



PRESCRIPTION AUDIT ANALYSIS AMONG PATIENTS ATTENDING A TERTIARY CARE TEACHING HOSPITAL IN TELANGANA

Clinical Research

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ABSTRACT

Aim- The present study was done to assess the drug prescription standards followed by the physicians by doing prescription audit and to assess the prescriptions according to WHO prescribing indicators in patients attending a tertiary care teaching hospital in Hyderabad. **Methodology-** The study was a prospective observational study done in Kamineni Academy of Medical Sciences and Research Centre, Hyderabad for a period of 3 months (June 2022- August 2022). The study was done by analyzing 140 prescriptions, of which 80 prescriptions were of in-patients and 60 were of out-patients. These prescriptions were analyzed using WHO prescribing indicators and using the prescription audit criteria of National Accreditation Board for Hospitals (NABH) purpose. **Results-** All the prescriptions were analyzed by the WHO prescribing indicators- 64.35% of prescriptions had drugs written with generic names and 92.11% of drugs were prescribed from National List of Essential Medicines. Among 80 in-patient prescriptions analyzed, an average of 6.83 drugs were prescribed per patient. This polypharmacy may have resulted in prescriptions with large number of potential drug-drug interactions (21.25%) and more therapeutic duplication (11.25%). Am60 out- patient prescriptions analyzed, an average of 2.82 drugs were prescribed per patient. 13.33% prescriptions had drugs with potential drug-drug interactions and 5% had therapeutic duplication. 90% of all prescriptions had good legibility, with names of drugs written in capital letters. **Conclusion-** The study highlights the need to do periodic prescription audit analysis, to check for any errors in prescriptions. Such reports can help the physicians to reduce prescription errors in future.

KEYWORDS

prescription audit, prescribing indicators, drug-drug interactions, therapeutic duplication

INTRODUCTION

Prescription audit has enormous potential to promote the rational usage of drugs.^[1] Rational use of medicines, as defined by WHO requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at lowest cost to them and to their community. Therefore, it advocates that the right patient receives right drug for right indication, in the right dosage and at the right cost. In addition, to above mentioned criteria, appropriate information should be provided to the patient and appropriate monitoring should be done.

Rational use of medicines is essential to provide better health and medical care to the patients and develop confidence in the health care system. In developing countries where economic resources are limited, unsafe and ineffective treatment results in wastage of these valuable resources. The most common forms of irrational use of medicine are polypharmacy, inappropriate medication usage and prescribing medicines which are not there in National List of Essential Medicines or which are outside the standard treatment guidelines for a particular condition^[2]. WHO in collaboration with International Network of Rational Use of Medicines (INRUD) developed a set of indicators to assess the patterns of drug use in health care centers. Prescription audit helps in detection of inappropriate prescriptions, which further helps in creating interventions to improve prescribing habits. National Accreditation Board of Hospitals (NABH) mandates the conduct of regular prescription audits^[3]. A prescription audit is designed to measure the compliance of the prescriptions with the standards of proven clinical practice^[4]. Patient care can be improved through improvement in professional practice and quality standards.

The present study was therefore planned to analyze the prescriptions of patients according to WHO drug use prescribing indicators and do prescription audit to note down the fallacies during prescribing. This may further help in planning corrective actions to improve the quality of the prescriptions and reduce prescription errors.^[5]

MATERIALS AND METHODS-

This study was a prospective observational study, done involving 140 prescriptions in Kamineni Academy of Medical Sciences and Research Centre (KAMSRC), Hyderabad. The study was done for a period of 3 months (June 2022- August 2022) after obtaining permission from the Institutional Ethics Committee of KAMSRC. The present study was carried out to assess drug prescription standards followed by the prescribing physicians according to INRUD criteria

set by WHO.^[6]

The prescribing indicators include: the average number of drugs prescribed per encounter (optimal value 1.6–1.8), the percentage of drugs prescribed by generic name (optimal value 100%), the percentage of encounters where an antibiotic was prescribed (optimal value 20.0– 26.8%), the percentage of encounters where an injection was the route of administration (optimal value 13.4– 24.1%), and the percentage of drugs prescribed from the National List of Essential Medicines for which the optimal value is 100%.

Further, the prescription audit analysis to check the completeness of prescriptions was carried out by the Department of Pharmacology, KAMSRC, as a part of regular audit done for NABH accreditation purpose.

The demographic data, the drugs prescribed, dose, route of administration and other relevant data was taken from the drug charts in case sheets of the admitted in- patients as well as out-patient prescriptions and was entered into Microsoft Excel Sheet. The potential drug- drug interactions and therapeutic duplications were analyzed using online drug interaction checker developed by www.drugs.com^[7]. The prescriptions were also checked for legibility (drug names written in capital letters), signature of the treating physician and instructions given to patients. The prescriptions were also checked to see if the drug names were generic and they were prescribed from National List of Essential Medicines.

The demographic data was analyzed, and the results were expressed as mean± SD. The percentages were calculated using the formulae put forth by WHO for calculating various prescribing indicators.

RESULTS-

A total of 140 prescriptions were studied, out of which 80 were of in-patients and 60 were of out-patients. There were a total of 84 male patients and 56 female patients. The Mean age of the patients was 52.8± 18.2 years.

The drug prescribing indicators were calculated according to the formulae suggested by WHO and the results were expressed in percentages (Table I).

Table I: Table Shows Analysis Of All The Patient Prescriptions, According To WHO Prescribing Indicators

Average number of drugs per prescription (n=634)	4.53
Percentage of drugs prescribed by generic name (n= 408)	64.35 %
Percentage of prescriptions with an antimicrobial prescribed (n= 30)	21.43 %
Percentage of prescriptions with an injection prescribed (n= 43)	30.71 %
Percentage of drugs prescribed from National List of Essential Medicines (n=584)	92.11 %

The average consultation time for patients attending out-patient services of the hospital was 3.4 minutes. The average dispensing time by the hospital pharmacist was 7.8 minutes.

The most common parenteral antibiotic is combination of cefoperazone and sulbactam (Table II). Cefixime was the most common oral antimicrobial prescribed.

Table II: Table Shows Commonly Used Injectable Antimicrobials In Prescriptions

S No	Injectable antibiotics	Number of times prescribed
1	Cefoperazone + sulbactam	11
2	Amoxicillin + clavulanic acid	7
3	Piperacillin + tazobactam	6
4	Metronidazole	4
5	Remdesivir	3
6	Others	4

Table III: Table Shows Prescription Errors Detected After Doing Analysis Of Prescriptions

Total number of prescriptions with incorrect dose	12 (15%)
Total number of prescriptions in which dose was not mentioned	4 (5%)
Total number of prescriptions with drugs in capital letters	72 (90%)

Prescription audit analysis was done on 80 drug charts of in-patients (table IV)

Table IV: Table Shows Some Important Parameters Of Drug Use Among In-patients According To Prescription Audit Criteria

Average number of drugs per prescription (n=546)	6.83
Total number of prescriptions with potential drug-drug interactions	17 (21.25%)
Total number of prescriptions with therapeutic duplication	9 (11.25%)
Total number of prescriptions with irrational fixed dose combinations	2 (2.5%)

Table V: Table Shows Some Important Potential Drug- Drug Interactions In Prescriptions Of In-patients.

S No	Interacting drugs	Consequence
1	Ondansetron + sertraline	Risk of serotonin syndrome
2	Clarithromycin+ sildenafil	Increased levels of sildenafil
3	Ondansetron + tramadol	Risk of serotonin syndrome
4	Ciprofloxacin+ tramadol	Increased risk of seizures
5	Ramipril+ telmisartan	Risk of hyperkalemia
6	Diclofenac + enoxaparin	Increased risk of bleeding
7	Hydroxychloroquine+ ondansetron	Increased QT interval
8	Ketorolac+ diclofenac	Increased risk of gastrointestinal bleed
9	Tramadol+ linezolid	Risk of serotonin syndrome
10	Methyl prednisolone+ levofloxacin	Tendonitis and tendon rupture
11	Telmisartan+ spironolactone	Risk of hyperkalemia
12	Diclofenac+ fondaparinux	Increased risk of bleeding

Therapeutic duplication is prescribing multiple medications for the same indication without a clear distinction of when one drug should be administered over another. Such Therapeutic duplication was seen in 8.33% prescriptions with drug combinations belonging to same class of drugs e.g; anti-epileptics, anti-hypertensives and antimicrobials (Table VI).

Table VI: Table Shows Therapeutic Duplications Found In The Prescriptions

1	Levetiracetam + divalproex+ clonazepam
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2	Amlodipine+ metoprolol+ losartan
3	Clarithromycin+ azithromycin
4	Prazosin+ tamsulosin
5	Furosemide+ spironolactone+ mannitol
6	Oxazepam+ lorazepam
7	Ketorolac+ diclofenac

Prescription Audit Among Out -patients-

A total of 60 prescriptions of out -patients were also analyzed (table VII). Mean number of drugs per prescription was less in outpatients (2.82) compared to in-patients (6.83) and so also the number of potential drug- drug interactions (13.33%) and therapeutic duplications (5%).

Table no VII: Table Shows Some Important Parameters Of Drug Use Among Out-patients.

Average number of drugs per prescription	2.82
Total number of prescriptions with potential drug-drug interactions	8 (13.33%)
Total number of prescriptions with therapeutic duplication	3 (5%)
Total number of prescriptions with irrational fixed dose combinations	4 (6.67%)

Some potential drug-drug interactions were observed in the prescriptions of these out-patients (Table VIII). A total of 6 irrational fixed dose combinations were observed among all the prescriptions (Table IX)

Table VIII: Table Shows Common Potential Drug – Drug Interactions In Prescriptions Of Out-patients

S no	Interacting drugs	Consequence
1	Clopidogrel + pantoprazole	Decreased effect of clopidogrel
2	Cinitapride + torsemide	Irregular heart rhythm
3	Ciprofloxacin+ atorvastatin	Increased risk of rhabdomyolysis
4	Clonidine + metoprolol	Decreased BP and HR
5	Clonidine + insulin	Increased hypoglycaemia
6	Torsemide + dapagliflozin	Increased dehydration
7	Pantoprazole + Furosemide	Risk of hypomagnesaemia

Table IX: Table Shows Some Irrational Fixed Dose Combinations In Prescriptions

S no	Irrational fixed dose combinations
1	Cinitapride + Pantoprazole
2	Drotaverine+ mefenamic acid
3	Aceclofenac + paracetamol + Serratiopeptidase
4	Calcium carbonate + calcitriol+ zinc+ Ibandronate
5	Ofloxacin+ Tinidazole
6	Cetirizine + Phenylpropanolamine+ dextromethorphan

DISCUSSION-

The present study was done to assess the prescriptions of patients according to WHO drug use prescribing indicators and do prescription audit to help physicians improve prescribing standards. The study was done as a part of regular prescription audit done by Department of Pharmacology in Kamineni Academy of Medical Sciences and Research centre, for the purpose of NABH accreditation.

The results of the study show that there is polypharmacy among in-patients, with a mean of 6.83 drugs per prescription. This has resulted in therapeutic duplication (8.33%) and increased potential drug-drug interactions (21.25%). The results of the present study were comparable to the study done by Kumar YEP et al^[8] in in-patients in the Department of General Medicine in tertiary care Government hospital, where 5% prescriptions had therapeutic duplications and 19% prescriptions had drugs with potential Drug-Drug interactions. Some of the drug combinations that could result in drug-drug interactions were unavoidable, as they were according to the current treatment guidelines. An important example of such combination is combining 2 antiplatelet drugs or their combination with anti-coagulants in treatment of severe cases of Myocardial Infarction (STEMI). Polypharmacy is more common in elderly patients and can also result in prescription of potentially inappropriate medications in the elderly patients^[9]

In the present study, antimicrobials were prescribed in 21.43% of prescriptions, which is comparable to the standards set by WHO (20-26.8%). This is good because unnecessary and excess use of antibiotics leads to antibiotic resistance.^[10] Injections were given in 30.71%

prescriptions, which is more than the optimum standard levels set by WHO (13.4- 24.1%).

64.35% drugs were prescribed with generic name and 92.11% prescriptions had drugs present in National list of Essential Medicines (NLEM 2015).^[11] This needs to be improved, as generic prescribing cuts down the cost of treatment.^[12] WHO recommends use of 100% generic drugs and more drugs to be prescribed from NLEM or according to the hospital formulary which is designed according to the current treatment guidelines and local availability of medications. 90% prescriptions were legible and were written in capital letters, which needs to be highly appreciated and encouraged. Medical Council of India (MCI) in 2016, gave notification which directed physicians to prescribe drugs with generic names and prescriptions be written preferably in capital letters^[13]. Further, documentation was good with prescriber's signature at appropriate places in the case sheets.

Prescribing errors were present, with incorrect dose in 15% prescriptions and dose was not mentioned in 5% prescriptions. These medication errors are more likely in patients who are hospitalized, especially those patients who may be on polypharmacy, being treated under the supervision of multiple specialists, and having various comorbid conditions. These findings were comparable to a study done by Sheikh et al^[13], in in- patients attending a tertiary care hospital in Mangalore, where prescription errors were seen in 20% patients and to a study done by Parthasarathy A et al^[15] where prevalence of prescription errors was 14.6% among in-patients admitted under the Department of Medicine in a tertiary care hospital in South India. These type of omission errors (with absent patient and drug details) and commission errors (incorrect drug dosage) needs to be looked into by the physicians while prescribing drugs^[16]. It also emphasizes the role of clinical pharmacologist to conduct regular prescription audits to improve the quality of prescriptions^[17].

Prescription audit among out-patients done in our study was compared to that done by Arjun Saha et al in a teaching hospital in North-East India. In our study, average of 2.82 drugs were prescribed per prescription. In study done by Arjun Saha et al,^[18] an average of 2.64 drugs were present in out-patient prescriptions.

The Limitations Of This Study Were-

1. Limited sample size of prescriptions
2. The actual drug- drug interactions which could have occurred could not be studied by follow up of these patients.
3. Only the prescribing indicators could be studied, as the patient population was in- patients; other patient care indicators as well as facility-specific indicators as suggested by WHO could not be studied.

CONCLUSION-

This study shows that there is a strong and constant need to conduct regular prescription audit by the clinical pharmacology team to detect prescription errors which are largely preventable. There is a need to communicate the results of such audits regularly to the physicians to improve the prescribing standards, which further helps in promoting rational use of medicines. Inappropriate polypharmacy needs to be avoided, to reduce the impact of prescribing cascade which is detrimental to the patient's health and increases the total cost of health care. This reduces compliance of the patient and can result in loss of confidence in the health care facility. The clinical pharmacologist can therefore contribute to change in Indian healthcare setup by working closely with physicians for better treatment of patients.

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