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Prescription analysis and drug utilization pattern in a tertiary care teaching hospital

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ABSTRACT

Background

Periodic prescription analysis is one of the methods to assess drug utilization and rationality of prescribing. It should be regularly conducted to improve the quality of prescription and curb the menace of irrational prescribing which has become a worldwide problem.

Objectives

To analyze the rationality status of prescriptions and drug utilization pattern in inpatients admitted in a tertiary care hospital.

Materials and Methods

The present observational retrospective study was carried out in inpatients of Medicine, Surgery, Gynaecology, Pediatrics, Skin, Orthopaedics and Psychiatric departments of our tertiary care hospital over a period of three months during which data of 200 patients were collected. The age, sex and diagnosis of the patients were noted. The rationality of prescriptions was evaluated using WHO core indicators of drug utilization.

Results

Two hundred prescriptions were analysed in which 1036 drugs were prescribed. Mean number of drugs per prescription was 5.18. In our study, 75.97% drugs were prescribed by generic names and drugs from EDL were 75.48%. Dosage forms used were mostly oral (60.71%). Infectious diseases were the most common illnesses (19.5%) followed by diseases of respiratory system. The most common drug groups prescribed were antimicrobials, analgesics & anti-inflammatory drugs, GIT , multivitamins and minerals. The incidence of poly-pharmacy was also common with maximum number of prescriptions (36.5%) having five drugs per prescription.

Conclusion

Prescription analysis is an important measure to improve the quality of care afforded by the hospitals. Establishment and implementation of appropriate clinical guidelines, use of essential medicines list, continuing medical education and regular update to the clinicians will help in implementing the principles of rational pharmacotherapeutics.

Keywords: Prescription analysis, Drug utilization pattern, Polypharmacy

INTRODUCTION

As per WHO, Drug utilization studies are tools that deal with the marketing, distribution and prescription pattern of drugs and help to assess the subsequent impact of these on medical and socioeconomic status of patients. [1] Thus, inherent in the definition, such studies provide logical background for determining the rationality of drug use as well as providing evidence based guidance for making policy decisions at various levels of healthcare. Drug utilization research studies conducted in the inpatient settings are also help in evaluating the drug prescribing trends, efficiency and cost- effectiveness of hospital formularies. There is always a variation in drug utilization among different countries and even among health institutions within a country and sometimes within the same institute at different point of time probably because of changing disease trends over a period of time. [2]

Prescription pattern analysis is a part of drug utilization studies with the main focus on prescribing, dispensing and administering of drugs. They promote appropriate use of monitored drugs and reduction of abuse or misuse of monitored drugs. They also guide and support prescribers, dispensers and the general public on appropriate use of drugs, collaborate and develop working relationship with other key organizations to achieve a rational use of drugs. Prescription Patterns explain the extent and profile of drug use, trends, quality of drugs, and compliance with regional, state or national guidelines like standard treatment guidelines, usage of drugs from essential medicine list and use of generic drugs. The principal aim of these studies is to facilitate the rational use of drugs in a population. [3]

Irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly. The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread health hazards. The rational use of medicines is defined as "Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community. [4]

In developing countries like India, a substantial proportion of medicines in the market are irrational fixed-dose-combinations and some of them are even hazardous. Analysis of a properly selected sample of prescriptions would reveal the extent of use of such irrational and hazardous drugs by doctors as well as irrational use of rational drugs. This will help in assessing the extent of wastage (health-wise & money- wise) due to irrational prescribing and in developing ways to overcome this wastage.

Hence, monitoring of prescription and drug utilization patterns should be done periodically to increase the therapeutic efficacy, decrease the adverse effects and provide feedback to the prescriber to ensure rational use of medicines. Considering all these facts, this study was carried out with the following objectives: 1. To obtain information on the prescribing patterns of drugs in inpatients of various departments during the study period. 2. To analyze the patterns of drug use using the WHO indicators.

MATERIALS AND METHODS

Study site- Govt. Villupuram Medical College, Tamilnadu

Study Type- Retrospective, cross-sectional

Study Period- 3 months

Study Criteria- This study criterion was the in-patients of Medicine, Surgery, Gynaecology, Paedidrics, Skin, Orthopaedics and Psychiatric departments

Source of Data- Patient case records available at Medical record department

Material Used-Data collection form

The study was approved by the institutional ethics committee.

Mode of Analysis - The data were subjected to descriptive analysis by microsoft excel.

After collecting data of all prescriptions, data were analyzed for drug utilization pattern and rationality of prescriptions.

For studying the drug utilization pattern, following data were collected-(i) age, (ii) gender, (iii) average stay in the emergency department, (iv) diagnosis of the patient, (v) co-morbid conditions. Detailed information on drugs used including name of the drug, dosage schedule (form, route, and frequency) and duration of treatment was recorded from the patient medical records.

Rationality of prescriptions was evaluated by using the WHO core drug prescribing indicators, that is (a) average number of drugs per encounter, (b)

percentage of encounters with an antibiotic, (c) percentage of encounters with an injection, (d) percentage of drugs prescribed from the essential drugs list or formulary, and (e) percentage of drugs prescribed by generic names. Indian National List of Essential Medicines, 2003, was used for assessing the number of drugs prescribed from the essential list.

RESULTS

A total of 200 prescriptions were analyzed for the study. The age distribution of the prescriptions included 66 (33%) patients aged between 20 and 40 years, whereas 62 (31%) were in the age group of above 60 years. The proportion of females (56.5%) was slightly more than the males (43.5%) [Table 1].

Table 2 shows the prevalence pattern of diseases amongst the prescriptions studied and analyzed. Infections 39 (19.5%), respiratory problems 32 (16%), gastrointestinal tract problems 29 (14.5%), cardiovascular system disease 23 (11.5%) and trauma 21 (10.5%) being the most common amongst them.

Table 1: Demographic profile of patients

Table 1a: Age distribution

Age in years	Number of patients (%)
< 19	23 (11.5)
20 - 40	66 (33)
41 - 60	49 (24.5)
> 61	62 (31)
Total	200 (100)

Table 1b: Sex distribution

Gender	Number (%)
Male	87 (43.5)
Female	113 (56.5)

Table 2: Pattern of diseases out of studied prescriptions

Disease Pattern	Number (%)
Infectious diseases	39 (19.5)
Respiratory system diseases	32 (16)
Cardiovascular system diseases	23 (11.5)
Gastrointestinal system diseases	29 (14.5)
Central nervous system diseases	4 (2)
Musculoskeletal system diseases	2 (1)
Diseases of skin and soft tissues	14 (7)
Trauma	21 (10.5)
Others	36 (18)

Regarding the number of drugs present in a prescription, it ranged from one drug to a total of 8 drugs. 5 drugs and 6 drugs were most common in a prescription with 1 and 2 drugs in a prescription being the least common [Table3]. A total of 1036 drugs were prescribed in 200 prescriptions, amounting to a total of 36 different drugs with repetitions.Out of these 1036 drugs, 787 (75.97%) drugs were prescribed according to their generic name and 154 (14.86%) by their brand name. Total number of Fixed dose combinations were 95 in the studied prescriptions. Most common drug formulation used was oral 629 (60.71%) followed by injections and then topical [Table 4].

Table 3: Number of drugs prescribed per prescription.

Prescription containing number of drugs	Number of prescriptions (%)
One	1(0.5)
Two	1(0.5)
Three	2(1)
Four	42(21)
Five	73(36.5)
Six	67(33.5)
Seven	12(6)
Eight	2(1)

Table 4: Drug profile

Parameters	Number (%)
Drugs prescribed by generic name	787(75.97)
Drugs prescribed by brand name	154(14.86)
Fixed dose combinations used	95(9.17)
Dosage forms	
Oral	629(60.71)
Injection	390(37.65)
Topical	17(1.64)

Most common drugs prescribed belong to the antimicrobials 394 (38.03%) followed by analgesics/ anti-inflammatory drugs 251(24.2%) and anti- ulcer (GIT class) 174(16.8%) [Table 5]. In our study, 1036 drugs were prescribed to the 200 patients. Average number of drugs per prescription was 5.18. Of the total 200 prescriptions, injections were prescribed in 127 (63.5%) encounters. An antibiotic was prescribed in 136 (68%) encounters. It was observed that 787 (75.97%) of the 1036 drugs were prescribed by generic name. 782 (75.48%) were prescribed from the National list of essential medicines 2011. The values are shown in [Table 6].

Table 5: Most common prescribed drugs from various categories

Category of drugs	Number (%)
Antimicrobials	394(38.03)
Analgesics/ Anti-inflammatory Drugs	251(24.2)
Anti-ulcer (GIT class)	174(16.8)
Cardiovascular System	68(6.56)
Central Nervous System	13(1.25)
Expectorant, bronchodilators	35(3.4)
Multi –vitamin and minerals	101(9.75)

Table 6: Values of core prescribing indicators of WHO

Core prescribing indicator of WHO	Value
Average number of drugs per encounter (n=200)	5.18
Percentage of encounters with an antibiotic prescribed (n=200)	68%
Percentage of encounters with an injection prescribed (n=200)	63.5%
Percentage of drugs prescribed by generic name (n=1036)	75.97%
Percentage of drugs prescribed from essential drug list or formulary (n=1036)	75.48%

DISCUSSION

Prescription auditing is the mainstay of quality assurance in hospitals. Providing the right medicine to the right people at the right time is a main priority of health care. The way to ensure this is through the effective implementation of the WHO's recommendation on rational drug policies. Rational prescribing leads to the better use of limited resources which is particularly helpful in developing country like ours. The data so obtained can serve as a guide to health administrators, manufacturers, distributors and health professionals groups for policy making. [5, 6]

In our study, the commonly affected patients were in the age group of 20–40 years [66 (33%)] .Females 113(56.5%) were more than males 87(43.5%) in the number of prescriptions analyzed which is similar to the study conducted by Potharaju et al. [7]

The average number of drugs per prescription is an important index of the standard of prescribing and the scope for review and educational intervention in prescribing practice.In our study the total no. of drugs in 200 prescriptions analyzed were 1036. Therefore average number of drugs/prescriptions is 5.18 which was similar to study done by Nishita et al. [8] This number is very much higher than the recommended limit of 2.0. Increase in the number of average drugs per prescription may increase the risk of drug interactions, may lead to unwanted side effects and also increases the prescribing and dispensing errors. This is an important indication that educational intervention of the principles of rational pharmacotherapeutics needs to be introduced.

In our study the most common prescription were for infectious diseases (19.5%), respiratory system illnesses (16%) followed by Gastrointestinal system diseases (14.5%). Least common were central nervous system disorders (2 %), musculoskeletal system disorders (1%). This is consistent with the study done by Abidi et al, 2012. [9]

Poly pharmacy was clearly visible in our data. Maximum number of prescriptions i.e. 36.5% had five drugs each followed by six in 33.5% and four drugs in 21% of prescriptions.The results correlated with the study done by Nishita et al.[8] Poly pharmacy is a very common practice now days as is reported by various studies. It is of concern in those patients with various co-morbidities as it increases the chances of drug interactions.

Drugs were prescribed by generic names in 75.97% of cases. This figure is as high as compared to other Indian studies many of which have even reported upto 73.4% usage of generic name. This result was similar to the studies conducted by 62.3% [Vishwanath et al. (2014)] [10] and 67.25% [Manoj Kumar Saurabh et al. (2010)] [11]. Drugs prescribed by brand name were 14.86% which has to be further reduced. Generic prescribing reduces the chances of dispensing errors which may be due to misinterpretation of sound alike drugs and also decreases the economic burden on the patients which will in turn improve the patient compliance. Hence we should encourage generic prescribing by educational intervention methods and strict compliance to WHO drug policies.

Out of 1036 drugs 95 (9.17%) FDCs were prescribed. This figure is quite low as compared to three Indian studies which reported 40.92%, 75% and 60% respectively. Use of fixed dose combinations should be discouraged unless strictly necessary. [9, 12, 13]

Dosage forms used were mostly oral 60.71% and Injectables 37.65% .Topical forms were least 1.64%. Since the percentage of injectables was high as compared to other studies, we need to reduce the unnecessary use of injectables to prevent HIV and other blood borne infections. [14]

The most Common categories of drugs prescribed in our study were antimicrobials (38.03%) followed by analgesics/ anti-inflammatory drugs which were 24.2%, anti-ulcer (GIT class) 16.8 %, multivitamins minerals & enzymes 9.75% and cardiovascular system drugs 6.56%.These results were correlated with the study done by Afroz Abidi et al. [9] Doctors should not prescribe unnecessary medicines like multi vitamins, minerals, anti-ulcers, NSAIDs that can lead to irrational prescribing and increase the chances of adverse drug reactions, drug-drug interactions and increased cost of therapy. They should adhere and prescribe from the Essential drug list.

Percentage of encounters with an antibiotic prescribed 68%, whereas an injection was prescribed in 63.5 % of the encounters which were higher when compared to the study done by Akhilesh et al.[15] The number of antibiotics should be prescribed only for bacterial infections and as low as possible. The prolonged use of antimicrobials for prophylaxis in surgery should be avoided, because it increases the

chances of antimicrobial resistance and adverse effects. Excessive use of injections adds to the cost of sterilization and nursing resources and increases problems such as pain and local edema.

Drugs on EDL were 75.48% which was comparable with other Indian studies.[9]There was no EDL to which the physicians could refer. A local hospital formulary will help the physicians to prescribe on an outpatient basis and follow the clinical protocols.

CONCLUSIONS

Prescription analysis gives a clear picture of the prescribing practices in our hospital setting. High average number of drug per prescription along with high use of antibiotics and injections was noted in the study. All these parameters should be checked and improved to provide quality and rational treatment to the patient. Polypharmacy should be discouraged, because it is an economic burden to the nation and makes health care unaffordable to the poor.

This type of study helps to evaluate, monitor and if necessary, suggest changes or modifications in prescribing practices of clinicians which will ultimately make patient care more rational and cost-effective. Periodic prescriptions analysis and effective feed- back to clinician should be done based on results to ensure rational prescribing and effective health care management.

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