

## THE STUDY OF DRUG UTILIZATION PATTERN IN PEDIATRIC PATIENTS

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## ABSTRACT

**Objective:** The pattern of drug utilization in pediatric patients in a tertiary care hospital in erode dist was studied.

**Methods:** The study was conducted in the two pediatric clinics in erode dist, during which prescription and case records were reviewed.

**Results:** A total of 286 patient's prescriptions were analyzed. In that 156(54.5%) patients were male and 130 (45.5%) patients were female. The study showed that significant uses of drugs were used for conditions like fever (34.6%), Respiratory Diseases (21.7%), gastrointestinal disorder (16.8%), and infection diseases (12.6%). These conditions were most common reason for hospitalization of the pediatric patients. Anti-infective agents were the main class of drugs prescribed [339 (24.8%)]. Other classes of commonly prescribed drugs were anti-inflammatory agents (20.8%), intravenous fluids (19.0%), and gastrointestinal therapy (14.7%), Drugs acting on the respiratory system (7.6%). The drugs which accounted for over 75 % of prescriptions included the anti-infective agents and anti-inflammatory. The anti-infective agents were mainly used in the inpatient settings. Of the anti-infective agents, antibiotics were most commonly prescribed. These agents also accounted for large percentage of injectables.

**Conclusion:** Anti-infective agents are mostly prescribed drugs for pediatric patients. Antibiotics are prescribed to pediatric patients based on empirical therapy without sensitive test. Anti-inflammatory drugs are prescribed without antacids. Parenteral route mostly prefer than oral route.

**Keywords:** Children, Drug utilization, Pediatric drug prescribing, Inpatients.

## INTRODUCTION

Prescribing practices are a reflection of health professional's abilities to determinate among the various choices of drugs and determine the ones that will most benefit the patients.[1] The study of prescribing pattern is a part of the medical audit and seeks to monitor, evaluate and if necessary, suggest modification in prescribing practices to make medical care rational and cost effective.[2] Appropriate drug utilization in terms of efficacy, safety, convenience and economic aspects at all levels in the chain of drug use.[3] Epidemiological evaluation of medicine use in the elderly is now a highly visible topic, but drug utilization studies in pediatric population have been limited. The assessment of medicine utilization is important for clinical, educational and economic purpose.[4] Infants and children represent a large part of the population in developing countries.[5] Pediatric population is prone to suffer from recurrent infections of the respiratory tract and gastrointestinal system. Lower respiratory tract infections are the leading cause of death in children below 5 five years of age.[6] acute respiratory infection, acute watery diarrhea and viral fever are the common childhood illnesses accounting for the major proportion of pediatric visits.[7]

The study of drug utilization in an evolving field. The use of large computerized databases that allow linkage of drug utilization data to diagnosis, subject to some inherent limitations, is contributing this area of study. Importance of drug utilization studies in pharmacoepidemiology has been increasing due to their close association to other areas like public health, pharmacovigilance, pharmacoconomics and pharmacogenetics. Aim of the study was to evaluate drug utilization pattern among pediatric patients. Infancy and childhood is a period of rapid growth and development. Infants and children represent a large part of the population in developing countries.

## MATERIALS AND METHODS

## Study site

This drug utilization study was conducted at the two pediatric clinics in erode district, Tamilnadu, India.

## Study period

The study was an observational study completed over a period of 9 months, from December 2011 to August 2012. Literature survey,

Preparation of data entry format, Collection of cases and Data analysis.

## Study design

Prospective-observational study

## Patient selection

**Inclusion criteria:** Children age less than 12 years (inpatients)

**Outclusion criteria:** All the adults' patients, outpatients, ICU emergency patients and Patients with AIDS not include in this study.

## Study material

A specially designed data entry format was used to enter all patients' details like patient name, age, sex, weight, inpatient number, date of admission, date of discharge, reason for admission, past medical history, any surgical procedures done, vital signs like temperature, BP and pulse/ respiratory rate. Provision is given in the format to enter laboratory investigations, sensitivity to various antibiotics, diagnosis made and number of drugs prescribed.

## RESULT AND DISCUSSION

Aim of the study was to evaluate drug utilization pattern among pediatric patients. Infancy and childhood is a period of rapid growth and development. Infants and children represent a large part of the population in developing countries. The study of prescribing pattern is a part of the medical audit and seeks to monitor, evaluate and if necessary, suggest modification in prescribing practices to make medical care rational and cost-effective. A total of 286 patient's prescriptions were analyzed. In that 156(54.5%) patients were male and 130 (45.5%) patients were female [Fig 1].

The mean age of patients whom the prescription were written was 95.3 months. Newborn infants (neonates) only 2.1% of the total prescriptions. Majority, 54.5%, of the recipients were males. 29.7% and 68.2% of total prescriptions were made to Infants and Toddlers of age 28 days-23 months and 2 - 11years, respectively [Fig 2]. The mean  $\pm$  SD [median (range)] number of drugs prescribed per prescription (DPP) was 4.8  $\pm$ 2.4. The diseases commonly responsible for hospital admissions in the pediatric age group especially the children of 2 - 11 years, in our settings are infectious in etiology. This may have accounted for a higher usage of these compounds.

Result of length of hospital stays indicated that the mean hospital stays found to be  $4 \pm 2$  days [Fig 3]. The dataset contained records for 286 hospitalizations of children under 12 at the time of admission with 8 (2.8%) being repeat admissions.

The study showed that most of the drugs were used for conditions like fever (34.6%), Respiratory Diseases (21.7%), gastrointestinal

disorder (16.8%), and infection diseases (12.6%). These conditions were most common reason for hospitalization of the pediatric patients. Respiratory diseases known as Asthma, Chronic Obstructive Pulmonary Disorder (COPD), Pneumonia fever and Bronchitis. Gastrointestinal disorder known as Acute Gastro enteritis (AGE), Diarrhoea, Dehydration and constipation [Fig 4].

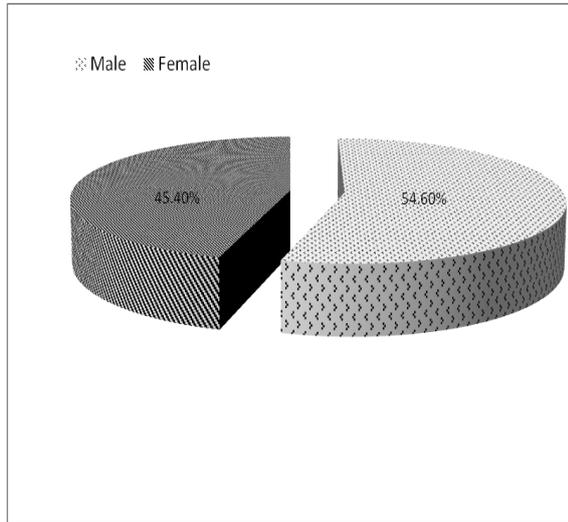


Fig. 1: Sex wise Distribution

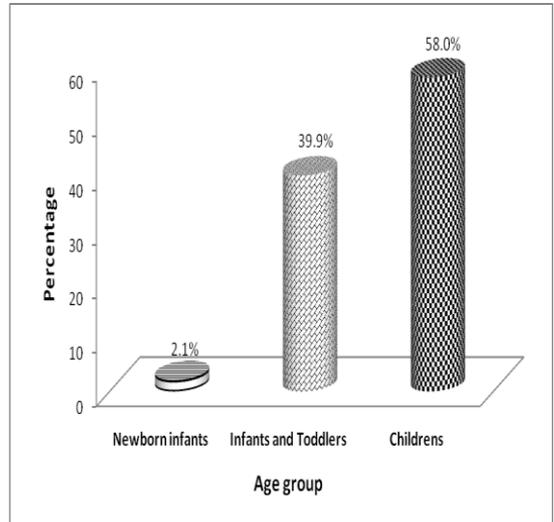


Fig. 2: Age wise Distribution

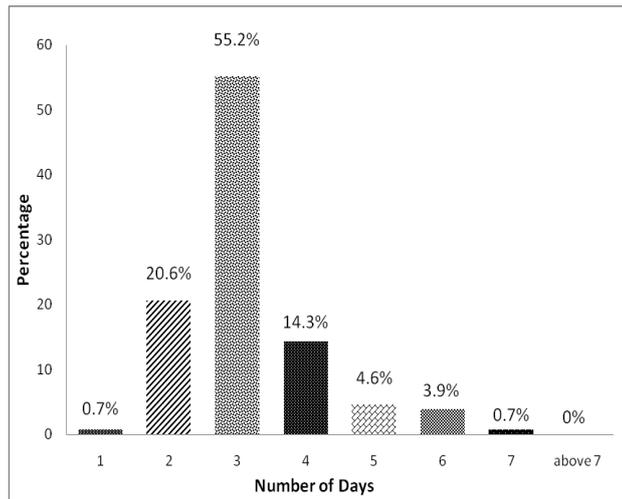


Fig. 3: Duration of hospital stays of patients

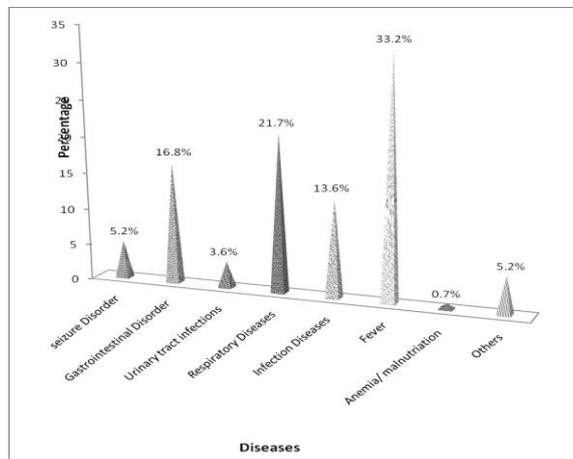


Fig. 4: Distribution of diagnosis in diseases[9]

The present finding has brought forth the need to investigate the rational use of antibiotics in pediatric age group. Similar high use of anti-infective agents has been noted in other studies.[10,11]In a study done by Bharathiraja et al.[7]about 79.4% of children were prescribed antibiotics for common child illness 96% of which were prescribed for acute respiratory infections (ARI).

Anti-infective agents were the main class of drugs prescribed [339 (24.8%)]. Other classes of commonly prescribed drugs were anti-inflammatory agents (20.8%), intravenous fluids (19.0%), Gastrointestinal therapy (14.7%), Drugs acting on the respiratory system (7.6%), Nutritional supplements (4.4%), Drugs acting on the central nervous system (3.4%), Hormonal agents (3.4%) and cardiovascular drugs (0.5%) [Fig 5].

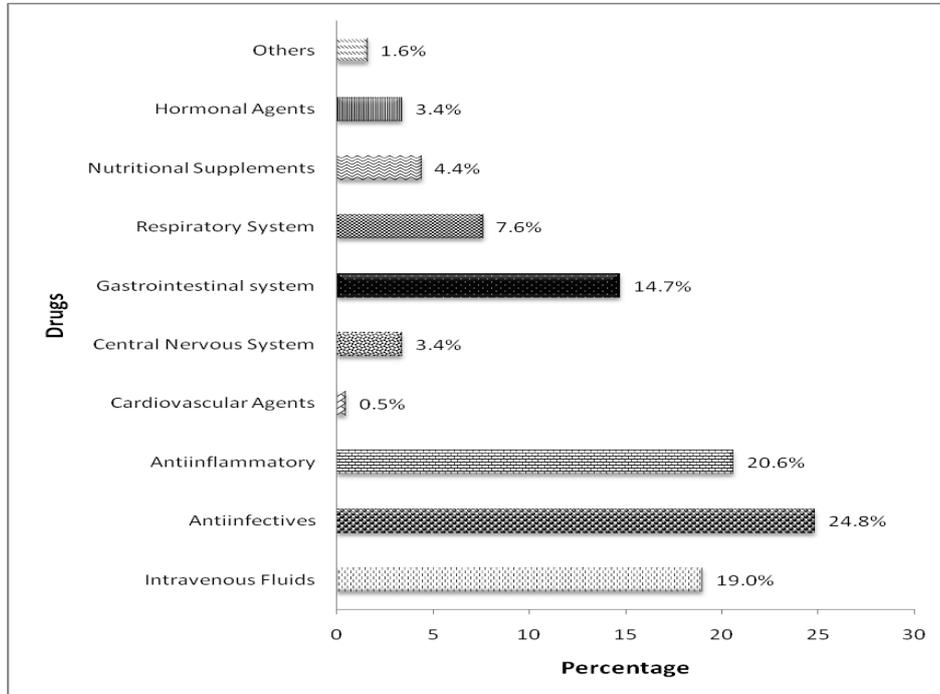


Fig. 5: Drugs prescribed in pediatric patients

In total 1367 drugs were prescribed in the study population. Anti-infective agents were prescribed in 218 out of 286 prescriptions. 124 (43.4%) of these had a single antibiotic prescribed, 70 (24.5%) had two antibiotics prescribed, 21(7.3%) and 3(1.0%) had three and four antibiotics prescribed per prescription, respectively. Antibiotics, anti inflammatory and intravenous fluids were the most

common drugs prescribed to the pediatric patients. The drugs which accounted for over 75 % of prescriptions included the anti-infective agents and anti-inflammatory. The anti-infective agents were mainly used in the inpatient settings. Of the anti-infective agents, betalactam antibiotics were most commonly prescribed [Fig 7]. These agents also accounted for large percentage of injectables.

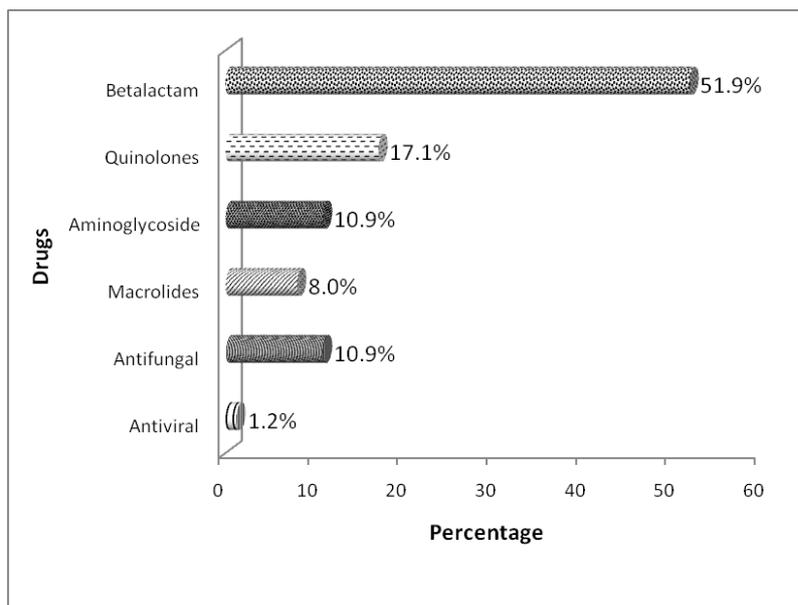


Fig. 6: Anti infective drugs prescribed in pediatric patients

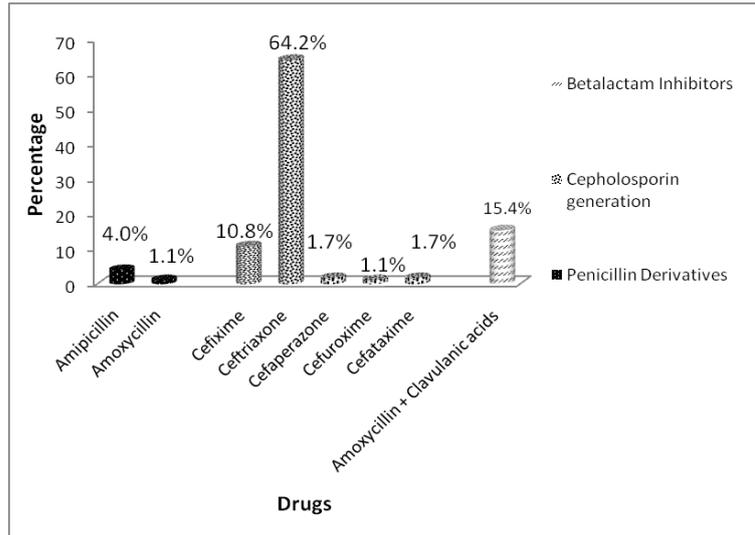


Fig. 7: Beta-lactam antibiotics sub classification

Injectables used in pediatric patient settings were the most common (24.8%) drugs prescribed as injectables. Among the antibiotics, Beta-lactam group of antibiotics were prescribed most commonly

(51.9%). The other drugs prescribed as injectables were intravenous fluids (19.0%) and gastrointestinal therapy (14.7%) [Fig 9]. In total, 24.8% of the prescriptions had a drug prescribed as injectables

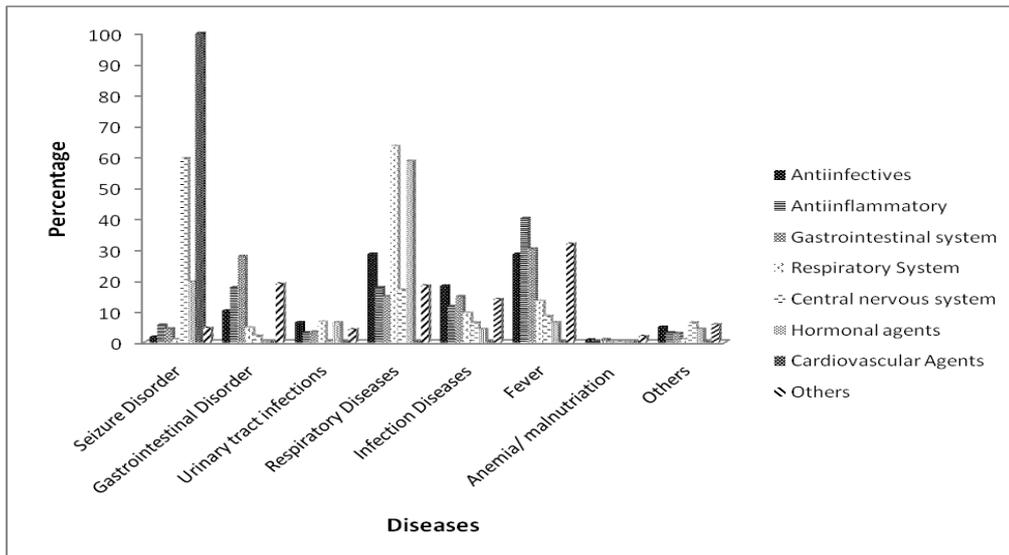


Fig. 8: Commonly drugs prescribed in diseases wise

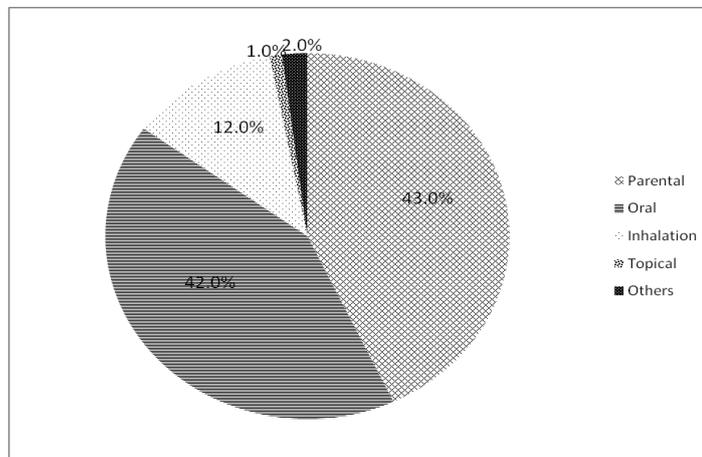


Fig. 9: Route of administration of drugs

However, there is a need to emphasize the need to switch over to other routes of administration as soon as possible. As systematic review concluded that oral therapy appears to be an effective and safe alternative to Parenteral antibiotics in hospitalized children with severe pneumonia who do not have any serious sign or symptoms.[12] It need to be investigated if the practice of switching from Parenteral to oral drug administration when the clinical condition permits would reduce the cost associated with the drug therapy.

Some of the limitations of our study are a low percentage of newborn infants [(neonates) 2.1% of total prescriptions], reliance on one time analysis of prescriptions, inability to assess the rationality of use of antibiotics in various settings.

#### CONCLUSION

The aim of the study was to carry out drug utilization study in inpatients setting in pediatric patients. The study concluded that, Antibiotics are mostly prescribed drugs for pediatric patients. Antibiotics are prescribed to pediatric patients based on empirical therapy without sensitive test; Anti-inflammatory drugs are prescribed without antacids. Parenteral route mostly prefer than oral route.

There is a need to emphasize the switch over to other routes of administration as soon as possible and also to be investigated if the practice of switching from parenteral to oral drug administration when the clinical condition permits would reduce the cost associated with the drug therapy. In this study was conducting only in two pediatric hospital and few numbers of diseases were selected. By selecting more number of cases and by conducting study in different hospitals the results may be accurately.

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