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Study on Usage of Antimicrobials in Hospitalized Patients in Rural Tertiary Care Teaching Hospital

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ABSTRACT

The aim of this study is to find the usage of antimicrobials in hospital section and to study the frequency of morbidity and mortality. The present study was undertaken to screen rational use of antimicrobials in inpatient department (IPD). Prescriptions from medicine, surgery, obstetrics (OBG) were collected over a period of nine months. Prescriptions containing antimicrobial drugs were analyzed for appropriateness in dose, dosage, duration of therapy. In our study we found that, out of 362, 179 were males and 189 were females. In that most commonly Cephalosporinns 142 (39.22%), Quinolones 128 (35.35%), Antiprotozoal 63 (17.40%) followed by Macrolides, Aminoglycosides, Penicillines, and Anthelmentics were prescribed. Our findings indicate an urgent need for the establishment of proper guidelines, dissemination of information to practitioners and supervision of antimicrobial usage in low income countries like India. Irrational and unnecessary drug use can be expensive and harmful leading to resistance.

Key words: Antimicrobials, Prescription, Health Care

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INTRODUCTION

The majority of hospitalized patients receive antimicrobials for therapy or prophylaxis during their inpatient stay. It has been estimated that at least fifty percent of patients receive antimicrobials needlessly. Reasons include inappropriate prescribing for antimicrobial prophylaxis, continuation of empiric therapy despite negative cultures in a stable patient, and a lack of awareness of susceptibility patterns of common pathogens. Antimicrobial are frequently misused and overused in many developing countries, thus resistance to antimicrobials, has led to an increase in morbidity, mortality and cost of health care.[1] Over prescribing not only increases the costs of health care, but also result in super infection due to antimicrobial-resistant opportunistic fungi, and may increase the likelihood of an adverse drug reaction. On the other hand, not prescribing (when there is an urgent need at the bedside) may also lead to serious consequences. More than 75% of critically ill patients receive at least one antibiotic during their stay in hospital. The rationale for administering antibiotics is that patients with a microbiologically confirmed infection have a greater mortality rate compared with patients without infection. The discovery of antimicrobial agents by Paul Ehrlich was one of the most remarkable discoveries that changed the face of medical practice[2].

Anti-microbial are the most commonly used of all drugs. Although antibacterial agents are universally recognized as having no antiviral activity, 50% or more of patients diagnosed with a viral respiratory tract infection are prescribed a course of antibacterial therapy. If the gains in the treatment of infectious diseases are to be preserved, physicians must be wiser and more selective in the use of antimicrobial agents.[3]

Clinically and economically inappropriate prescribing of antimicrobials in many forms including inappropriate and irrational use of antimicrobials constitutes a major health problem. Various factors which contribute to irrational prescribing include; lack of unbiased source of information uncertainity about diagnosis, limited experience, and aggressive drug promotion by pharmaceutical industries and time patients demand etc. There was high prevalence of polypharmacy including antibiotic and prescriptions by brand names thus increasing the cost of prescription.

Rational prescribing can be achieved by practicing evidence-based medicine. Since pharmacist is often the final link between prescribed medication and the patient, better interaction between health care providers, pharmacists and the patient can lead to better patient knowledge about drug use and compliance to therapy.[4]

It is an area in which a pharmacist's expertise is valued by other health professionals and where a pharmacist's knowledge of pharmacology can be recognized and appreciated. Pharmacists are able to provide a very valuable role in screening for interactions and advising on management when interactions occurs, whether at the patient's bedside or as part of the dispensing process or sale of a medicine.[5]

The aim of this study is to find the usage of antimicrobials in hospital and to study the frequency of morbidity and mortality. It is believed that this study would help to develop an antimicrobials policy and to decrease the development of antimicrobials resistance as well as post operative mortality and morbidity of our hospital.

MATERIALS AND METHODS:

Study design: The study was a prospective and observational study.

Materials:

Patient profile form, Patients consent form and study information sheet

Source of data:

Patients' case notes, Treatment charts, Laboratory reports, Patient interview

Inclusion Criteria:

- Inpatients of department of medicine, OBG, Surgery
- Patients on multiple drug therapy; with minimum of two drugs with at least one is an antimicrobial agent

Exclusion Criteria:

- Patients not on any antimicrobial agent
- Patients on single drug therapy with antimicrobial agent
- Outpatients of department of medicine, OBG, Surgery

Ethical Clearance:

Ethical Committee clearance was obtained by the Institutional Ethical committee (IEC) Sri Adichunchanagiri Institute of Medical Sciences.

Duration of the study:

The study was conducted over a period of 9 months.

Place of study:

Department of Medicine, OBG and Surgery Sri Adichunchanagiri Hospital and Research Center, B.G .Nagara, Bellur, Mandya district, Karnataka, India.

Method of collection of data/Study procedure:

This was a prospective and observational study. Data was obtained from the patients of General medicine department, OBG and Surgery department.

All patients were admitted to Medicine, OBG and Surgery wards during the study period will be screened for use of any antimicrobial agents. Those who met the inclusion criteria were enrolled for the study. Follow up were carried out till the day of discharge for the enrolled patients such as demography details of patients drug use and disease details were documented in the patient profile form. The nature of interaction with regard to onset, severity, documents were also assessed. Data was evaluated using suitable statistical tools.

RESULTS AND DISCUSSION:

The study of prescribing pattern is a component of medical audit, which seeks monitoring, evaluation and necessary modifications in the prescribing practices of prescribers to achieve rational and cost effective medical care. It is necessary to define prescribing and to identify irrational prescribing habits to drive a remedial message to the prescribers.

Table 1: Gender wise distribution:

Gender	Number of patients	Percentage (%)
Male	173	47.79%
Female	189	52.21%
Total	362	100.0%

In our study we found that, out of 362, 179 were males and females were 189 as shown in table number 1. This is mainly due to the structural and anatomical differences in the females due to shorter urethra. The same observations were made by Tomas Greibling in his studies and also a text book on Urinary tract infection in males and also in the text books of pharmacotherapeutics by Herfindal and Roger walker.[6 7 8]

Table 2: Type of Antimicrobials Prescribed: (n=362)

Drug class	Number of drugs	Percentage (%)
Quinolones	128	35.35%
Macrolides	21	5.80%
Antiprotozoal	63	17.40%
Cephalosporines	142	39.22%
Antifungal	04	1.10%
Aminoglycosides	12	3.31%
Anthelimintic	06	1.65%
Penicillines	11	3.03%

For some patients prescribed more than two antibiotics

Types of antimicrobial prescribed:

In our study table number 2 shows different types of Antimicrobial drugs were found. In that most commonly Cephalosporinns 142 (39.22%), Quinolones 128 (35.35%), Antiprotozoal 63

(17.40%) followed by Macrolides, Aminoglycosides, Penicillines, and Anthelmentics were prescribed.

Table 3: Based upon category Antimicrobials use (n=362)

Antibiotic Use	Number of Patients	Percentage (%)
Single	207	57.18%
Combination	58	16.02%
Prophylactic	26	07.18%
Empirical	71	19.61%

Category based

The prescription with the single antimicrobials were 207 (57.18%), Combination 58 (16.02%), Prophylactic 26 (07.18%) and Empirical 71 (19.61%) therapy as shown in table number 3, it remains controversial whether combination therapy, given empirically or as definitive treatment, for Pseudomonas aeruginosa bacteremia is associated with a better outcome than monotherapy. Same study shows chamot et al.[10]

Table 4: Distribution Pattern of Culture Sensitivity test reports

Culture sensitivity	Male		Female		Total	
	N	%	N	%	N	%
Do not done	89	24.58	108	29.83	197	54.41
Negative	42	11.60	71	19.61	113	31.21
Positive	17	04.69	35	09.66	52	14.36
• Citrobactor	03	0.82	06	01.65	09	0.24
• E coli	09	2.48	18	04.97	27	0.42
• Proteus	01	0.27	03	0.82	04	0.11
• Strepto coccus Aureaus	04	1.10	08	02.20	12	0.33
Total	**148**	**40.89**	**214**	**59.10**	**362**	**100.0**

Culture sensitivity test reports

Table number 4 shows that Among 362 patients (subjects) culture sensitivity test was performed only for 165 patients in that 113 (31.21%) patients were negatively culture sensitive and 52 (14.36%) patients were positively culture sensitive. The culture sensitivity result showed presence of Citrobacter species 03 (0.82%) of males and 06 (1.65%) in females. The highest incidence of micro organism was E.Coli found in 9(2.48%) males and 18 (4.97%) was present in females.

The study also found that E. coli was the most predominant organism. This finding is in concordance of the other study by Ravi Pathiyil Shankar, Praveen Partha and Nagesh Kumar Shenoy on Prescribing patterns of antibiotics and sensitivity patterns of common microorganisms in the Internal Medicine ward of a teaching hospital in Western Nepal. [12]

They showed that *E. coli* was the most frequent isolate from urine samples. It is also shown in a multicenter study by Atul Kothari and Vishal Sagar on Antibiotic resistance in pathogens causing community-acquired urinary tract infections in India which revealed that the most common pathogen associated with CA-UTI was *E. coli* (68%), with other Gram negative organisms forming 32% of all the isolates.[13]

Table 5: Incidence of recurrence disease (n=362)

Incidence of recurrence	Male		Female		Total	
	N	%	N	%	N	%
Yes	23	06.35	61	16.85	84	23.20
No	76	20.99	202	55.80	278	76.79
Total	**99**	**27.34**	**263**	**72.65**	**362**	**100.0**

Incidence of recurrence in males and females

The incidence rate of recurrence is significantly associated with more number of patients were females 61(16.85%) compare to males 23 (6.35%) in table number 5.

Table 6: Urine analysis: Report of turbidity of the patients

Incidence of turbidity	Male		Female		Total	
	N	%	N	%	N	%
Yes	28	7.73	47	12.98	75	20.71
No	91	25.13	196	54.14	287	79.28
Total	**119**	**32.87**	**243**	**67.12**	**362**	**100.0**

N-Total number of patients

Urine analysis: Turbidity

Table number 6 shows the incidence of turbidity in urine sample is more in females 47(12.98%) and less in males 28 (7.73%).

CONCLUSION:

The present study reveals that the drug utilization in terms of rationality of antimicrobial remains poor. There is an urgent need to develop standards guidelines of antimicrobial drug prescriptions to avoid drug resistance. Irrational and unnecessary drug use can be expensive and harmful leading to resistance. Educational interventions to promote rational use of antimicrobial agents and awareness of deleterious impact of irrational prescribing habit on the community and clinical members of the health care system are needed.

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