A prospective and retrospective study on drug utilization pattern of antibiotics in pediatric patients attending a tertiary care teaching hospital, Palakkad

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ABSTRACT

To attain comprehensive knowledge about the drug utilization pattern of antibiotics in pediatrics population. The study was designed as a prospective and retrospective observational study to collect various data of pediatrics patients and thereby have a comprehensive knowledge of prescription trends of antibiotics. During the entire study period, a total of 164 pediatric patients were included of these 77 were OP patients and 87 were IP patients. The data analysis showed that among 164 patients, 47 children were between age group 0-2 followed by 42 children with age group of 8-12. Out of total 164 patients 100 were male & 64 were female. While considering total diseases seen in IP & OP cases, 60 patients had fever followed by 31 suffering from Upper respiratory tract infection. While considering commonly encountered drug during therapy ie, in treatment Amoxicillin clavualanate (n=46) was prescribed more followed by Azithromycin (n=22). The study revealed that majority of patients i.e. (n =151) underwent mono therapy followed by 31 patients with dual therapy. The majority of patients, i.e. (n = 62) were admitted in the hospital for 5 days followed by 49 cases for 3 days in case of therapy while during discharge also 5 days duration was more. Parental was the most used dosage form during treatment while after discharge tablet were most used.

Keywords: Antibiotics, Resistance, Pediatric department, Penicillin, Cephalosporin, Hospital, Poly therapy, Dual therapy.

1. INTRODUCTION

Antibiotics are the key drugs for treatment of infections and are among the most commonly prescribed drugs in Pediatrics department [1]. The relationship between antimicrobial use and antimicrobial resistance is complex, with a growing body of data strongly suggesting that higher levels of antimicrobial usage are associated with increased levels of antimicrobial résistance [2]. The causes for this phenomenon include widespread use of antibiotics in agriculture, increased use of antibiotics in pediatric patients, and excessive use of antibiotics in adults [2]. Many of the antibiotics are unnecessarily prescribed for viral infections such as common cold. Using antibiotics to treat these viral infections is a misuse or overuse of antibiotics. This misuse/overuse is common in children, and is currently considered to be one of the major public health issues [3]. With the increase in antimicrobial prescriptions, prescribing errors have also become more common. These include suboptimal empiric therapy, inappropriate combination therapy, dosing, as well as duration errors [1]. In present scenario antimicrobial resistance, tissue penetration, drug interactions, side effects, and cost are among the factors which influence the prescription pattern and effectiveness of antimicrobial therapy [1]. Several socio-economic and behavioral factors are thought to contribute to the inappropriate use of antibiotics and consequently, to the increased incidence of bacterial resistance in developing countries.

To avoid bacterial resistance, the World Health Organization proposed, among numerous interventions, that prescribers adopt and use protocols or guidelines. In spite of these children are at high risk for opportunistic or nosocomial

infections due to intensive antibiotic therapy or prolonged hospitalization and immunosuppressed condition. This article describes retrospective and prospective study of hospitalized children younger than 18 years during January 2015-March 2016. The objective was to determine the Drug utilization pattern of pediatric antibiotic prescription.

2. METHODOLOGY

2.1. Study Site

The study was conducted at the department of Paediatrics under the leadership of Dr. Nelakandan at Karuna Medical College Hospital, Chittur, Palakkad.

2.2. Study Period

The study was conducted over a period of six months from November 2015 – March 2016.

2.3. Study Design

Prospective study and Retrospective observational study

2.3.1. Prospective study

A random sample of patients were selected for whom antibiotics had been prescribed were selected. Data from the medical and nursing records were noted in case report forms. Data on drug use were extracted from medical records. Data on prescriptions (type of antibiotic, dose, frequency, duration) were obtained from the physician's notes. Data on consumption were obtained from the nurses notes. The patients, or caretakers of children, were interviewed to obtain data on demographic and socio-economic variables. Among OP and IP patients we included children having prescription with antibiotics and Age criteria were designed to be from 0 to 12 years. We excluded Prescriptions not containing antibiotics, Children more than 12 years of age and children admitted in ICU and orthopedic ward.

2.3.2. Retrospective study

Cases from year 2015 January to 2016 March were collected and Drug utilization pattern were analyzed for randomly selected cases.

2.3.3. Guidelines

Guidelines that followed in the study were standard treatment guidelines of Department of Public Health & Family Welfare & NHS guidelines for Antibiotic Prescribing in the Community

2.3.4. Variables

Demographic variables included hospital, sex, age, length of stay ,living area (urban or rural) as well as variables for prescribing antibiotics such as dosage, duration (interval between start and stop dates), and reason for switching or stopping [2]. Socio-economic variables included monthly family income level, employment & Education. Department and nursing class were regarded as healthcare-related variables and diagnosis of infection was chosen as the disease related variable.

2.3.5. Quality evaluation

Retrospective and prospective data records of patients were selected for the quality evaluation. Every prescription was evaluated with the help of Standard treatment guidelines. The quality of antibiotic use that was assessed according to the method of Gyssens *et al*. and were categorized as follows [2, 4] Definitely appropriate, Not indicated, Inappropriate regarding dose, Interval or route of administration, Inappropriate regarding duration, Inappropriate with respect to efficacy, Toxicity, Broadness of spectrum or costs, Insufficient information.
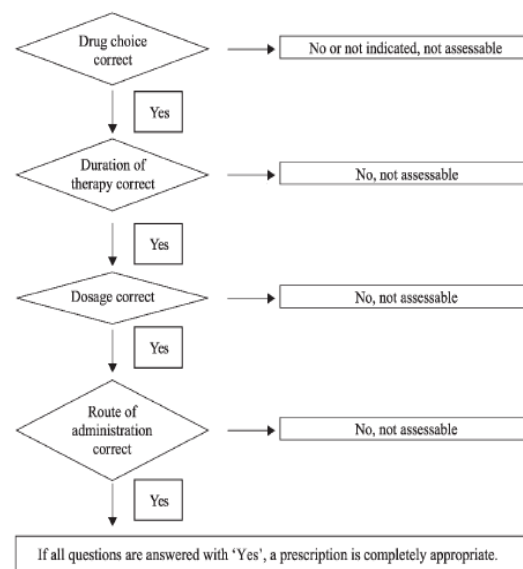

__Figure - 1: Assessment criteria for quality-of-use evaluation or antibiotics prescription__

2.3.6. Study Population

A total of 164 subjects were included in the study.

2.3.7. Development of patient data entry form

A specially designed data entry form was used for collecting patient details. It consists of patient details, signs and symptoms, diagnosis and medication etc.

2.3.8. Development of interview questionnaire

Collected 100 interview questionnaires consists of details about demographic variables and socioeconomic variables including family income

level, employment, knowledge about proper antibiotic use and education etc.

3. RESULT AND DISCUSSION

During the entire study period, a total of 164 pediatric patients were included of these 77 were OP patients and 87 were IP patients [Figure 1]. The data analysis showed that among 164 patients, 47 children were between age group 0-2 followed by 42 children with age group of 8-12 [Figure 2]. Out of total 164 patients 100 were male & 64 were female [Figure 3].
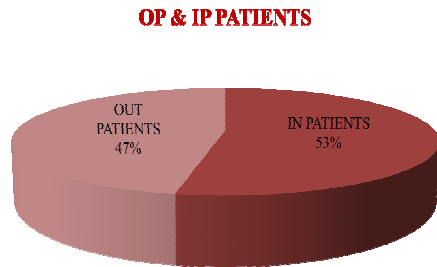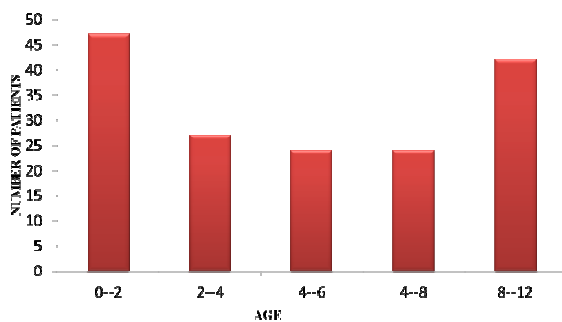

Figure - 1: Distribution of patients.

Figure – 2: Age distribution.
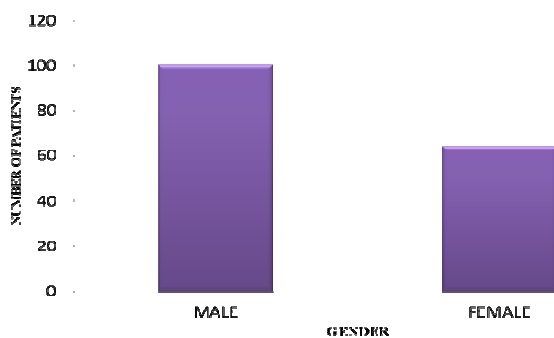
Figure - 3: Gender Distribution.

While considering total diseases seen in IP & OP cases, 60 patients had fever followed by 31 suffering from Upper respiratory tract infection, [Figure 4]. While considering commonly encountered drug during therapy ie, in treatment Amoxicillin clavulanate (n=46) was prescribed more followed by Azithromycin (n=22) [Figure 5].

For the purpose of performing the analysis of the prescription pattern of antibiotic among pediatrics, the pharmacotherapy was categorized into mono and dual therapy. The study revealed that majority of patients i.e. (n =151) underwent mono therapy followed by 31 patients with dual therapy **[Figure 6].**
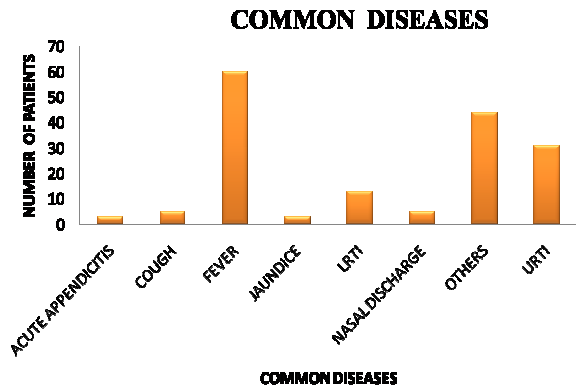

Figure - 4: Common disease seen in patients.

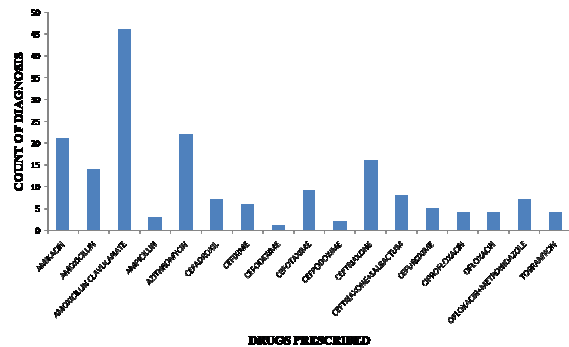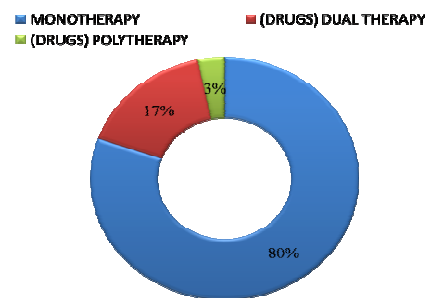**Figure - 5: Common drugs during treatment.**

Figure - 6: Types of therapy

The study revealed that majority of patients, i.e. (n = 62) were admitted in the hospital for 5 days followed by 49 cases for 3 days [Figure 7] in case of therapy while during discharge also 5 days duration was more [Figure 8]. Parenteral was the most used dosage form during treatment (n = 62) [Figure 9] while after discharge tablet

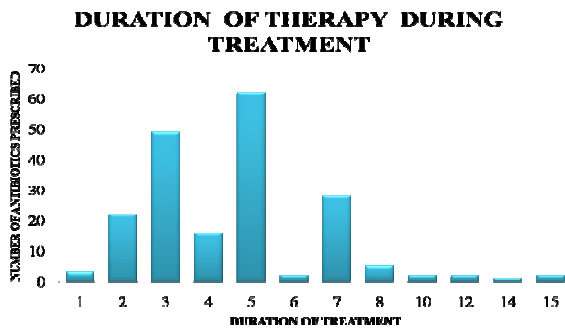were most used after discharge (n = 62) [Figure 10].
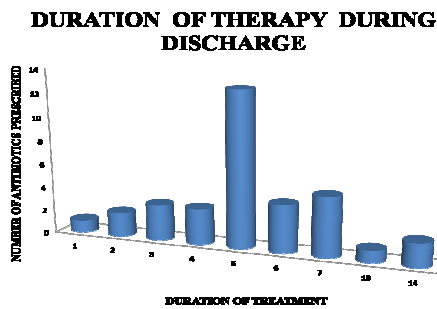
DURATION OF THERAPY DURING TREATMENT
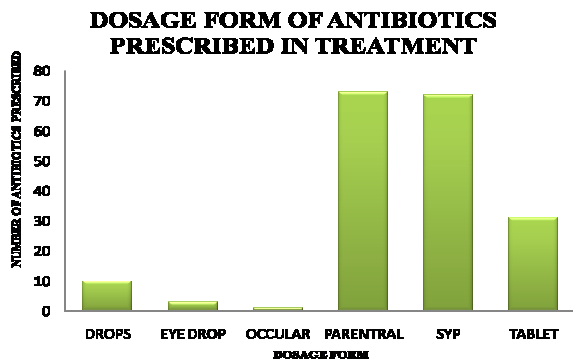
Figure - 7: Duration of therapy during treatment.

DURATION OF THERAPY DURING DISCHARGE

Figure - 8: Duration of therapy during discharge.

DOSAGE FORM OF ANTIBIOTICS PRESCRIBED IN TREATMENT

Figure - 9: Dosage forms of antibiotics prescribed in treatment.

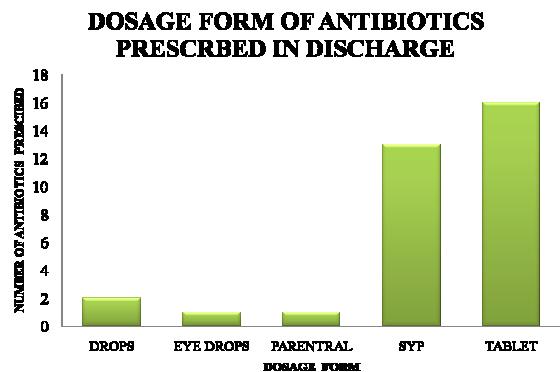**DOSAGE FORM OF ANTIBIOTICS PRESCRBED IN DISCHARGE**

Figure - 10: Dosage forms of antibiotics prescribed in discharge.

When considering most commonly used antibiotics used between 0-10 month was found to be Amikacin (n = 6) followed by cefotaxime (n = 3) [Figure 11]. When considering most commonly used antibiotics used between 1-5 year [Figure 12] and 6-12 year [Figure 13] was found to be Amoxicillin clavualanate.
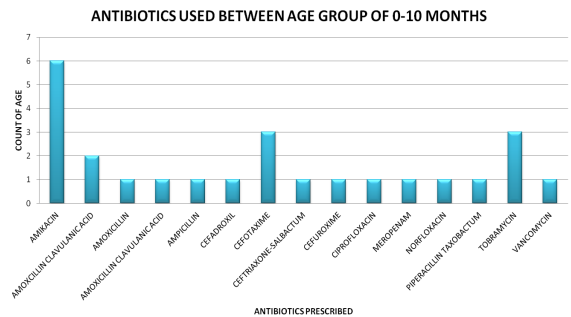
ANTIBIOTICS USED BETWEEN AGE GROUP OF 0-10 MONTHS

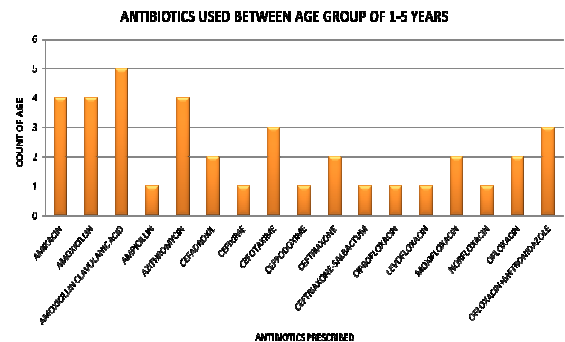**Figure - 11: Antibiotics used between age group of 0-10 months.**

ANTIBIOTICS USED BETWEEN AGE GROUP OF 1-5 YEARS

Figure - 12: Antibiotics used between age group of 1-5 years.

ANTIBIOTICS USED BETWEEN AGE GROUP OF 6-12 YEARS
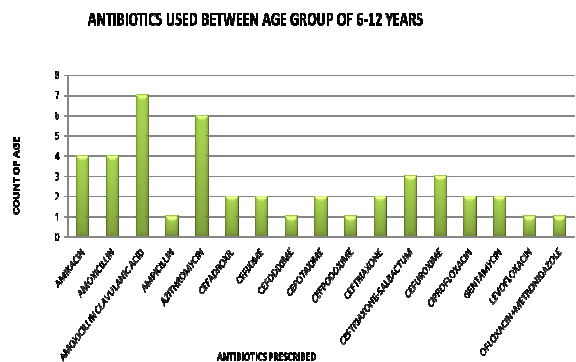
Figure - 13: Antibiotics used between age group of 6-12 years.

Table shows Parents perception for antibiotic use which was collected using interview questionnaires [Table 1] and it shows they don't urge pediatrician to prescribe antibiotic. Table 2 shows socioeconomic variables like family income, employment, education and number of childrens. From the data it showed that most of the parents were

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of moderate family income, irregular employment and with one child. So these socio economic factors affects antibiotic purchase, complete the course of duration.

Table- 1: Parent's perception for antibiotic use		
Parents perception for antibiotic use		
Antibiotic used in all diseases	Agree	24
	Uncertain	60
	Disagree	16
Antibiotic used only physician prescription	Agree	96
	Disagree	4
Antibiotic has no side effect	Agree	6
	Uncertain	40
	Disagree	54
Urge peadiatrician to prescribe antibiotic	Agree	0
	Disagree	100
Antibiotic used cures only bacterial infection	Agree	2
	Disagree	2
	Uncertain	96

Table - 2: Socioeconomic variables	
Socioeconomic variables	**numbers**
Family Income	
High	3
Moderate	72
Low	25
Employement	
Regular	22
Irregular	78
Education	
Primary School Education	47
High School Education	53
No of Childrens	
One	65
Two	25
Three	10

4. CONCLUSION

The study concluded that the Amoxicillin clavulanate was prescribed more followed by Azithromycin. The study revealed that majority of patients underwent mono therapy and most of the patients, were admitted in the hospital for 5 days duration. Parental was the most used dosage form during treatment while after discharge tablet were most used. Parents perception for antibiotic use which was collected using interview questionnaires and it shows they don't urge pediatrician to prescribe antibiotic. Socio economic factors also affects the patients parents to purchase and difficult to complete the course of antibiotics.

5. REFERENCES

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