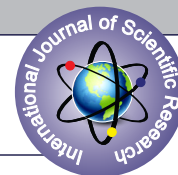


ANTIBIOTIC UTILIZATION PATTERN STUDY IN SURGERY OPD OF GOVERNMENT AND PRIVATE HOSPITALS OF WESTERN RAJASTHAN: A PROSPECTIVE AND CROSS SECTIONAL STUDY

Pharmacology

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ABSTRACT

BACKGROUND- The main reason of antibiotic resistance is misuse, overuse and underuse of antibiotics. this study was a prospective study done in Surgery outpatient department of Government and Private hospital. The main aim of this study was to analyze the utilization pattern of antibiotics by using WHO core indicators.

METHOD- the study design was prospective, cross sectional. This study was conducted in Surgery outpatient department of Government and Private hospitals of Western Rajasthan. Total 200 prescriptions from both hospitals were analysed.

RESULT- Average number of drug per prescription was 3.5 in Government and 3.6 in private hospitals. Less number of antibiotics were prescribed by generic name in private hospital. Overuse of Antibiotics were reported both hospital. Appropriate number of antibiotic Injections were prescribed in both hospitals.

CONCLUSION- There is a urgent need to encourage the rational use of antibiotics. Improvement in the standards of prescribing patterns in many aspects is also required. The health practitioner should prescribed more generic drugs as they decrease the cost of treatment specially in private hospital.

KEYWORDS

Drug utilization pattern, inappropriate use of Antibiotic.

INTRODUCTION-

Drug utilization study is a structured process which is used to assess the quality of drug therapy and treatment by engaging in the evaluation of data on drug prescribing, dispensing and patient use in a given health care environment, against predetermined, agreed upon criteria and standards, with special emphasis on the resulting medical, social, and economic consequences¹. Drug utilization gives an idea about prescribing performance of clinicians and results assist in improving it². Improper and inappropriate use of drugs increase the unnecessary expenses and cost of treatment³. Hence Drug Utilization Reviews (DURs) are very useful for discovering high cost drugs, which are of economic importance. In India drug usage pattern are not satisfactory. There is shortage of data on prescription pattern studies⁴. Surgical management cannot be completed without the use of antimicrobial drugs because infection at surgical sites is one of the most common causes of postoperative morbidity and mortality. During surgical management of diseases, irrational prescription and inappropriate drug use may lead to severe complications in pre and postoperative management such that even mortalities may occur. Irrational prescription includes polypharmacy, use of medically ineffective and inappropriate drugs unrelated to diagnosis, expensive drugs, use of branded drugs instead of generic drugs, and excessive use and misuse of antimicrobials. Polypharmacy and preference for costly medicines are common not only in developing countries but also occur in developed countries. Such irrational use of medicine results in increased incidence of adverse drug reaction, delay in relief, financial loss and is one of the major reasons for increasing resistance to antimicrobials. It is an important and reliable tool to evaluate the use of antimicrobial and development of resistance for it. So this study conducted in Surgery OPD of Government and Private hospital.

MATERIALS AND METHODS

Settings

The present study was carried out in Department of Pharmacology, Dr. S.N. Medical College, Jodhpur and Surgery OPDs of Government and Private hospitals of Western Rajasthan.

Study Design

It was a prospective cross-sectional study. The study was based on the prescription pattern of antimicrobials agents prescribed in Surgery OPDs of the Government and Private hospitals Of Western Rajasthan. The data from the prescriptions were entered into a specially designed Performa in accordance with the WHO prescribing indications. The following parameters were write down for every prescription: Diagnosis, Name of antibiotic (generic/brand name), Dose, Frequency, Route, Duration.

Ethical Aspects

The study project was approved by the institutional Research Ethics Committee. The researcher signed a commitment term related to data utilization for the study purpose, ensuring the ethical aspects, according to Resolution.

Study Population

A total of 200 prescriptions were collected and copied from both Government and Private hospital during the study from the Surgery OPDs. 100 prescriptions were collected from each Hospital.

Inclusion Criteria

- Out patients who were prescribed or treated with antimicrobial medication, were included in this study.
- Patients between 18 years to 65 years were included in study.

Exclusion Criteria

- Prescriptions which did not containing antimicrobials were excluded from the study
- Emergency and Inpatients department (IPD) were excluded from the study.
- Pregnant women and Paediatric population were excluded from the study.

The WHO and International Network for Rational Use of Drugs (INRUD) have developed a standard set of drug use indicators⁵. The data collected was analyzed on the following criteria, which includes selected WHO core indicators and additional indicators of drug use. the data was enclosed in the form similar to drug use indicator consolidation form as outlined below⁶.

Prescribing Indicators:

- 1) The average number of drugs per prescription.
- 2) The percentage of drugs prescribed by the generic name
- 3) The percentage of prescriptions with an antibiotic
- 4) The percentage of prescriptions with an antibiotic injection.
- 5) The percentage of drugs prescribed from the essential medicine list (Rajasthan State Essential Medicine List 2019).

6) Additional Indicator:

- 1) The percentage share of different antibiotics
- The percentage share of different antibiotics also calculated by formula given below-
- $$\frac{\text{Total number of particular group of antibiotics} \times 100}{\text{Total number of antibiotics prescribed in particular OPD}}$$

RESULTS-

The present study was conducted in Surgery OPD of Government and

Private hospital of Rajasthan. The result showed that average number of drugs per prescription and percentage of antibiotics per prescription were high in both hospitals. Less number of Antibiotic injections were prescribed in both hospitals. Antibiotics prescribed by generic name was very low in private hospital (3.73%) as comparison to Government hospital (66.66%). Although both hospitals were not fulfil the criteria of WHO (100%). In both Government(33.42%) and Private hospital(37.22%) antibiotics were frequently prescribed. No. Of antibiotics prescribed from EML were very high in Government hospital as compared to private hospital. All the antibiotics were prescribed from EML in Government hospital. In Private hospital the percentage of prescription with an antibiotic prescribed from EML was very low as compare to Government hospital.

Table-1- Who Core Indicators

WHO Core Indicators	Government Hospital	Private Hospital
1.Average number of drugs per prescription	3.5	3.6
2.Percentage of Antibiotics prescribed by generic name	66.66%	3.73%
3.Number of Antibiotics prescribed per prescription	33.42%	37.22%
4.Percentage of antibiotics injection per prescription	21%	19%
5.Percentage of antibiotics prescribed from EML	100%	97.76%

Figure- 1-

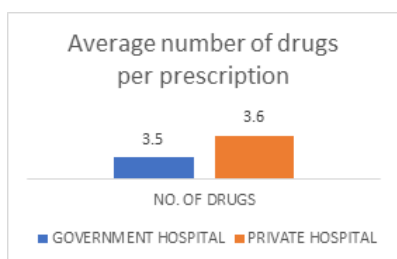


Figure-2-

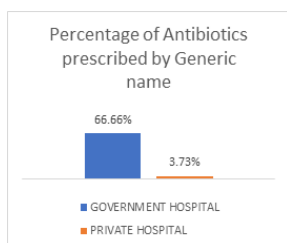


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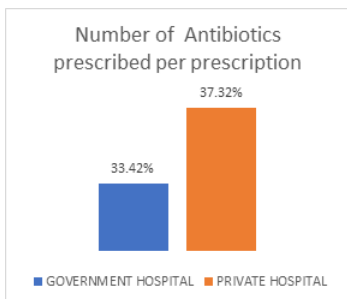


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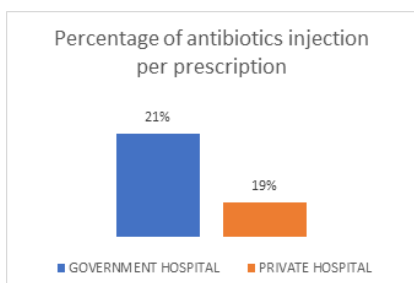
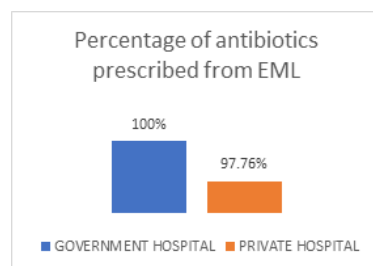


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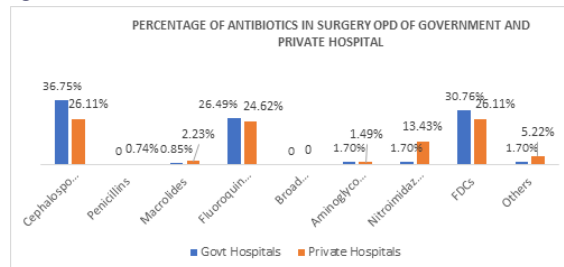
Percentage Of Antibiotics In Surgery Opd Of Government And Private Hospital

Cephalosporin group of antibiotics was frequently prescribed in Government (36.75%) and Private (26.11%). Fixed dose combinations were second highly prescribed drugs in Government (30.76%) and Private (26.11%) hospital. Nitroimidazole antibiotics were mostly prescribed in Private (13.43%) hospital. fluoroquinolones were frequently prescribed in Government (26.49%) and private (24.62%) hospital.

Table-2

Antibiotic group	Percentage of Prescription		Difference
	Govt Hospitals	Private Hospitals	
Cephalosporins	36.75%	26.11%	10.64%
Penicillins	-	0.74%	0.74%
Macrolides	0.85%	2.23%	1.38%
Fluoroquinolones	26.49	24.62	1.87%
Broad spectrums	-	-	-
Aminoglycosides	1.7%	1.49%	0.21%
Nitroimidazoles	1.7%	13.43%	11.73%
FDCs	30.76%	26.11%	4.65%
Others	1.7%	5.22%	3.52%

Figure-2



DISCUSSION-

Hippocrates (400BC) once said "Life is short and the art long, the occasion fleeting, experience fallacious and judgment difficult. The physician must not only be prepared to do what is right himself but also to make patients, the attendants, and the external cooperate". Prescribing drugs is a major skill which needs to be continuously assessed and refined according to the need of the individual patients and society. A prescription by a medical practitioner may be taken as a reflection of the clinician's attitude towards the disease and the role of drugs in its treatment. It also give an idea about the nature of the health care delivery system⁸. Antibiotics are effective and strong drugs against different life-threatening infections. Antibiotics have saved millions of lives since their first appearance seventy years ago. Inappropriate and irrational use of antibiotics is major cause of the emergence of antibiotic-resistant strains and many are dying despite usage of antibiotic. It is the responsibility of clinicians to develop good prescribing habits which will help in reducing antibiotic resistance.

Some of the common causes that are responsible for the development of antimicrobial resistance are-

1. Unnecessary overuse of antibiotics.
2. The inappropriate and irrational dose of antimicrobials
3. Insufficient duration of antimicrobial therapy
4. Use of irrational fixed-dose drug combination (FDCs)

Resistance to antibiotics leads to –

1. Treatment failure

2. Use of expensive drugs

In my study 100 prescriptions from Surgery Out Patient Department of Government hospital and 100 hundred from the above said OPD of Private hospitals of Western Rajasthan, were audited for drug utilization studies of antimicrobial use. The analysis was done for the average number of drugs, the percentage of drugs prescribed by generic name and trade names, percentage of total number antibiotic and antibiotic injection, percentage of antibiotics prescribed from EML, number of antibiotics prescribed in Surgery OPD of Government and Private hospital.

Assessment Of Average Number Of Drugs Per Encounter-

Polypharmacy occurs when patients use more number of drugs than are necessary; for example, a patient with an upper respiratory infection receiving prescriptions for antibiotics, cough remedies, analgesics, and multivitamins. polypharmacy is usually calculated by measuring the average number of medicines per prescription.

The average number of drugs per prescription is an important parameter in prescription audit. Based on the WHO prescribing indicators, it was seen that the average number of drugs per prescription is an important way for review and educational intervention in prescribing practices. The total number of drugs per prescription should be as low as possible since a higher number of drugs increases the risk of treatment failure.

In the present study, the average number of drugs per prescription was 3.5 in Government hospital and 3.6 in private hospital. This number is very much higher than the recommended limit of 2.0 by WHO.

Assessment Of Drugs Prescribed By Generic Name-

For the encouragement of rational use of medicines in India, the All India Drug Action Network was founded in 1982. Since then; it is active in the campaign for rational use of medicine.

In the present study, 66.66% of drugs were prescribed by generic names in Government hospitals. But in private hospital use of drugs by generic names was very low (3.75%).

Who (1997) Has Recommended That 100 % Of The Drug Should Be Prescribed By Generic Name. The Main Advantages Of Drug Prescribed By Generic Name Are-

1. Reduce consumer cost through substitution of less expensive formulation for drugs prescribed by brand names⁹.
2. Changes from one brand to another lead to the possibility of therapeutic equivalence.
3. Many non-proprietary names are difficult to remember and spell.

The Government of India has started a program, 'Jan Aushadhi'. The Government open generic pharmacy in every district of India and ensure that available medicines at reasonable prices at these drug stores.

ASSESSMENT OF PRESCRIPTION WITH AN ANTIBIOTIC

India is a crowded populated country with a larger Clinical need, so it becomes a perfect country for multinational companies to pump in their newly developed but poorly researched drugs including antibiotics. There has been an increasing need for new antibiotics because of inappropriate and irrational antibiotic use and the threat of bacterial drug resistance to almost all available antibiotics. Antibiotic resistance among pathogenic microorganisms is a matter of worldwide concern. The main reason for antibiotic resistance is the overuse and misuse of antibiotics. Antibiotics are the most commonly prescribed drugs in hospitals.

In Government hospitals 33.42% of the prescriptions and in Private hospital 37.32% prescriptions had antibiotics. This percentage is high than that recommended by WHO (20.0-26.8).

Assessment Of Prescriptions With Injection Prescribed-

Generally Oral Route Remains The Preferred Route For The Administration Of Antibiotics But Sometimes It Becomes Necessary To Give Antibiotics By Parenteral Route. Following Are The Reasons For This-

1. The patient's condition is very unpredictable and bioavailability is important.
2. Unconscious Patients are not tolerating oral therapy.

3. Quick action is required according to the patient's condition.
4. Patients are not reliable.

Inappropriate injection practices were especially reported in developing countries, including the prescription of unnecessary injections and the reuse of equipment without sterilization.

In the present study Percentage of prescriptions with an antibiotic injection was 21% in Government hospital and 19% in Private hospital which is according to WHO (Optimal Value-13.4-24.1). This indicating a positive trend toward a reduction in the indiscriminate use of antibiotics and unnecessary injections. Injection increases chances to the infection causes pain at the injection site and also they are increasing the cost of treatment.

Assessment Of Drugs Prescribed From Essential Medicine List (rajasthan State Essential Medicine List 2019)

Drugs should be prescribed from the Essential medicine list, it improves the quality of healthcare. Each individual receives the right medicine, in the right dose for the right duration with appropriate information and follow up treatment, at an affordable cost. This forms the concept of rational use of medicine.

In Government hospital percentage of drugs prescribed from the Essential Medicine List was high (100%) in comparison to Private hospitals where 97.76% of prescribed drugs were from EML.

Assessment Of Percentage Share Of Different Antibiotics In Selected OPDs

The present study revealed that in both types of hospitals Cephalosporins (Cefixime, ceftriaxone, cefuroxime) were the most frequently prescribed drug. The reason may be due to their broad spectrum of activity and fewer incidences of adverse effects. According to the global antibiotic resistance partnership (GARP) between 2005-2009 sales of Cephalosporins were increased by 60%¹⁰. An ICMR study shows that more than 70% of Enterobacteriaceae (which include Salmonella, E. coli, Yersinia pestis, Klebsiella, and Shigella) are resistant to third-generation Cephalosporins. Among the Enterobacteriaceae species, Klebsiella and E. coli have been reported to be resistant to group third-generation Cephalosporins (80%) antibiotics. Resistance to these drugs increases the cost of treatment and risk of hospital-acquired infections because of a longer stay in the hospital.

The next most frequently prescribed drugs in both hospitals were Fluoroquinolones. Ciprofloxacin and levofloxacin were mostly prescribed drugs Surgery (for Road traffic accident and infection) department. Penicillins are mostly used in Private hospitals. Macrolides (azithromycin) were mainly used in private hospital. Nitroimidazoles (Metronidazole) were used in private hospital. Combination of Amoxicillin and Clavulanic acid mostly used in both hospitals. The combination of Ofloxacin and Ornidazole was mostly prescribed in Surgery OPD. Combining Anti-amoebic with a fluoroquinolone (antibacterial) is irrational because the patient suffers only from one type of diarrhoea. Excessive Use of this combination increases cost, adverse effects, and may encourage resistance. We need strict regulations to stop the over-the-counter sale and irrational prescriptions.

CONCLUSION-

This study reveals that irrational use of antibiotic, polypharmacy, lesser number of prescription by generic name and over prescription of the antibiotic and FDCs. in both hospital. There is a urgent need of improvement in the standards of prescribing patterns in many aspects. The health practitioner should prescribed more generic drugs to decrease the cost of treatment. The irrational FDCs may cause hazardous effects so it should be prescribed only when it is necessary. Recommendations to improve the current prescribing patterns should be based on the Standard Treatment Guidelines, EML, and antibiotic policy. This study concluded that there is urgent need of encourage the rational and appropriate use of drugs.

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