

SURVEY ANALYSIS



“ASSESSMENT OF PRESCRIPTION OF ANTIBIOTICS IN PEDIATRICS”

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ABSTRACT:

BACKGROUND: Antibiotics are strong and effective medicines, used to treat various bacterial infections. Antibiotics are among the most commonly prescribed drugs in paediatrics. Overuse and inappropriate use of antibiotics has led to antibiotic resistance and treatment failure.

OBJECTIVES: To assess the prescription of antibiotics in paediatrics of a Tertiary Care Teaching Hospital.

STUDY DESIGN: A retrospective study was done in a paediatric department in Mandya district hospital. Ethical clearance was obtained. The patient data was collected by using well designed patient data collection form and their prescription were recorded and analysed.

RESULT: A total of 100 cases of various infections are examined among that 55% male and 45% female. Accompanying major age group having infections is 1-3 years i.e. 35%. Out of 100 prescriptions, Cephalosporins are the major class of antibiotics used about 40% followed by Aminoglycosides, Penicillins, Macrolide, Quinolones, Cotrimoxazole and Nitroimidazoles respectively. Amikacin is the most commonly used individual antibiotic i.e. 26%.

CONCLUSION: The present study concludes that prescription pattern of antibiotic in paediatrics was rational. Children of age toddlers (1-3 years) are more prone to various infections. Cephalosporins are the major classes of antibiotics used. Amikacin is most commonly used individual antibiotic.

KEY WORDS: Antibiotic, Paediatrics, Prescription pattern, Resistance, rational.

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INTRODUCTION:

Antibiotics are substance produced by microorganisms, which selectively suppress the growth or kill other organisms at very low concentrations. Antimicrobial drugs are classified based on mechanism of action either bacteriostatic or bactericidal. Bacteriostatic drugs arrest the growth and replication of bacteria at serum level. Bactericidal agents kill bacteria and the total number of viable organism decreases¹.

Worldwide population constitute of about 28% of children and infants who are most susceptible to diseases due to under development of immune system. Several studies reported that 50% to 85% of children receive antibiotics in developed and developing countries prescribed by physicians. The use of antimicrobial agents, especially antibiotics has become a routine practice for the treatment of paediatric illnesses².

Children represent about 40% of India's population. Most suffer from frequent, usually self limiting illnesses. Drug use in children has not been as extensively researched as in adults. It has been observed that 18.2% of children take drugs that are not required³. The Institute of Medicine reported that between 44,000 and 98,000 Americans each year die as a result of medical errors in hospitals. According to this report, the vast majority of medical errors that cause harm to patients are preventable². Respiratory tract and gastrointestinal tract are the common sites for infections in children⁴.

Antibiotics are among the most commonly prescribed drugs in pediatrics. The maximum number of antibiotics prescribed was according to guidelines⁵: Amoxicillin + clavulanic acid (35%), Ceftriaxone (29%), Amikacin (17%), Cefotaxime + sulbactam (12%), Vancomycin (2%), Tobramycin (1%), Piperacillin (1%), Gentamicin (0.5%).

The choice of antibiotics for infants and children is usually empirical. The antibiotics are more effective and play an important role in management of infectious diseases if the diagnosis is accurate. However, they can lead to many serious consequences ranging from super infection such as toxic mega colon, pseudo-membranous colitis, and more seriously also lead to emergence of multidrug-resistant micro-organism which is expected to cause more serious infections⁶.

Paediatrics is the specialty of medical science concerned with the physical, mental and social

health of children from birth to young adulthood. paediatric groups are among the most vulnerable population groups to contact illness and cause harmful effects of drugs due to differences in pharmacodynamic and pharmacokinetic. We live in world which is heavily populated by microorganisms of astonishing diversity. In this environment the paediatric group populations are commonly affected by various infectious diseases. Antibiotics are commonly prescribed to treat various infectious condition⁷.

Irrational use of drugs is a major health problem of present day medical practice and its consequences include ineffective treatment, unnecessary prescribing of drugs particularly antimicrobials and injections, development of antibiotic resistant strains, adverse effects and economic burden on both patients and society. Infants and children are among the most vulnerable population groups to contract illnesses. The use of antimicrobial agents, especially antibiotics has become a routine practice for the treatment of paediatric illnesses. However, there are also reports of an irrational use of antibiotics which may even lead to infections that are worse than the originally diagnosed ones⁷.

The use of antimicrobial agents has become a routine practice for the treatment of paediatric illnesses and antibiotics are among the most commonly prescribed drugs in paediatrics. They are commonly prescribed for children with conditions for which they provide no benefit, including viral respiratory infections such as the common cold. Broad-spectrum antibiotic use is increasing, which adds unnecessary cost and promotes the development of antibiotic resistance⁸. The overuse and inappropriate use of antibiotics has led to antibiotics resistance. During the last decades, antibiotic resistance is on the rise. This is mainly due to the abuse of broad- spectrum antibiotics in first line treatment, or erroneous use (e.g. treatment of viral respiratory tract infection), use of multiple courses (e.g. cystic fibroses patients) or prolonged duration of antibiotic treatment. One of the major contributing factors for emergence of resistance and treatment failure due to irrational use of antibiotics is irrational prescribing with respect to dose, frequency, and duration of antibiotics streaming and not considering compatibility and drug interaction effect of co-administered drug⁹.

Resistance to antibiotics can be caused by varied factors such as health facilities, medication non

adherence, multiple prescribers and dispensers, use of first generation medications, inappropriate medication usage, intake of wrong dosage, incorrect usage of medications, use of counterfeit drugs, over and under usage of medications, animal husbandry etc¹⁰.

“Essential medicines”, a concept proposed by WHO in 1977, was defined as drugs with availability, safety, effectiveness and rational use. The WHO guideline on essential medicines has obtained approval from its member states. In 2009, the Chinese government approved the national essential medicines system. It is common sense that doctors with prescription eligibility should be responsible for rational drug use¹¹.

Healthcare professionals have a responsibility for creating a safe medication environment and reducing risk to a vulnerable pediatric population². Prescribing drugs is an important skill which needs to be continuously assessed and refined according to the need of the individual and society. Prescription behavior is influenced by many factors such as unethical drug promotion, lack of knowledge, individual inexperience with the more efficacious drug, direct manufacturer to consumer advertising, and unavailability of drugs. Hence, there is always a chance of irrationality in the prescription¹².

Appropriate drug utilization studies have been found to be crucial to evaluate whether drugs are properly used and utilized in terms of medical, social and economic aspects. Several professional societies have issued guidelines designed to reduce the use of antibiotics world- wide by means of various control strategies. Detailed knowledge of antibiotic prescription pattern is important before the policies and measures can be implemented⁸.

Evaluation of prescribing pattern will also help in minimizing adverse drug reactions as children are more susceptible to them and it shall also aid in providing cost effective medical care¹³.

Several professional societies have issued guidelines designed to reduce the use of antibiotics worldwide by means of various control strategies. Detailed knowledge of antibiotic prescription pattern is important before policies and measures can be implemented. Drug prescribing is a skill that needs to be refined on a continuing basis. It reflects that professional's skills and attitude toward diagnosis of an ailment and selection of appropriate treatment¹⁴.

Prescribing pattern helps in evaluating local consumption/resistance pattern for optimized therapeutic effect of medications. It also helps in planning various steps to be taken to minimize adverse drug reactions as children are more vulnerable to them and to provide cost effective medical care³. Thus, the aim of our study was to assess the prescribing pattern of antibiotics in MIMS TEACHING hospital.

OBJECTIVES:

- To assess the most prescribed category of antibiotics.
- To assess the number of prescribed antibiotics in paediatrics.

MATERIALS AND METHODOLOGY:

Study site:

The present study was conducted in paediatric department of MIMS teaching hospital, Mandya it is a 650-bedded Tertiary Care teaching Hospital, providing specialized health care services to all strata of people in and around Mandya.

Study design:

A hospital based cross-sectional study was conducted in paediatric department unit.

Source of data:

Patient data related to study was obtained from patient case records.

Study approval:

Ethical clearance was obtained from the Institutional Ethics Committee of MIMS (Mandya).

Study criteria:

- **Inclusion criteria:**
 - All the paediatrics of age 1 month to 14 years.
 - All prescriptions containing antibiotics in in-patients.
- **Exclusion Criteria:**
 - Paediatrics from neonatal intensive care unit.

- Antibiotics used for surgical prophylaxis.

no. of antibiotic prescribed, appropriate dose and duration of therapy).

Study procedure:

A suitably designed data collection form was used to record all the necessary data including patient's gender, age, patient Medication history and reason for admission and lab investigations. The collected prescription were analyzed for the most commonly used antibiotic and its category, indication for antibiotic prescribed, rationality of prescription (

Statistical method:

A simple percentage calculation was conducted to arrive conclusion of our study. Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS:

We had done analysis on 100 cases in paediatric department (above 1 month and below 14 years)among that 55% male and 45% female (Table 1and fig 1).

GENDER	NO. OF PATIENTS	IN PERCENTAGE
MALE	55	55%
FEMALE	45	45%

Table 1: DETAILS ON DISTRUBUTION OF PATIENTS BASED ON GENDER WISE.

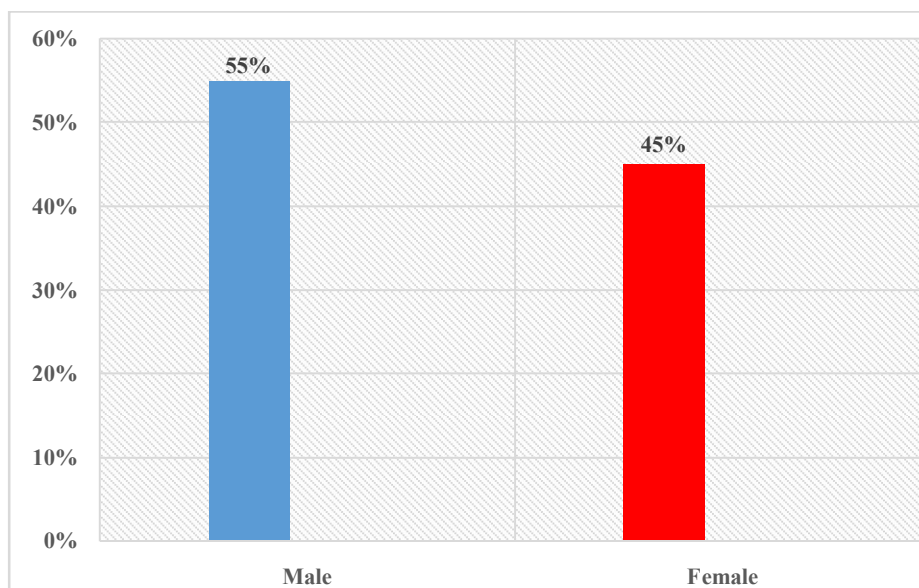


Figure 1: DETAILS ON DISTRUBUTION OF PATIENTS BASED ON GENDER WISE.

Table and Figure 1 showed that gender wise distribution of patients in which male patients (55%) is more than female patients (45%).

having major infections i.e. 35% followed by month-1 year i.e. 31 %, 6-11 years i.e. 18%, 3-5 years i.e. 12% and 12-14 years 4% (Fig 2 and Table. 2).

Out of 100 cases in paediatrics of age 1-3 years

AGE GROUP	NO. OF IN PATIENTS	IN PERCENTAGE
Month-1	31	31%
1-3	35	35%
3-5	12	12%
6-11	18	18%
12-14	4	4%

Table 2: DETAILS ON DISTRUBUTION OF PATIENT BASED ON AGE IN YEARS

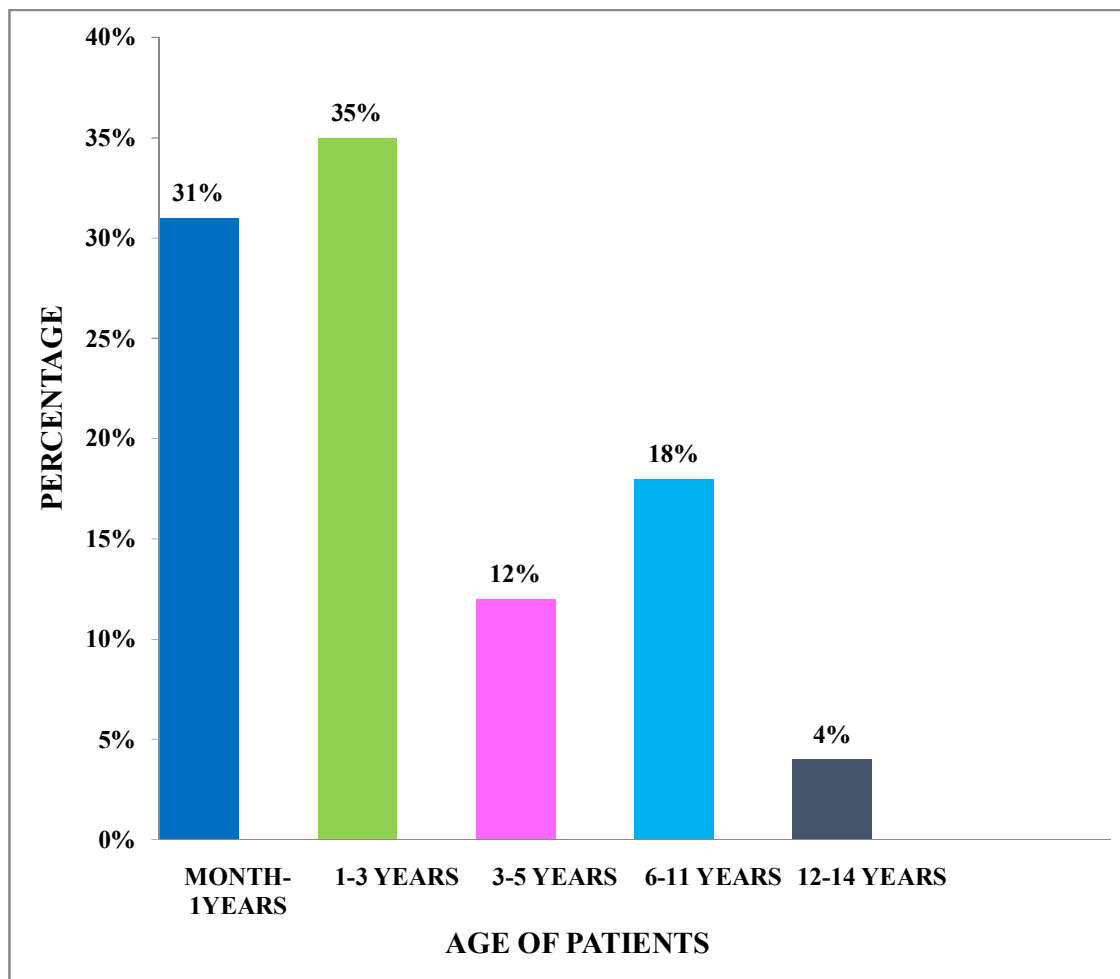


Figure 2: DETAILS ON DISTRUBUTION OF PATIENT BASED ON AGE IN YEARS

Cephalosporins are the major classes of antibiotics used to treat various infections i.e. 40% followed by Aminoglycosides i.e 26%, Penicillins i.e. 26%,

Macrolide i.e. 5%, Quinolones 1%, Cotrimoxazole i.e. 1% and Nitroimidazoles i.e. 1% (Fig 3 and Table. 3).

ANTIBIOTIC CLASSES	NO.OF PATIENTS	IN PERCENTAGE
CEPHALOSPORINS	40	40%
AMINOGLYCOSIDES	26	26%
PENICILLINS	26	26%
MACROLIDE	5	5%
QUINOLONES	1	1%
NITROIMIDAZOLE	1	1%
SULFONAMIDE +TRIMETHOPRIM	1	1%

Table 3: DETAILS ON DISTRUBUTION OF CLASS OF ANTIBIOTICS IN PRESCRIPTION

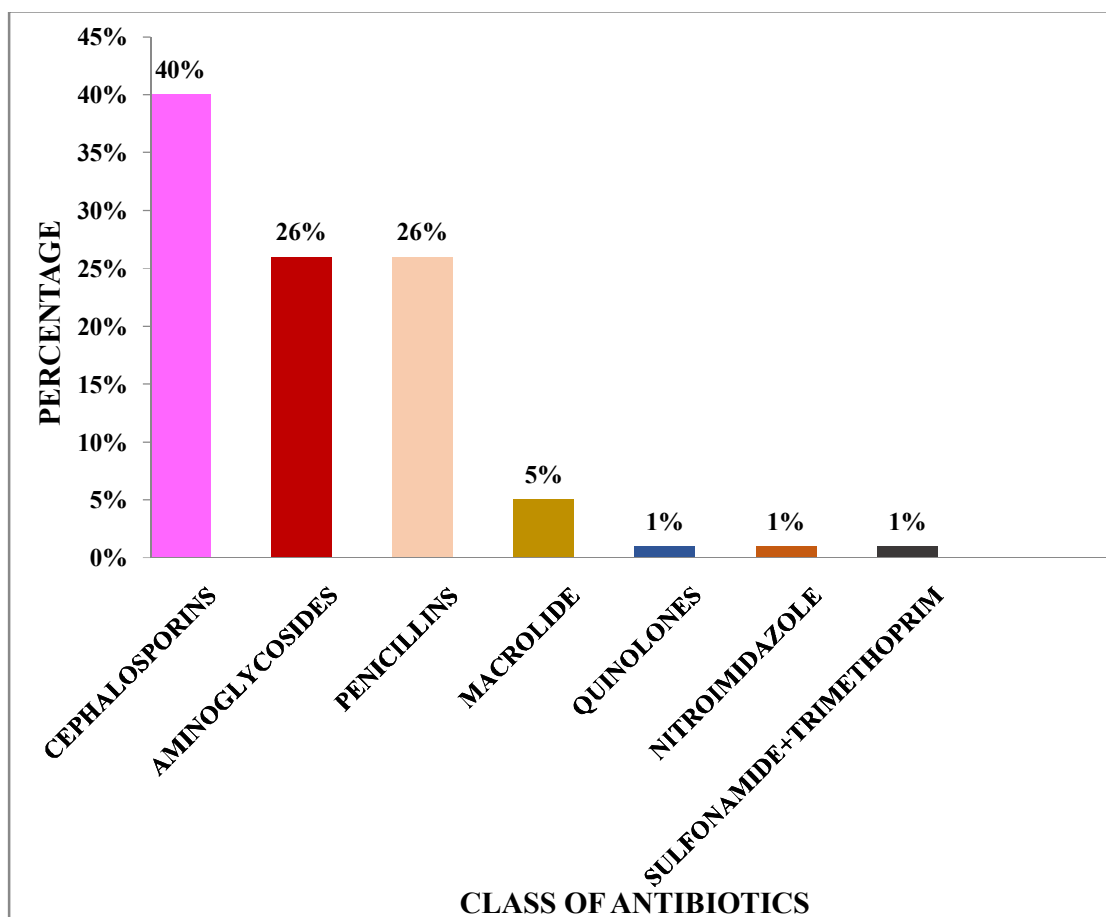


Figure 3: DISTRUBUTION OF CLASS OF ANTIBIOTICS IN PRESCRIPTION

Amikacin is the most common used antibiotic in the treatment of various infections in pediatrics i.e. 26% followed by Ceftriaxone i.e. 25%, Amoxicillin + clavulanic acid i.e. 24%, cefotaxime i.e. 15%,

Azithromycin i.e. 5%, Ampicillin i.e. 2%, Ciprofloxacin i.e. 1%, Cotrimoxazole i.e. 1% and Metronidazole i.e. 1% (Fig 4 and Table. 4).

CLASS OF ANTIBIOTICS	TYPE OF ANTIBIOTICS	NO. OF ANTIBIOTICS PRESCRIBED IN PATIENTS	IN PERCENTAGE
CEPHALOSPORINS	CEFTRIAZONE	41	25%
CEPHALOSPORINS	CEFOTAXIME	24	15%
AMINOGLYCOSIDES	AMIKACIN	43	26%
PENICILLINS	AMOXICILLIN+CLAVULANIC ACID	40	24%
MACROLIDE	AZITHROMYCIN	8	5%
PENICILLINS	AMPICILLIN	3	2%
FLUOROQUINOLONES	CIPROFLOXACIN	2	1%
SULFONAMIDE +TRIMETHOPRIM	COTRIMOXAZOLE	1	1%
NITROIMIDAZOLE	METRONIDAZOLE	1	1%

Table 4: DETAILS ON DISTRIBUTION OF TYPE OF ANTIBIOTIC PRESCRIBED

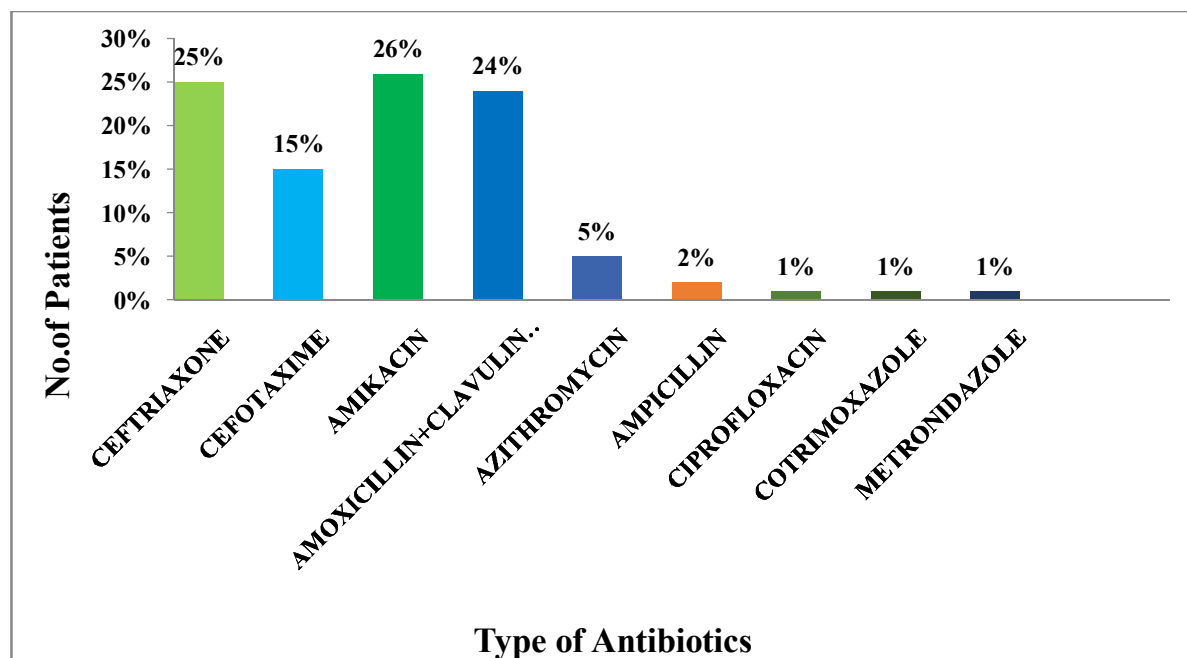


Figure 4: DISTRIBUTION OF TYPE OF ANTIBIOTIC PRESCRIBED

DISCUSSION:

The use of antimicrobial agents, especially antibiotics has become a routine practice for the treatment of paediatric illnesses. Antibiotics represent one of the most commonly used drugs in paediatrics ward. Their irrational use leads to a number of consequences in terms of cost, drug interactions, hospital stay, bacterial resistance and increased medication error.

The present study was carried out in 100 prescriptions selected in paediatric in-patients case sheets from record section and paediatric ward in MIMS Mandya. In our study, the total percentage of male paediatric patients were 55% comparatively more than that of female paediatric patients 45%.

The number of paediatric patients belongs to age group 1-3years (35%) and next in 1month-1years (31%), 6-11years (18%), 3-5 years (12%) and 12-14 years (4%). This indicates more chances of infections in 1-3years age group.

Totally 25 different clinical diagnoses were treated with antibiotics. Among which cephalosporins (40%) were most frequently prescribed classes of antibiotics followed by penicillin (26%), Aminoglycosides (11%), Macrolide (5%), Quinolones (1%), Nitroimidazoles (1%) and Cotrimoxazole (1%)

The most common antibiotics prescribed were Amikacin (26%) followed by Ceftriaxone (25%), Amoxicillin+clavulanic acid (24%), Cefotaxime (15%), Azithromycin (5%), Ampicillin (2%), Ciprofloxacin (1%), Cotrimoxazole (1%) and Metronidazole (1%). Amikacin was the most

commonly used antibiotic to treat various infections in paediatrics.

CONCLUSION:

This study gives an overview of the pattern of antibiotic use in the study area. Generally, we can conclude that there was:

- The study showed that children between the ages of 1 and 3 years were admitted more frequently than other age groups.
- Amikacin is the most prescribed antibiotic in paediatrics.
- Cephalosporins were mostly used category of antibiotics for the infections caused by bacteria in the inpatient paediatrics department which was according to the prescribing guidelines of the hospital, and among the cephalosporin's, more than half of the prescribed one was Ceftriaxone which is a third generation cephalosporin antibiotic spectrum which covers gram positive, gram negative and anaerobic organism.

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