30.50% cases, 2 in 12.50% cases, 3 in 4% cases, 4 in 1.70%

Figure 1: Number of drugs/prescription

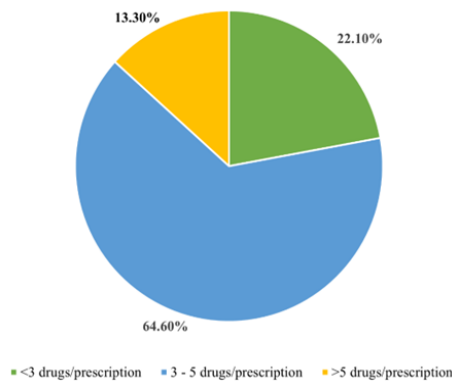


Figure 1. Shows the number of drugs per prescription and have been categorised into <3 drugs, 3-5 drugs and >5 drugs per prescription.

Figure 2: Nomenclature of drugs in prescription

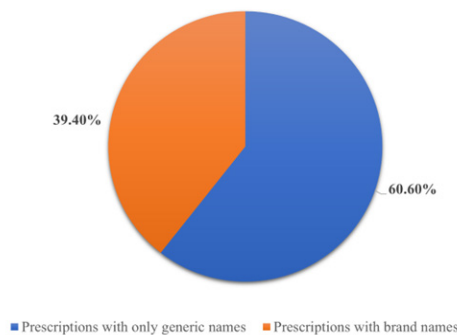


Figure 2. Represents the drug nomenclature used in prescriptions.

Figure 3: Number of antimicrobials/prescription

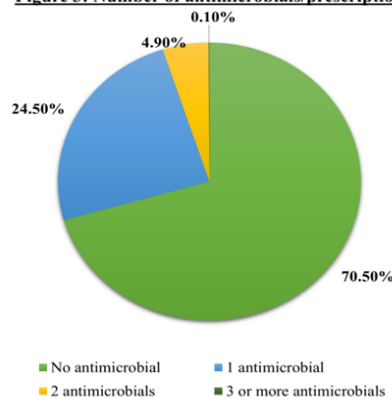


Figure 3. Shows the number of antimicrobials prescribed in each prescription and has been categorised into 0, 1, 2 and, 3 or more antimicrobials per prescription.

Figure 4: No. of FDCs/prescription

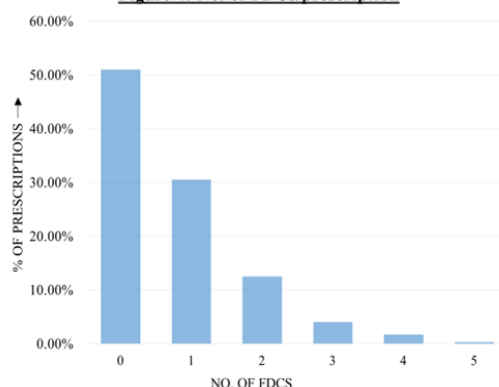


Figure 4. Shows the number of FDCs per prescription and have been sorted into 0, 1, 2, 3, 4 and 5 FDCs per prescription.

FDCs - Fixed dose combination

Figure 5. Shows the prescribing pattern of multivitamins and their frequency of administration where OD is once a day, BD is twice a day and NS is not specified.

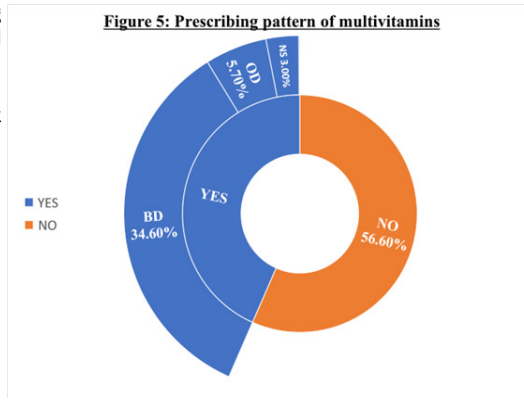
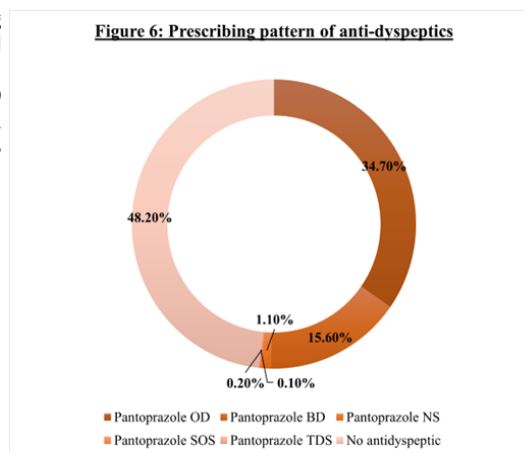


Figure 6. Shows the prescribing pattern of antidyspeptics and their frequency of administration where OD is once a day, BD is twice a day, TDS is thrice a day, NS is not specified and SOS is as required.



cases to 5 in 0.3% prescriptions (Figure 4).

Multivitamins were prescribed to 43.40% patients. The prescriptions were further analyzed for the dosage of multivitamins which was found to be twice a day in 34.60% prescriptions, once a day in 5.70% and in 3% prescriptions dosing frequency was not specified (Figure 5).

Antidyspeptics were prescribed to 51.80% patients. The only antidyspeptic drug prescribed was capsule pantoprazole. Analysis shown in Figure 6 reveals that capsule pantoprazole was prescribed once a day in 34.70%, twice a day in 15.60% prescriptions, thrice a day in 0.10% prescriptions, as required (SOS) to 0.20% patients whereas dosage was not specified [NS] in 1.10% prescriptions. The duration of treatment with antidyspeptics was noted to be <7 days in 33.20% prescriptions; 8-14 days in 3.10% prescriptions, 15-21 days in 3.20% prescriptions and 22-30 days in 0.40% cases, SOS in 0.10% cases while the duration was not mentioned in 11.70% prescriptions.

In our study, NSAIDs and paracetamol were prescribed to 45.10% patients.

The drugs which were not available in the hospital pharmacy but their substitutes

were found to be available constituted 10% of the prescriptions while no substitutes for the unavailable drugs were found in 43.20% cases.

DISCUSSION

Prescription audit is one of the simplest and most trustworthy ways to determine whether treating physicians are adhering to the accepted standards as mandated by the Medical Council of India so that the limited available resources are put to use judiciously. It also aids in identifying population requirements and aids in improvising policies in accordance with those demands. However, despite their enormous relevance, prescription audits have been the subject of remarkably few publications, which suggests that they are overlooked and underutilized.

While investigating the errors in prescriptions, patient's detail such as, age was not mentioned in 2.6% prescriptions which is similar to the results of the audit conducted by Bandyopadhyay D. [12]; gender was not mentioned in 0.90% prescriptions.

We encountered a greater number of female patients: 54.90% than male patients: 44.20%.

In our study, the average number of drugs per prescription was found to be 3.76 which exceeds the WHO recommendation of 1.6-1.8. This is quite higher when compared to the prescription audit conducted in a teaching hospital in South India which is 2.38 [13]. On the same grounds, the number of drugs per prescription was found to be zero in 0.4% prescriptions, one in 7.5%, two in 14.2%, three in 20.3%, four in 29.4% and five or more than 5 in 28.2% cases. The reason of this rampant polypharmacy can be possibly attributed to the fact that around 21.3% prescriptions belonged to the Department of Dermatology where patients generally receive topical as well as systemic medicines. Furthermore, it was observed that many patients had consulted multiple departments in the same visit, which may have led to polypharmacy. Indifferent attitude of physicians towards antidyspeptics, multivitamins and NSAIDs and paracetamol can also be a contributing factor.

In our study, diagnosis was mentioned only in 36.30% prescriptions which is much lower when compared to the findings of Singh T et al [3] which is 64.2% and Meenakshi et al [13] which is 82.7%. The reason

Table 1. Summary of results

Parameter		Results
Age group		15 days - 97 years
Age not mentioned		2.6%
Gender	Males	44.20%
	Females	54.90%
	Not mentioned	0.90%
Diagnosis	Mentioned	36.30%
	Not mentioned	63.70%
Number of drugs/prescription	<3 drugs	22.10%
	3-5 drugs	64.60%
	>5 drugs	13.30%
Nomenclature of drugs in prescription	Generic names only	60.60%
	Generic + Brand names	39.40%
Antimicrobials/prescription	0	70.50%
	1	24.50%
	2	4.90%
	3	0.10%
Duration of antimicrobials	2-5 days	105
	6-15 days	111
	16-30 days	3
	Not mentioned	75
FDCs/prescription	0	51.00%
	1	30.50%
	2	12.50%
	3	4.00%
	4	1.70%
	5	0.30%
Prescription pattern of multivitamins	Once a day (OD)	5.70%
	Twice a day (BD)	34.60%
	Thrice a day (TDS)	0.10%
	Not Specified (NS)	3.00%
	Not prescribed	56.60%
Prescription pattern of antidyspeptics	Once a day (OD)	34.70%
	Twice a day (BD)	15.60%
	Not Specified (NS)	1.10%
	Not prescribed	48.20%
Duration of antidyspeptics	<7 days	33.20%
	8-14 days	3.10%
	15-21 days	3.20%
	22-30 days	0.40%
	SOS (as required)	0.10%
	Not mentioned	11.70%
Prescriptions with NSAIDs/and paracetamol		45.10%
Drugs not available in pharmacy: substitute available		10%
Drugs and it's substitute both unavailable		43.20%

might be heavy patient load, or non-specific complaints of patients but a lack of diagnosis calls into doubt the validity of the medications being prescribed and may have an impact on patient compliance as well.

The percentage of drugs prescribed by generic name was 60.60% compared to study in South India wherein 55.4% were prescribed by generic names [13]. This value is far lower than WHO ideal value of 100%. NMC recently enforced an order in August 2023 requiring physicians to prescribe generic medications rather than their branded counterparts since in terms of strength, dosage, form, safety, quality, and intended use, generic medicines are no different from their branded counterparts and has an additional advantage of providing an aid in cost cutting.

It was observed that 48.7% of the prescriptions had fixed dose combinations [FDCs] which is relatively high when compared to other studies where FDCs were found to be 27.1% [13] and 36% [14]. Though FDCs may help in reduction of overall pill burden, they also increase the chances of adverse drug reactions [15,16]. Additionally, FDCs generally tend to be more expensive than their individual equivalents and might lead to unnecessary cost enhancement of therapy [15,16] and thus they should be used cautiously. Furthermore, number of FDCs/prescription were analysed individually and it was found that no FDCs were prescribed in 51.3% cases while 1 FDCs in 30.50% prescriptions, 2 FDCs in 12.50%, 3 in 4% and 4 FDCs in 1.70% prescriptions were found which suggests the need to train the physicians regarding the judicious use of FDCs and the repercussions of irrational use of FDCs. The commonly prescribed FDCs were multivitamins; ferrous sulphate + folic acid; calcium + vitamin D3.

The % of encounters where antimicrobials were prescribed was found to be 29.50% which is within the limit set up by WHO [$\leq 30\%$]. Therefore, it can be concluded that antimicrobials were administered sparingly at this hospital, which in itself exemplifies how crucial it is for the physicians to be educated regarding the use of antimicrobials and also reflects the success of such training in our hospital. In other studies, conducted in similar settings, the result was found to be 19.4% [14] and 52.5% [3]. The duration of antimicrobial treatment in our prescriptions varied from 2 to 30 days, and 7.5% of prescriptions

did not specify the duration. This implies that the chemist's judgement was the final arbiter of how long the patient would receive the antimicrobial, an enormous burden placed on his shoulders. On further analysis, two patients received 30-day prescription for antimicrobials; one patient had pterygium, while the other patient was undiagnosed. Antimicrobials were recommended for 21 days for a patient of SICS with PCIOL implantation; six acne patients were prescribed antimicrobials for 15 days, and five acne patients were advised to take antimicrobials for 14 days. Seven other patients, who had diabetes, pneumothorax, acne, and a few more who were undiagnosed, received antimicrobials for ten days. It is difficult for one to accept the justification for administering antimicrobials for such a long period, especially when the diagnosis is lacking in 21% of prescriptions with antimicrobials.

The % of encounters with multivitamins was found to be 43.4%. In other studies, conducted in similar settings, it was found that multivitamins were amongst the most commonly prescribed drugs [17]. Hemangini et al [17] highlighted that 29.75% patients were prescribed multivitamins but our study has reported excessive use of multivitamins in our hospital when compared with the same. Furthermore, while analysing the prescription for the pattern of dosing of multivitamins, it was found that OD dosing was found only in 5.70% cases, while BD and TDS dosing was found in 34.60% and 0.10% cases respectively and the dose was not specified in 3% prescriptions. Justification regarding the benefits provided by more than once daily dosing of multivitamins could not be found, and such an irrational use of multivitamins might just be increasing the cost burden on the hospital rather than providing any additional benefits.

Similarly, the % encounters with antidyspeptics were found to be 51.80%. Hemangini et al [17] reported a similar trend of use of antidyspeptics in their study which was approximately 44%. Additionally, the dosing of antidyspeptics was found to be once a day in 34.70%, twice a day in 15.60% and thrice a day in 0.10% prescriptions. The dosing was not specified in 1.10% prescriptions. The duration of antidyspeptics ranged between 3 to 30 days. The antidyspeptic most commonly prescribed was pantoprazole and there are no guidelines, which could justify the use of antidyspeptics in the dosing of twice or thrice

a day. Thus, the dosing of antidyspeptics was found to be irrational in our study. 33.20% patients were prescribed antidyspeptics for <7 days while the duration of antidyspeptics was not mentioned in 11.70% prescriptions. Lack of diagnosis again puts into consideration the fact that physicians have an indifferent attitude towards the use of antidyspeptics.

The % encounters with NSAIDs and paracetamol was found to be 45.10% in our study while it was only 13.5% in another study [18]. The major contributing department in this regard was the department of medicine [13.8%] while no department could be identified in 20.0% prescriptions where NSAIDs were being prescribed. This might just be indicative of the fact that the patients are being provided only symptomatic treatment rather than definitive treatment.

The prescriptions were also analyzed for the drugs which were unavailable in the hospital pharmacy but their substitutes were available which was 10% and the drugs which were not available in the hospital pharmacy but their substitutes too were not available which was 43.20%. This was done in an attempt to understand the awareness and attitude of physicians towards the alternative preparations that are available in the hospital and to understand as to what drugs should be incorporated into the hospital inventory so as to reduce the cost burden of the patients.

CONCLUSION

Our study highlights the irrational use of drugs especially with respect to multivitamins, antidyspeptics and NSAIDs. It suggests that there is a huge scope of improvement in the quality of the prescriptions. There is a need of scrutiny of prescriptions by senior consultants in terms of dosing and brand names which can help in reducing the cost burden of patients and the hospital. Expansion of hospital inventory to include frequently prescribed drugs as well training of physicians to utilize alternative preparations available in the hospital can reduce the out-of-pocket expenditure of patients.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

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Analiza propisivanja i potrošnje lekova u bolničkoj apoteci ambulantnog odeljenja zdravstvene ustanove tercijernog nivoa

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KRATAK SADRŽAJ

Uvod: Revizija recepta je procedura poboljšanja kvaliteta koja ima za cilj da unapredi negu pacijenata i sastavni je deo sveobuhvatne kliničke revizije.

Cilj: Ova studija je sprovedena radi revizije kvaliteta recepata za ambulantno odeljenje [OPD] u jednoj gradskoj vladinoj bolnici i da bi se analizirao jaz između propisanih lekova i efektivnog korišćenja alternativnih preparata dostupnih u bolnici i rezultujućih troškova za pacijente.

Materijal i metode: U državnoj bolnici u Puneu sprovedena je akademska opservaciona studija u kojoj je nasumično prikupljeno 1000 recepata od pacijenata koji su dolazili u bolničku apoteku, bez obzira na dijagnozu, u periodu od 10 dana u januaru 2023. i maju 2023. Recepti su analizirani za medicinske komponente i indikatori upotrebe lekova i slučajeve u kojima su NSAID, multivitamini, antidispeptični antidispeptici i nazivi brendova propisani zajedno sa njihovim doziranjem. Dobijeni podaci su sumirani i analizirani korišćenjem MS-Excel-a.

Rezultati: Oko 36,3% recepata je imalo dijagnozu, 77,9% recepata je imalo ≥ 3 leka, 49% je imalo fiksne kombinacije doza (FDC), 43,4% je imalo multivitamine, dok je 51,8% imalo antidispeptice. NSAID i paracetamol su propisani za 45,10% pacijenata. Deset odsto na receptima imalo je lekove koji su se prepisivali spolja, ali je njihova zamena bila dostupna u bolničkoj apoteci.

Zaključak: Naša studija naglašava potrebu da stariji konsultanti preispitaju recepte u pogledu doziranja i brendova kako bi se lekovi mogli pravilno koristiti. Deljenje inventara sa lekarima koji propisuju lek i orijentacija u pogledu upotrebe dostupnih supstituta može biti od pomoći u smanjenju troškova iz džepa. Često propisivani lekovi se mogu dodati u inventar kako bi se smanjio teret troškova za pacijente.

Ključne reči: osnovni indikatori, upotreba lekova, inventar lekova

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