Research Article

Drug Utilization Study of Antibiotic in Medicine Department of a Tertiary Care Teaching Hospital: A Descriptive Observational Study

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ABSTRACT

Drug utilization studies are useful in the drug reforming required resistance and sensitivity to improving the standards of medical treatment at all levels in health system. It also helps in the identification of problems creates with drug use. The aim of this study was to evaluate the number of antibiotics prescribed per prescription according to the indication and cultural report of infected patients. Methods: This was a descriptive observational study. Over a period of six months from November 2016 to April 2017, about 150 patients who were prescribed antibiotics were included in the study. The data on antibiotic containing prescriptions from each patient was collected from the inpatient of medicine department and entered in a specially designed case report form. The study was carried out in a tertiary care teaching hospital. Result: A total of 150 prescription cases were analysed. It was observed that out of 150 patients, 54 were male (36%) and 96 were female (64%). Out of 150 patients, 90 (60%) patients were treated empirically and 60 (40%) were treated based on their culture report. According to data analysis the maximum infection were observed with gram negative bacteria (66%) i.e. *E.coli* in urinary tract infection etc and with gram positive bacteria (34%) i.e. *streptococcus* species in septicemia, meningitis etc. For these infections commonly prescribed antibiotic were amikacin (57%) and metronidazole (25%) in single therapy respectively. The route of administration used for these antibiotic was intravenous (69%) as compared with oral (31%). Most of the prescriptions contained polypharmacy. Conclusion: The study was undertaken to give feedback to the prescribers, so as an overuse of injections that had increased the cost of the treatment; also, the culture sensitivity was not done before prescribing antibiotics. Patient counseling should be done for the proper use of antibiotics, culture sensitivity tests should be conducted before prescribing antibiotics.

Keywords: Drug Utilization, Antibiotics, Medicine.

INTRODUCTION

Infection is the invasion of an organism's (disease causing agents) in the body tissues and their multiplication with toxins they produce or the reaction of host tissues to these organisms. An infection may cause no symptoms and be subclinical, or clinically apparent. The symptoms for these infections may include discharge from a wound, fever, cough, shortness of breathing, burning with urination or difficulty urinating, headache, nausea, vomiting, and diarrhea. An infection may remain localized or it may spread through the blood or lymphatic vessels to become systematic[1]. The most common types of infections are Bloodstream Infection (BSI), Ventilator-Associated Pneumonia (VAP), Urinary Tract Infection (UTI), Gastroenteritis, Meningitis, Pneumonia, Upper and lower respiratory infection and Surgical Site Infection (SSI)[2]. The infections are caused by viral, bacterial, and fungal pathogens. The pathogen may be exogenous (acquired from the environmental or animal source or from other person) or endogenous (from the normal flora)[3]. Most commonly microorganism that cause these types of infections in human's are *Streptococcus aurous, beta-hemolytic streptococcus, E.coli, protease, Klebsiella, anaerobes, Pseudomonas, Acinetobacter,* *Streptophomonas, Methicillin resistant, Candida albicans, Pseudomonas aeruginosa, Acinetobacter baumanii, Stenotrophomonas maltophilia, Streptococcus pneumonia, Homophiles influenza, Moraxella catarrhalis. Clostridium difficile, Mycobacterium tuberculosis, Vancomycin-resistant enterococcus, Campylobacter Jejune, Campylobacter Jejune, listeria monocytogenes Legionnaires' disease*[4].

In the United States, the Center for Disease Control and Prevention estimated roughly 1.7 million hospital-associated infections, from all types of microorganisms including bacteria and fungi combined, cause or contribute to 99,000 deaths each year[5]. In Europe, where hospital surveys have been conducted, the category of gram negative infections are estimated to account for two-thirds of the 25,000 deaths each year. Nosocomial infections can cause severe pneumonia and infections of the urinary tract, bloodstream and other parts of the body. Many types are difficult to treat with antibiotics. In addition, antibiotic resistance can complicate treatment[6].

Antibiotics are the most frequently prescribed drugs among both in the hospital setting and the community setting to infected patients. As the consumption of antibiotic increases, resistance to antibiotics becomes a

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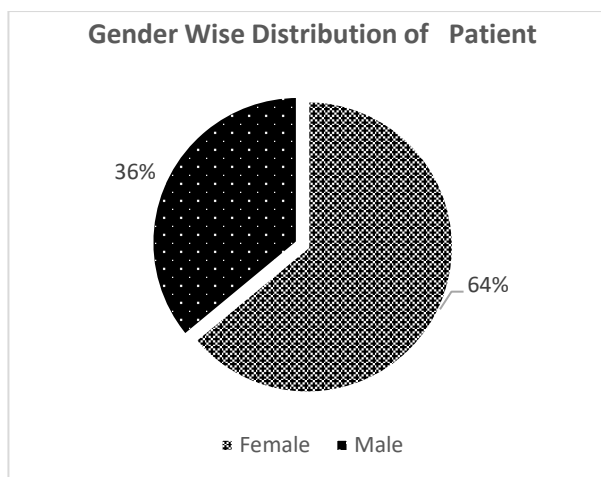## Gender Wise Distribution of Patient

Figure 1: Gender Wise Distribution of Patient. Most of patients in the age group of 56-70 years, followed by age group of 41-55 years and 25-40 (Figure 2).
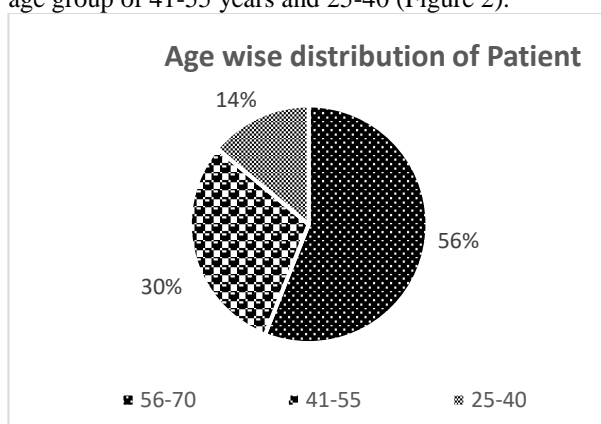
Age wise distribution of Patient

Figure 2: Age wise distribution of patient

major threat to public health[7]. An inappropriate prescription increases the cost of the medical treatment and it also increases the morbidity and the mortality. The impact of the irrational prescription of drugs also leads to an increase in the incidence of adverse drug events and the emergence of drug resistance. The rational use of antibacterial agents is being increasingly recognized as an important contribution to control the worldwide emergence of bacterial resistance, to minimize the side effects and to reduce the cost of the treatment[8]. A knowledge on how antibacterial agents are being prescribed and used, is fundamental, to obtain a rational drug use. Monitoring of the prescriptions and drug utilization studies could identify the associated problems and provide feedback to the prescribers. So this study was undertaken in a tertiary care hospital to evaluate the utilization pattern and monitor the rationality of antibiotics among the pathogen infected patients admitted in medicinal ward.

Study Design
A descriptive observational study on antibiotic utilization pattern was conducted by the department of pharmacy practice in collaboration with the medicine department of M.M. medical college and hospital, mullana-ambala (India) with a sample size of 150 patients. The study was conducted for a period of six months from november 2016

to april 2017. Out of the 190 patients who admitted to the IPD departments of medicine, a total of 150 patients were analysed on the basis of the inclusion and exclusion criteria. All the prescriptions had complete documentation of information including, patients demographic characteristics, date of admission and discharge, clinical diagnosis, drug name, dose and route of administration, investigations, rationality and outcome of health status. The data of the patients who received antimicrobials was recorded and analysed further for the drug utilization studies. The study protocol and all the other documents which were related to the study were approved by the Institutional Ethics Committee.

Inclusion Criteria
All the patients (of either gender) with any type of infection admitted in medicine department of M.M. medical college and hospital of, during the study period were included in the study.

Exclusion Criteria
We excluded the inpatients who discharged against medical advice. All the pediatric patients, pregnant/lactating mothers and the patients who were referred to higher center were excluded from the study.

Method of Data Collection
During our study, we reviewed the case sheets of all patients who met the inclusion criteria. Data was collected using a well-structured data collection performa which includes patient's demographics, drug allergies, patient's case history, medication chart, culture reports and laboratory parameters. We reviewed the laboratory parameters regularly to check any variations. The culture and sensitivity reports were analyzed to assess the appropriateness of the antibiotic selection. Any medication errors that were found in our cases were also recorded. All the discrepancies observed have been documented appropriately in the data collection form designed for our study.

Data Analysis
The data was analyzed using Graph pad. The results were expressed in percentage.

RESULTS AND DISCUSSION
For the present study, on the basis of the inclusion and exclusion criteria we collected details of 150 patients who were diagnosis as infectious disease and treated with antibiotics. Among the 150 patients, majority of patients were female (64%) as compared to males (36%) (Figure.1).

The maximum medical conditions for which antibiotics were prescribed in the medicine department included Urinary Tract infection (25%), Bacterial vaginosis (BV) (16 %), bladder and urethra infection (14%), acute gastroenteritis (11 %), otitis media (9%) meningitis (8%), endocarditis (3%) septicemia (2%), Chronic Obstructive Pulmonary disease (2 %), others (8 %) (Figure 3).

According to our study observations, the most commonly microorganism found in culture was gram-negative (66%) like *Escherichia coli* in Urinary tract

disease, bladder infection, acute gastroenteritis and only gram-positive (34%) like *streptococcus* species
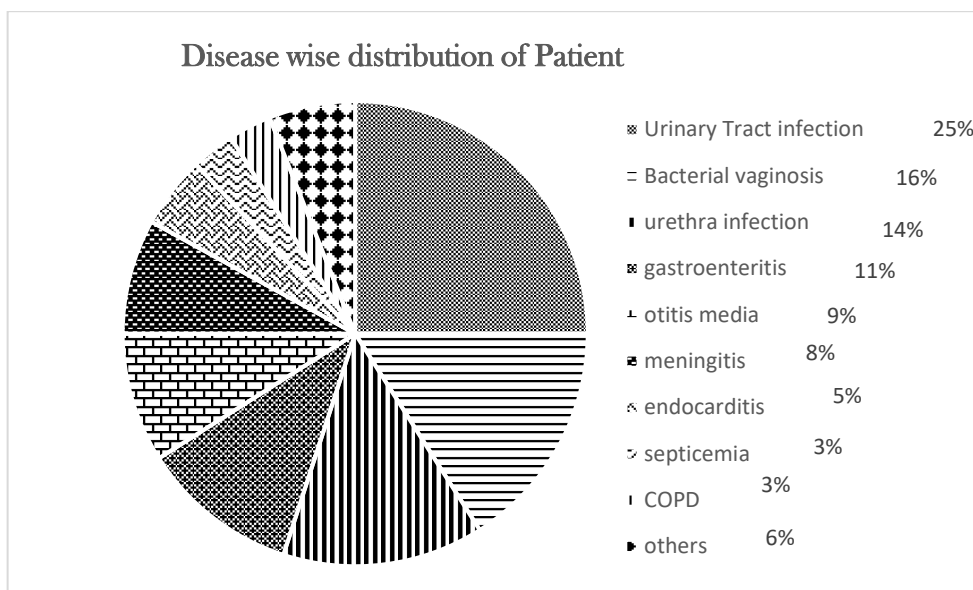
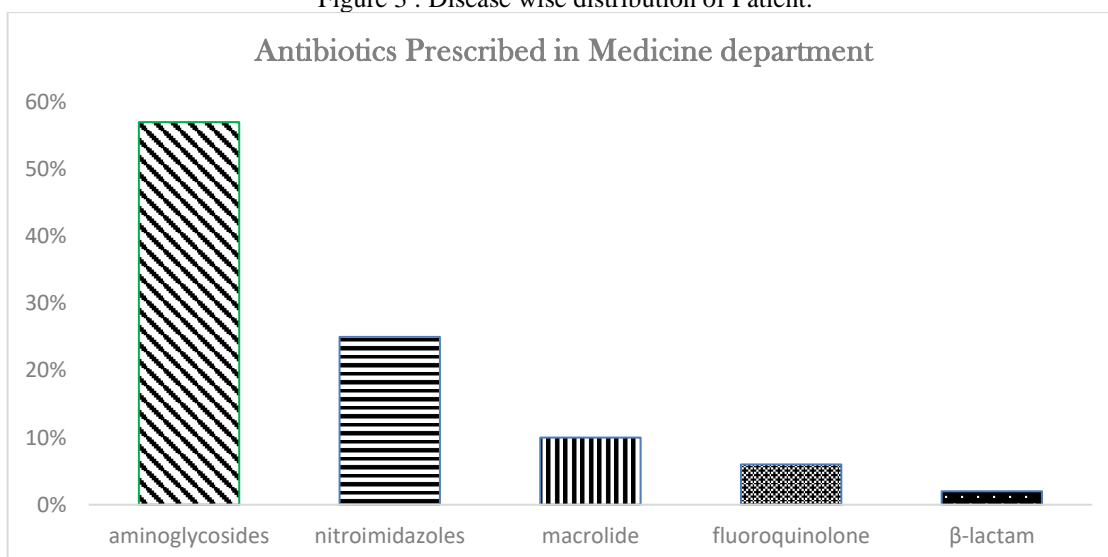Figure 3 : Disease wise distribution of Patient.

Figure 4: Antibiotics prescribed in medicine department.

Table 1: 1- Form and route of administration of antibiotics.

Form of formulation		Routes of administration	
Branded	62.35%	Intravenous	69%
Generic	37.64%	oral	31%

in septicemia, meningitis, otitis media and many more but in less concentration.

Out of the 782 drugs which were prescribed to the patients, 348 were antibiotics. Each patient, on an average, was prescribed 2.3 drugs per prescription per patient per course. It was also observed that out of the 348 antibiotics which were prescribed to the patients, and maximum 217 (62.35%) prescribed antibiotics were of the branded form and only 131 (37.64%) were of the generic form. The routes of administration were intravenous (69%) and oral (31%)

During this study, it was observed that the maximum prescribed antibiotic class was aminoglycosides i.e. amikacin (57%) with different strains of microorganism,

followed by nitroimidazoles i.e. metronidazole (25%), macrolide i.e. azithromycin and clarithromycin (10%), fluoroquinolone i.e. levofloxacin and ofloxacin (6%), β-lactam antibiotic i.e. imipenem (2%).

In present study, the maximum antibiotic resistance was observed of *E. coli* with ampicillin**,** ciprofloxacin**,** levofloxacin**,** tetracycline etc. and *staphylococcus aureus* with penicillin-G, levofloxacin**,** azithromycin etc. respectively.

CONCLUSION

The present work is the maiden drug utilization study which was conducted in the IPD Department of Medicine at Maharishi Markandeshwar (Deemed to be University) hospital. It highlighted rational prescription patterns which included the less utilization of antibiotics. The average number of drugs per prescription was found to be low. But there was an overuse of injections that had increased the cost of the treatment; also, the culture sensitivity was not done before prescribing antibiotics. Amikacin and

metronidazole, are maximum prescribed drug by medical practitioner in different infectious disease. Both antibiotics are in list of Essential Medicines, the most effective and safe medicines needed in a health system. So, in conclusion, the prescriptions were found to be rational according to standard guideline of antibiotics use.

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