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Research Article

ANALYSIS OF RECOMMENDING PATTERN OF ANTIMICROBIAL AGENTS IN A TERTIARY CARE HOSPITAL

Dr. Memoona Syed¹, Dr. Asfa Akram², Dr. Maria Mumtaz³

¹ Ghazi Khan Medical College, DG Khan

² THQ hospital Alipur

³ Sheikh Zayed Medical College Rahim Yar Khan

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Abstract:

Objectives: To evaluate the pattern of use of Antimicrobial drugs in patients admitted for various illnesses.

Materials and Methods: It is a retrospective and observational study, conducted during the period of April 2019 to April 2020 in the Medicine department of Bahawal Victoria Hospital, Bahawalpur. Prescription record of 252 patients were studied. These data were obtained from Medical Record Department (MRD) of the hospital. The study was conducted after obtaining permission from the Institutional Ethics Committee. Data were analyzed for- average number of antimicrobials prescribed per prescription, the relationship between patient age and sex, percentage usage of various antimicrobial groups and percentage use of individual antimicrobials.

Results: It was observed that 75 % of patients were prescribed 1-2 antimicrobial agent and 25 % were prescribed 3 or more than 3 antimicrobials. Cephalosporins were the most preferred antimicrobials followed by quinolones and aminoglycosides. Fluconazole was found to be most commonly prescribed antifungal whereas Artesunate and Metronidazole were most preferred antimalarial and antiamoebic drugs.

Conclusion: It can be concluded from the present study that physicians preferred to prescribe 2 or more than 2 antibacterial agents in a prescription. To treat various infections Cephalosporins and quinolones were observed to be most prescribed antibacterials. Fluconazole, Artesunate & Metronidazole were found to be commonly prescribed antifungal, antimalarial and antiamoebic agents. Uses of Macrolides, Tetracyclines & Vancomycin were very low. However, aminoglycosides were commonly prescribed to young males and Cephalosporins to young female patients.

Keywords: Drug Use, Antimicrobial, Prescription

Corresponding author:

Dr Memoona Syed,

Ghazi Khan Medical College, DG Khan

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INTRODUCTION:

Antibiotic treatment is in 1st place in all supergroups in the pharmaceutical market, with an increase of 14.8% in February 2012, according to data from all Pakistani chemical companies and distributors-Advance Working, Action & Correction and stem (AIOCD-AWACS) market research company. It occupies about 19% of the more than 60,000 CR markets, but drug use is the least studied drug in terms of research¹⁻². The main objective of drug use research is to facilitate the correct use of drugs in patient populations, to minimize adverse events and drug interactions that lead to a better outcome of the patient³⁻⁴. Drug use research is a powerful means to discover to determine the role of drugs in society. They provide a strong socio-economic basis for health care decisions. The use of medicines is defined as the marketing, distribution, prescribing and use of medicines in society and highlights the consequent medical, social and economic consequences⁵⁻⁶. Drugs are usually not used, taking into account safety and efficacy. Rational prescribing of drugs consists in the use of at least drugs to achieve the best possible effect as soon as possible and at a reasonable cost. Inequalities between irrational prescription and prescription and drug use can offset the benefits demonstrated by randomized controlled trials on the effectiveness of drugs⁷⁻⁸.

MATERIALS AND METHODS:

This Retrospective and observational study held in April 2019 to April 2020 in the Medicine department of Bahawal Victoria Hospital, Bahawalpur for one-year duration.

Study population: Data from medical records of 252 patients who had any illness or ailment were studied.

Procedure: The work was carried out with the consent of the Corporate Ethics Board. A total of 327 patients were tested and analyzed according to inclusion and exclusion criteria and 252 patients were selected. Information about the drug, such as age, gender, diagnosis, month of acceptance, number of prescription drugs, is collected on a personalized data collection page.

Tested parameters: The following parameters were taken into account in the study:

1. Average prescription antimicrobial drugs prescribed by prescription.
2. Percentage of use of various antimicrobials
3. Percentage of drug use in each antimicrobial group
4. Frequency of systemic infections in different months
5. Relationship between patient demographics and prescription pattern

Statistical analysis: The data has been descriptively analyzed using Microsoft Excel. In addition to the drugs offered in percentage, the use of different classes was also analyzed.

RESULT:

The total number of recipes analyzed is 252. The number of prescription drugs varies between 1 and 4 (Table-1).

Table 1: Number of antimicrobials per prescriptions in number and percentage

| Number of antimicrobials per prescriptions | No of pts (%) |
|--|---------------|
| One | 112(44.44) |
| Two | 80 (31.74) |
| Three | 36(14.28) |
| Four or more than four | 24 (9.52) |
| Total no of prescriptions studied | 252 |

It was observed that 1, 2, 3 and 4 or > 4 antimicrobials were prescribed for 44.44%, 31.74%, 14.28% and 9.52%, respectively (Table 1). Of the antimicrobials, the greatest number (71.42%) of patients were prescribed cephalosporins, followed by quinolone (39.68%), aminoglycoside (28.57%), anti-amoebic (24%), penicillin's (19.04%), and antifungal agents (8 %)), Antimalarial drugs (4.5%) and others accounted for 8% (Fig. 1). Among cephalosporins, the highest was the use of cefuroxime (33.33%), followed by cefotaxime (25.39%), ceftriaxone (6.32%), cefoperazone, cefixime, and cefepime, 1.58% each. Among the fluoroquinolones it was found that ciprofloxacin (14.28%) was the most preferred, followed by ofloxacin (12.69%), levofloxacin (7.9%) and norfloxacin (4.79%). Among the aminoglycosides, the most frequently chosen drug was amikacin (20.62%), followed by gentamicin (4.75%) and streptomycin (3.75%). Of the penicillin's, 11.1% was used for amoxicillin, followed by 4.75% benzyl penicillin and 3.17% ampicillin. Of the oral antifungal drugs, fluconazole (4%) was the most preferred, followed by Itraconazole 2.7% and Ketoconazole 1.3%. Artesunate was prescribed at 2%. Chloroquine 1.7% and primaquine 0.8% as antimalarials. Among the antibacterial drugs, metronidazole was used in 13.6%, followed by Tinidazole in 6.4% and Ornidazole in 4%. Macrolides, tetracyclines, and vancomycin were used in 3.1%, 3.1% and 1.5%, respectively (Table 2).

Table 2: Percentage usage of drugs in each antimicrobial group

| Drug class | Drug | (%) of prescriptions |
|------------------------|----------------|-----------------------------|
| Cephalosporins | Cefuroxime | 33.3 |
| | Cefotaxime | 25.3 |
| | Ceftriaxone | 6.32 |
| | Cefoperazone | 1.58 |
| | Cefixime | 1.58 |
| | Cefepime | 1.58 |
| Quinolones | Ciprofloxacin | 14.28 |
| | Ofloxacin | 12.69 |
| | Levofloxacin | 7.92 |
| | Norfloxacin | 4.75 |
| Aminoglycosides | Amikacin | 20.62 |
| | Gentamicin | 4.75 |
| | Streptomycin | 3.17 |
| Penicillins | Amoxicillin | 11.1 |
| | Penicillin - V | 4.75 |
| | Ampicillin | 3.17 |
| Antifungals | Fluconazole | 4 |
| | Itraconazole | 2.7 |
| | Ketoconazole | 1.3 |
| Antimalarials | Artesunate | 2 |
| | Chloroquine | 1.7 |
| | Primaquine | 0.8 |
| Antiamoebics | Metronidazole | 13.6 |
| | Tinidazole | 6.4 |
| | Ornidazole | 4 |
| Others | Macrolides | 3.17 |
| | Tetracyclines | 3.17 |
| | Vancomycin | 1.58 |

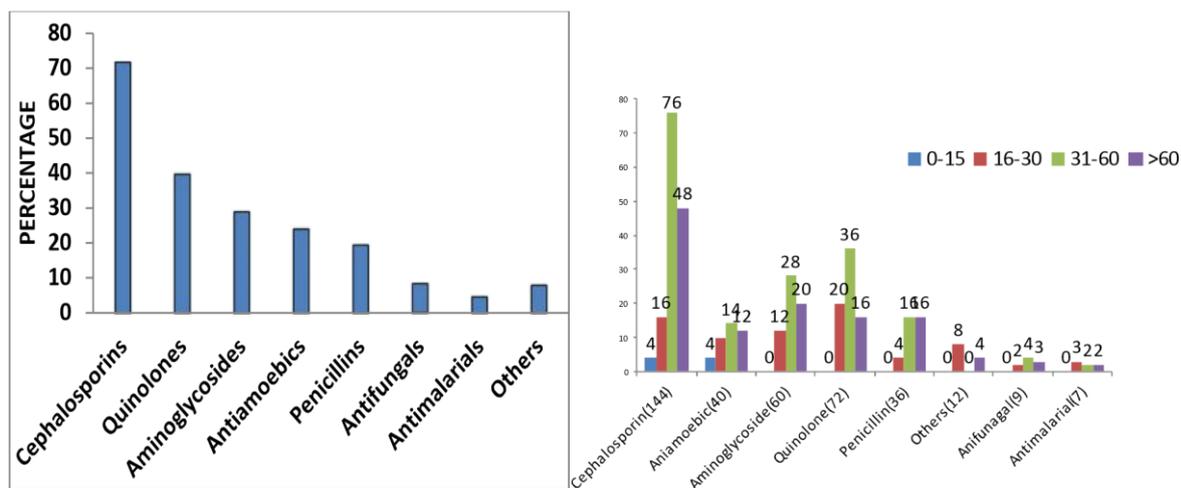


Fig 1: Prescribing frequency of antimicrobial group of drugs, Fig 2: Age-wise prescribing frequency of antimicrobials in males

Patients admitted due to cardiovascular disease were observed in May the most (85%), and the least in January (10%). Nervous system infections accounted for 15% in February and 5% in July. Another infection was found in 60% in August, and the lowest in March (10%) (Table 3). In young male patients, aminoglycosides and antimalarials were found to be highest and lowest prescribed respectively, while cephalosporins and quinolones were highly preferred for both younger and older women. Younger men were most often admitted for CVS and endocrine disorders. However, CVS and gastrointestinal disorders were common in younger and adult patients.

DISCUSSION:

The clinical setting in the medical ward warrants the use of drugs from various drug classes. Rational prescription of drugs is essential for better patient care. The first step in any intervention to improve drug utilization is to assess the extent of existing problem in prescribing. The objective of our study was to evaluate the drug utilization patterns among patients admitted to the tertiary care hospital⁹⁻¹⁰. The demographic results of patients admitted to the IPD over a period of 12 months revealed a male preponderance with a mean age of around 50 years, similar to a study carried out in Nepal in 2005¹¹. In contrast, Smythe et al (1993) showed an equal number of male and female patients admitted to the hospital with a mean age of 65 years. Previous Indian studies also documented male predominance which suggests that more males are admitted in an Indian setting for infections. The probable reasons for this finding could be the male to female ratio is higher in the state of Maharashtra and overall, in the India. In the Indian scenario, the female population is seen as severely reluctant to use health care facilities, even if they are seriously ill, especially low socio-economic strata¹²⁻¹³. A wide range of clinical diagnoses have been observed, such as sepsis, renal failure, acute respiratory distress syndrome, multiorgan dysfunction, head trauma, cvs-related disorders and diabetes complications. Due to the primary disease of patients, the debilitating disease, invasive diagnostic and therapeutic procedures and prolonged use of life support syndrome provides a predisposition to infections for these patients Most antimicrobials have been prescribed under the

brand name (60%). In all patients, more than five drugs were prescribed, in other words, complex polypharmacology (>90%)¹⁴. Polypharmacology is defined as an accompanying use of five or more medical products and may increase drug interactions and drug-related problems. Our study found that 30% of Nepalese had high-frequency antimicrobial prescriptions that were inconsistent with previous documented studies. Among many antimicrobial drugs, it was prescribed (69%) Provisions. In this study, problems such as diabetes, multiorgan disorders, HD and respiratory infections were also observed in patients requiring therapeutic and prophylactic use of antimicrobials. Protocol and guidelines for the eradication of antimicrobials; antimicrobials can be used to improve the rational use of antimicrobials¹⁵. This may have a multidisciplinary approach to the configuration of intellectual property rights in the intensive care unit and involving intensive care professionals; Pharmacists and microbiologists can work together to make antibacterial pharmacotherapy more rational.

CONCLUSION:

From the studies conducted, it can be concluded that doctors preferred to prescribe 2 or more than 2 antibacterial drugs. In the treatment of various infections, The most commonly prescribed antibacterial agents were cephalosporins and quinolones. Fluconazole, artesunate, and metronidazole have been found to be commonly prescribed anti-fungal, anti-malarial and anti-cobweb agents. The use of macrolides, tetracyclines and vancomycin was very low.

However, aminoglycosides were commonly prescribed for young men and cephalosporins for young patients. Overall, a wide spectrum of clinical diagnosis and a variety of drugs were used with the different drug classes. Overall, there is room for improvement in the rational use of antimicrobials. Antibiotic resistance is growing at an alarming rate, leading to increased morbidity, mortality and treatment costs. A key factor in the development of antibiotic resistance is inappropriate use of antibiotics. The medical fraternity needs to understand that antibiotics are a valuable and limited resource, and if no conscious effort is made to contain drug resistance, a multi-drug resistant organism may emerge that cannot be cured with an ever known antibiotic, reversing the progress of medicine by ranking and reverting to previous. - antibiotic. Pharmacoeconomic studies in the hospital can encourage cost-effective antimicrobial therapy. This will help rationalize prescribing practices based on feedback from these studies, and practices across institutions, regions and countries can be compared.

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