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DRUG UTILIZATION STUDY IN THE DEPARTMENT OF MEDICINE AT A TEACHING HOSPITAL

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ABSTRACT

Pharmacotherapy is among the most powerful interventions to improve health outcomes. However, since some medications are less appropriate for patients, systems approaches to improving pharmacy care may be an effective way to reduce inappropriate medication use. In our study we have not taken any control group and newer trends in quality of prescribing pattern. The present study was designed to avoid those limitations to improve the quality of physician drug prescriptions in hospital settings. According to our observation through drug utilization review of outpatient drugs are necessary for medical condition of the patient and adverse events are less likely to occur with regular follow-up. Drug utilization review programs use professional medical protocols and computer technology and data processing to assist in the management of data regarding the prescribing of medicines and the dispensing of prescriptions over periods of time. We have conducted this study in the routine clinical practice setting with no intervention in the clinical process. The most indicated strategy would be a multi-disciplinary approach involving cooperation between infection control, nursing, pharmacy and medical staffs. Health and drug utilization programs should promote rational use of drugs to reduce complications of irrational use.

KEYWORDS

Drug utilization review, Appropriate use of medications and Use of antibiotics.

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INTRODUCTION

Prescription drugs constitute an important component of health care. However, drugs can only benefit to patients if they are used appropriately which involves that physicians prescribe them according to evidence.

Usually Drug utilization review (DUR) programs are conducted aiming to improve appropriateness of prescription and promote rational use of drugs[1]. The

appropriateness of prescriptions is evaluated after the drug has been dispensed and by performing patient follow-up. The patient may then benefit from any corrective action. By doing these type of programs and taking feedback forms from the pharmacists, the prescribes will take into their account. A DUR study aims both at improving current prescribing patterns and at preventing inappropriate prescribing in the future. The purpose of a DUR is generally to detect possible problems with, and improve, drug use. DUEs have traditionally focused on drugs with frequent side-effects, high price tags or complicated dosing regimens.

These type of programs help to reduce medical interventions regarding drugs and promote appropriateness towards prescription[2]. This objective is of assuring beneficiaries access to cost-effective, high quality health care. DUR programs use professional medical protocols, computer technology, and data processing to assist in the management of data regarding the prescribing and the dispensing of prescriptions. Programs can be designed to monitor individual drugs, or drug classes, as well as to monitor drug use in specified diseases.

DUR programs should be carefully planned by the medical and pharmacy staff to include the drugs considered to be most problematic, if not used correctly[3]. By comparing actual drug use to predetermined standards, DUR can detect inappropriate and/or unnecessarily drug therapy. Programs can be designed to monitor individual drugs, or drug classes, as well as to monitor drug use in specified diseases. Whenever any intervention is identified they improve the quality of prescription and also life of patient. Interventions can include educational programs, provision of drug information, changes in hospital policies and procedures, and changes in the drug formulary.

These programs also improvise the recognition and need of pharmacist. Pharmacy education has traditionally stressed the importance of the 3R's (right drug, right dose, and right time).

The advent of point-of-service prescription claims processing and pharmacy benefit management (PBM) services ushered in the promise of a new tool to supplement the skills of the practitioner by allowing real-time, comprehensive, and automated review of prescription medications. DUR conducted properly will most probably decrease serious drug related adverse event. DUR is a technique used by prescription drug program administrators and PBMs to manage drug utilization[4,5]. If therapy is determined to be inappropriate, interventions may be needed with specific patients or providers to optimize drug therapy." Appropriately selected criteria for medication use are "predetermined" elements of drug use supported by labelling approved by the U.S. Food and Drug Administration, compendia, and peer-reviewed literature, developed by qualified health professionals against which aspects of quality, medical necessity, cost effectiveness, and clinical outcomes of drug use may be compared. There are several challenges in implementing the DUR systems more useful. These can be grouped into those involving (a) the technical aspects of health care systems and (b) how health care providers, particularly pharmacists, interpret and respond to potential drug therapy problem alerts generated by the systems[4].

The effectiveness of DUR programs has yet to be established. The few evaluation studies of those programs conducted until now have been criticized for lack of rigor. In general, there are no adequate control groups and prior trends in the quality of prescribing are not taken into account. Our study is designed to remove the barriers and improve the quality of prescription.

AIM AND OBJECTIVES

1. To evaluate the drug utilization pattern in the medicine department of a teaching hospital.
2. To assess the prescriptions for the WHO prescribing indicators.

The primary goal of the present study is to evaluate antibiotic usage in the Department of Medicine in-

patient wards. The investigation was conducted to determine whether prescriptions and the administrations of antibiotics in the hospital complied with the official (WHO) recommendations.

METHODOLOGY

The study of drug utilization pattern will be carried out in the medicine department of a teaching hospital.

Design

The study will be prospective, descriptive study.

Inclusion criteria

a) Patients of age more than 18 years.
b) Patients of both sexes.
c) All patients prescribed for medicines.

Exclusion criteria

a) Prescriptions with incomplete information.
b) Patients advised to consult any other specialist.
c) Pregnant women and feeding mothers.
d) Patients with diseases having specific treatment plans (Helminthiasis, Leprosy etc.) and critically ill patients will be excluded.

Limitations

1. The main concern was the lack of local guidelines and appropriateness should be evaluated as an adherence with these predefined guidelines, rather than as an objective fact.
2. Emergence of bacterial resistance was not investigated
3. No information on prescribing physicians was collected as it was not possible to describe physician characteristics in each units of IPD and test their comparability.
4. Finally the DUR study lasted only four months. The effect of this type of DUR could therefore have been greater if assessed a program implemented on a longer term.

Testing tool

The prescription indicators recommended by the WHO was used to assess the drug utilization pattern.

DATA ANALYSIS

The data will be analysed for the following

a) Average number of medicines per encounter per day.
b) Percentage of medicines prescribed from NEML.
c) Percentage of medicines prescribed by generic name.
d) Percentage of encounters with an injection prescribed.

The prescribing and utilization pattern of the medicines was carried with reference to National Essential Medicines List, 2009. The data was organized using ATC/DDD methodology. The data was analyzed with respect to the age and sex of the patients.

STATISTICAL CONSIDERATION

Descriptive statistics will be used for the analysis of data. The data obtained will be represented as mean ± SEM and percentages, as applicable. Appropriate statistical tests (chi square test) will be used for determining association between variable.

RESULTS

The results presented below are for 425 patients data obtained from the inpatient ward of Medicine department of teaching Hospital.

Profile of the patients

Out of 425 patients 73.4% (312 Patients) were male and 26.6 % (113) were female.

Subjects were divided into six groups depending upon their age - 20 to 29 yrs (group A), 30 to 39 years (B), 40 to 49 years (C), 50 to 59 years (D), 60 to 69 (E) and above 70 years (F).

Prescribing indicators

The prescribing indicators were calculated for all the patients and for the six age groups to determine any differences in prescribing between these age groups.

Analysis of medications per prescription

A total of about 672 medicines were prescribed to 425 patients. Mean ± SEM of medicines prescribed was 1.56 ±0.05. Mean ± SEM of medicines prescribed for male patients were 1.57 ± 0.06, while

for female patients it was 1.52 ± 0.09. For different age groups average number of medicines per prescription was 1.76, 1.57, 1.69, 1.53, 1.21 and 1.46 respectively for group A, B, C, D, E and F. It is observed that average number of medicines per prescription was highest in 20 to 29 yrs age group. It was found that in most of the prescriptions one antibiotic was prescribed.

Percentage of medicines prescribed by generic name

There was a good tendency of prescribing by generic name. 72.62% (488 medicines) were prescribed by generic name and antibiotics constituted the major proportion of medicines prescribed by generic name.

Percentage encounter with an injection prescribed

Use of injection was very high and percentage encounter with an injection prescribed was 92% (391 cases).

Other parameters

Top ten medicines

Ceftriaxone was highly prescribed medicine for about 217 cases, later followed by metronidazole was observed in 65 cases.

Usage of antimicrobial agents

Antibiotics were used in all cases and 31 different antimicrobial agents were prescribed. In more than 28 % of cases, Ceftriaxone was prescribed which was followed by Metronidazole.

Utilization of different dosage form

A significant number of medicines were prescribed as injection followed by infusion and tablet.

Prescribing differences between male and female patients

When comparison between male and female patients. There was no difference in the prescription pattern (p=0.573).

DISCUSSION

As mentioned previously, WHO has selected a core of drug use indicators to assess the scope of improvement in rational drug use in clinical practice. Regarding the use of antibiotics, relatively high levels of availability and consumption in developing countries have led to higher incidence of inappropriate use and greater level of resistance than in developed countries.

Hospital is allotted with it's 5 male units and 1 female unit (Total-6 units) reflects all patients attending Medicine IPD and the prescriptions of patients prescribed with antibiotics are included in the sample. Therefore, data reported in this study may be easy to compare to other studies in India as well as other developing countries.

The findings of our study are that the medicines used were the prescription preferences and the use of some medicines were not intensify of use. The wards of similar medical specialities used similar number of antibiotics, but from different pharmacological subgroups and, thus, with different microbiological activities.

When compared to previous similar studies conducted at different parts of globe.

Usage of Antimicrobials

Usage of antimicrobials in our study has no difference to that of developing countries which were prescribed empirically. Ideally, the selection of antibiotic drugs should be based on the microbiological data on bacterial sensitivity and on prevalence of resistance in the respective hospitals. This consensus is well recognized, but difficult to adhere to, as illustrated by the empirical initial treatment with antibiotics in 85% of infection cases shown in a recent survey in the 5 largest European countries. Rational prescribing can only be expected if the prescriber is aware of the most likely infecting agent[73].

Site of Infection

Moss *et al* found that most of the prescribers in their study based therapy only on the anatomical site of putative infection and lower respiratory tract was the most frequently targeted site[73]. Apparently this holds true for this study and also that by Kulshrestha and Agarwal[74].

Route of administration

Route of administration of an antimicrobial is influenced by the site and severity of infection as well as the cost of the treatment[75]. Since, this study was conducted in in-patient setting most of the

antibiotics were prescribed as injectable forms (injections and infusions).

Antimicrobial agents usage

The pattern of use observed, in that ceftriaxone was the most frequently prescribed, is aclear departure from that recorded in other Indian studies of this nature all of whom quote penicillin-group on top[39,76]. Obviously, this is due to the wider choice of drugs now available as well as the settings where and the time period when these studies were conducted.

Since ceftriaxone has a broad spectrum of activity including Enterobacteriaceae and is the β-lactum antibiotic of choice for most cases of hospital-acquired aerobic sepsis, it justifies its position on top.

This study has strengths and limitations. As a strength, this study was conducted in the context of current clinical practice with no attempt from the investigators to impose the selection of the drug or to enhance compliance of pharmacist in delivering DUR interventions.

Average age of the patients

S.No		Number of patients	Average age ± SEM	Range
1	Global	425	43.55 ± 0.11	20 - 80 yrs.
2	Male	312	44.39 ± 0.12	20 - 80 yrs.
3	Female	113	41.25 ± 0.21	20 -72 yrs.

S.No	Number of Drugs Per Prescription	Number of Prescriptions (%)
1	One	237 (4.5)
2	Two	138 (18.2)
3	Three	43 (21.9)
4	Four	7 (26.9)

S.No	Antibiotic	ATC Code	Patients	%
1	Ceftriaxone	J01DD04	217	28.52
2	Metronidazole	J01XD01	65	10.38
3	Cefotaxime + sulbactum	J01RA03	64	8.47
4	Piperacillin + tazobactum	J01RA01	46	8.47
5	Ofloxacin	J01MA01	44	6.28
6	Cefuroxime	J01CG02	42	5.74
7	Amikacin	J01GB06	23	4.92
8	Azithromycin	J01FA10	21	3.01
9	Ciprofloxacin		19	2.73
10	Amoxicillin + clavulanic acid	J01CRO2	15	2.19

Diagnostic characteristics of the patients

S.No	Diagnosis	Total	Female	Male
1	Fever	61	21	40
2	Rti	49	11	38
3	Cld and related disorders	38	12	26
4	Coad	35	6	29
5	Acute gastro-enteritis	31	9	22
6	Meningitis	24	8	16
7	Malaria related	23	6	17
8	Arthritis	17	6	11
9	Uti	17	7	10
10	Enteric fever	14	4	10
11	Koch's disease	11	1	10

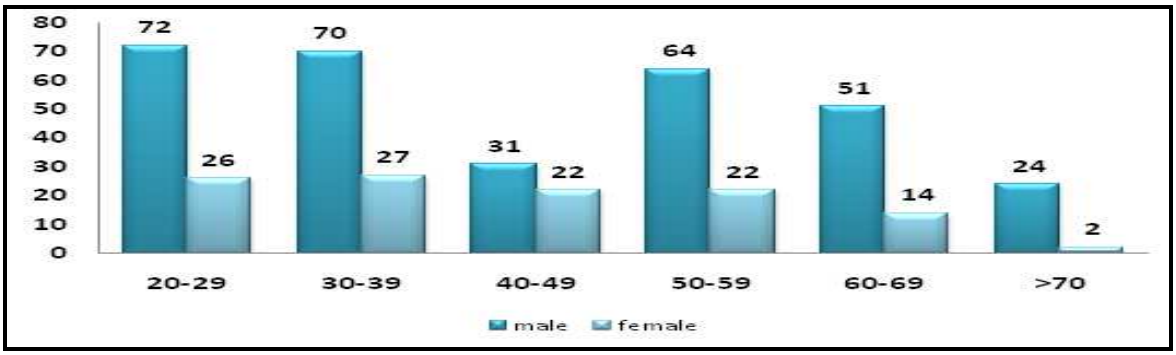
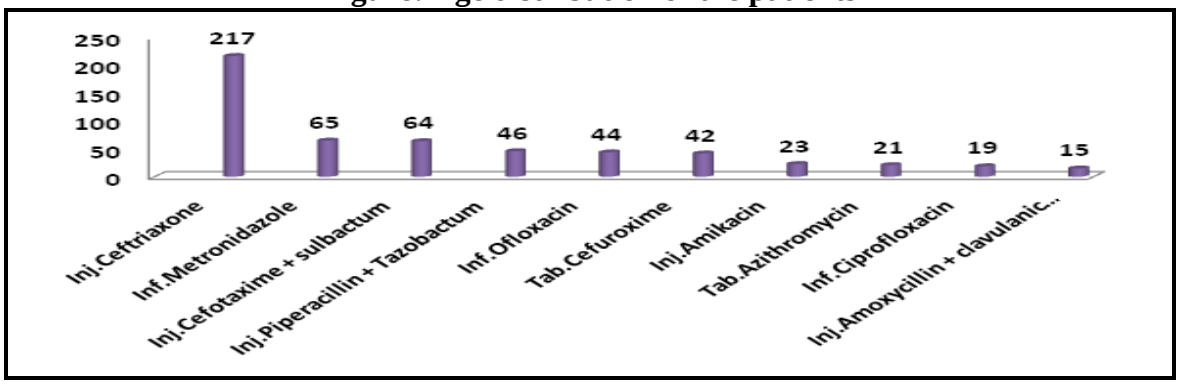


Figure: Age distribution of the patients



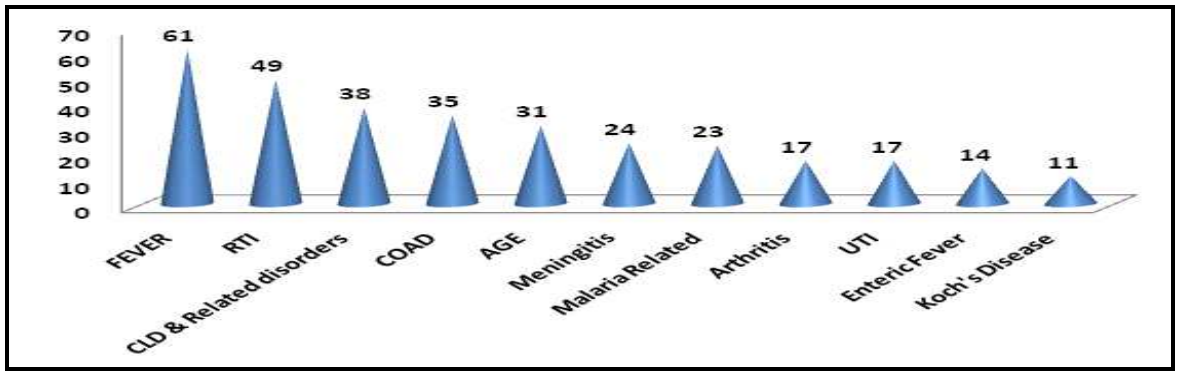
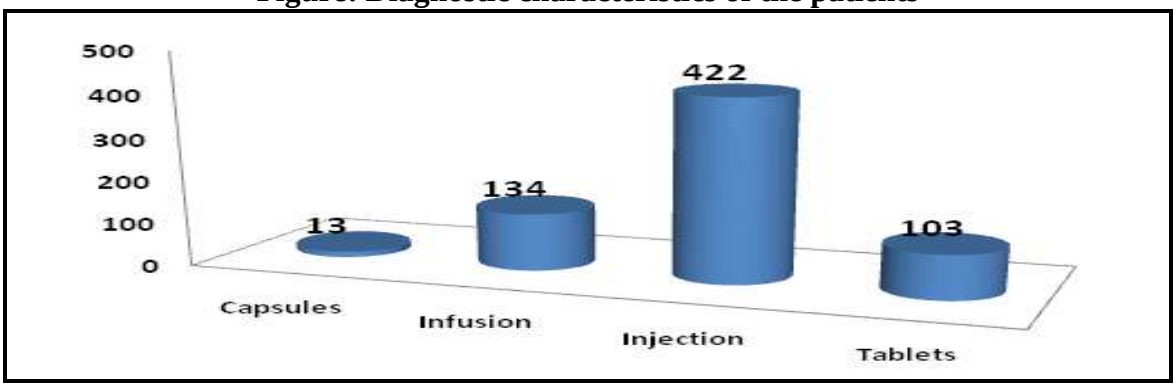


Figure: Diagnostic characteristics of the patients



CONCLUSION

In conclusion, we have conducted this study in the routine clinical practice setting with no intervention in the clinical process. The medical team is the determinant factor for Infectious Disease Specialist advice or strategies established to control excessive antibiotic use and the development of antibiotic resistance. The at most suggested strategy is involvement of total healthcare staff including prescribers, pharmacists, nursing and other medical staff. These programs should focus on promoting rational antibiotic prescription and utilization aimed at minimizing the future emergence of bacterial resistance.

Since hospital guidelines or formulary or an antibiotic policy did not exist, the physicians prescribing habit was the main factor that directly influenced prescribing. A useful measure could be the introduction of an antibiotic policy for the appropriate use of anti-microbial drugs. The presence of such policy, their widespread publication, ongoing education of hospital staff regarding the use of antibiotics, are all necessary components in the effort to control spiralling expenditure on such agents, and the emergence of multi-drug resistant organisms.

The other important findings of the study are,

1. A total of 425 patient's data was collected during the period and analyzed for WHO recommended prescribing indicators.
2. Our study findings shows good prescription pattern.
3. 72.62% medicines were prescribed by generic name.
4. Majority of medicines were prescribed as injections followed by infusions and tablets.
5. There is no significant prescribing differences between male and female patient groups.

Instead of conducting a descriptive, prospective DUR, a concurrent DUR with direct feedback to prescribers seems effective to improve the appropriateness with regard to the indication for use. Nevertheless, it may have negative effects on other component of the quality of the prescriptions. Since the effect of DURs varies with both the type of interventions conducted and the criterion applied, there is a need for further research in other settings and with other drugs.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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