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Research Article

## To assess prescribing pattern of antibiotics in department of pediatric at tertiary care teaching hospital

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### ABSTRACT

**Background:** Frequent use of antibiotics can cause antimicrobial resistance and increased health care cost. Child and infants have immature pharmacokinetic and pharmacodynamic system. To overcome issue regarding antibiotic, use of institutional protocols based on rational standard guidelines (IAP/WHO) is necessary.

**Aim:** To assess prescribing pattern of antibiotics in department of pediatric at tertiary care teaching hospital.

**Methods:** A 6 months prospective observational single centered study was conducted on 147 pediatric patients who were prescribed with antibiotics at a tertiary care teaching Hospital, from December 2017 to May 2018.

**Results:** In study population distribution of age 5-10(41.66%) is highest population of patients and age 16-18(9.72%) is lowest patients of population. In disease distribution URTI (23.12%) is highest population of patients and Meningitis (2.02%) is lowest. Amoxicilin (27.21%) was more prescribed antibiotic and Levofloxacin (2.04%) was less prescribed drug. In gender distribution (66.66%) patient were found to be male and (33.33%) patient were found to be female out of total population. In frequency of treatment (54.42%) were given as twice a day, followed by (27.89%) were given once a day and (17.68%) were given as a thrice a day.

**Conclusion:** It was found that the population of male patient more than female patient, Study give the common idea of antibiotic prescribing pattern. The prescribing of antibiotics was according to the guidelines.

**Keywords:** Antibiotic, Pediatric, rational, prescribing pattern, inpatient, outpatient.

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### INTRODUCTION

Antibiotics are one of the widely used drug in all age group patients. These are the best choice for the treatment of infectious disease. Antibiotics are the most commonly prescribed drugs in pediatric department. But the present study was conducted to analyse the increased irrational use of antibiotics. 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.<sup>1</sup>

Anti-biotic in pediatric should be closely monitored due to the underdeveloped pharmacokinetic and pharmacodynamic system of pediatric patients. Antibiotics are given prophylactically in the treatment to avoid the chances of infection, this prophylactic use should be closely monitored to prevent misuse and antibiotic resistance especially in pediatric patients, and it also leads to economical burden to

the patient so close analysis should be there before the treatment with antibiotic is initiated.<sup>2</sup>

Antibiotic use without proper monitoring can lead to antibiotic resistance. The first antibacterial resistance was known in 1948. In the present 21st century every known pathogen is resistant to one or more antimicrobials.<sup>3</sup> In 2011, the W.H.O's south east Region's health ministers adopted the Jaipur Declaration on Antimicrobial Resistance, which decided that combating antimicrobial resistance must be a priority for the national governments.<sup>3</sup>

Infants are representing as a huge part of population in developing countries; they are most susceptible to diseases due to immature immune system. Acute respiratory infection, acute watery diarrhoea, fever are the common infant diseases that lead to seek for medical consultation at hospital. Several studies reported that 50% to 85% of children receive antibiotics in developed and developing countries.<sup>7</sup> Antibiotic guidelines are standard set of guidelines for the treatment of infectious diseases based on

local culture sensitivity data .These guidelines help the physician to prescribe the antibiotics rationally to paediatric patients when definitely indicated.<sup>9</sup> Antibiotics are the most commonly prescribed drugs in pediatric patients so the study was conducted to observe and analyse the prescribing pattern of antibiotics in pediatric patients admitted in a tertiary care teaching hospital of Rajasthan India.

**MATERIALS AND METHODS** 10-17

A prospective and observational study of six month duration was carried out from December 2017 to May 2018. Data was collected from inpatient and outpatient prescribed with antibiotic in the department of pediatric at National Institute of Medical science and Hospital, Rajasthan, Jaipur, India. **The study was approved by the ethical committee Ref. No.; NIMS UNI/IEC/2018/37.** One hundred and forty-seven samples were taken below eighteen years of age of both genders, after getting informed consent from their parents. The patient demographic details, diagnosis, pharmacotherapy details were noted down in the predesigned case Performa on the day of admission and date of registration when prescribed. The antibiotics prescribing pattern was studied from the revised antibiotics prescribing policy of department of pediatrics.

**Selection criteria of patients**

**Inclusion criteria:**

- Below 18 years.
- Both Genders (male and female).
- Patients Prescribed with antibiotic
- Inpatient and outpatient.

**Exclusion criteria:**

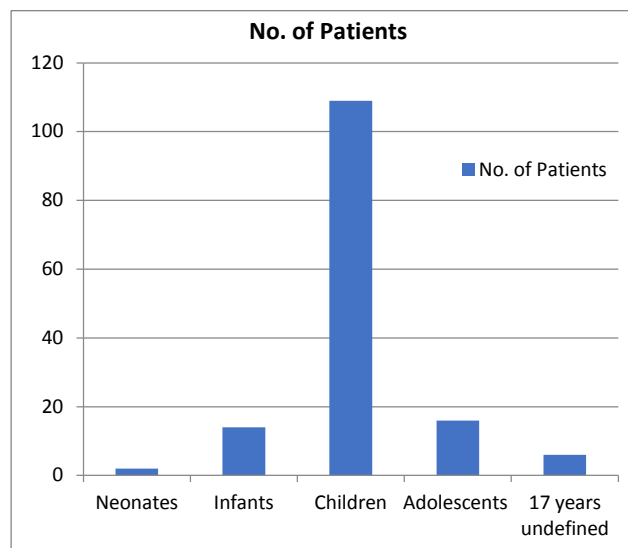
- Birth defective pediatric patients.
- Patients show drug interaction.
- Patients with severe side effects to antibiotics.

**Sampling Technique:** One hundred and forty-seven patients with bacterial infections were included in the study. Data will be analysed through SPSS V22 and confidence level will be 95% and level of significance will not be more than 5%

**RESULTS**

**Table 1: Age distribution of pediatric patient population.**

Age ( month/years)	No. of patient (%)
Neonates (0-1 month)	2(1.36%)
Infants (1 month to 1 year)	14(9.52%)
Children (1 year to 11 years)	109(74.14%)
Adolescents (12years to 16 years)	16(10.88%)
Age 17 years undefined WHO Guideline	6 (4.08%)

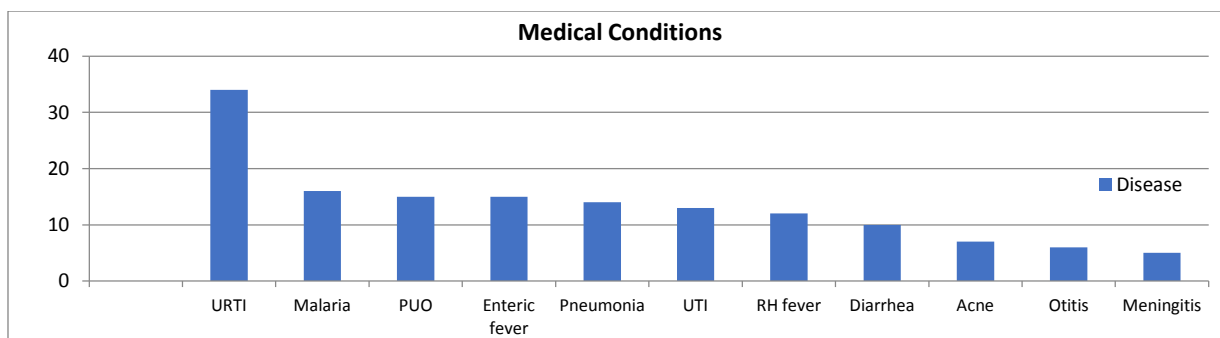


**Figure 1: Age distribution of pediatric patient population.**

**Age distribution of patients:** As shown above in table 1 the neonates patients were 2(1.36%), Infants patients were 14(9.52%), children patients 109(74.14%) the highest patients in this age group, adolescents patients were 16(10.88%), undefined age 17 years patients were 6(4.08%), More patient were found to be at children (1 year to 11 years) age group were 109(74.14%), patients. and less patient were found to be at age neonates age 2(1.36%) patients.

**Table 2: Medical conditions responsible for prescribing of antibiotics in paediatrics**

Medical Conditions	No. of patient	Percentage
URTI	34	23.12%
Malaria	16	10.88%
PUO	15	10.20%
Enteric fever	15	10.20%
Pneumonia	14	9.52%
UTI	13	8.84%
RH fever	12	8.16%
Diarrhea	10	6.80%
Acne	7	4.76%
Otitis	6	4.08%
Meningitis	5	3.40%
	Total =147	Total = 100%



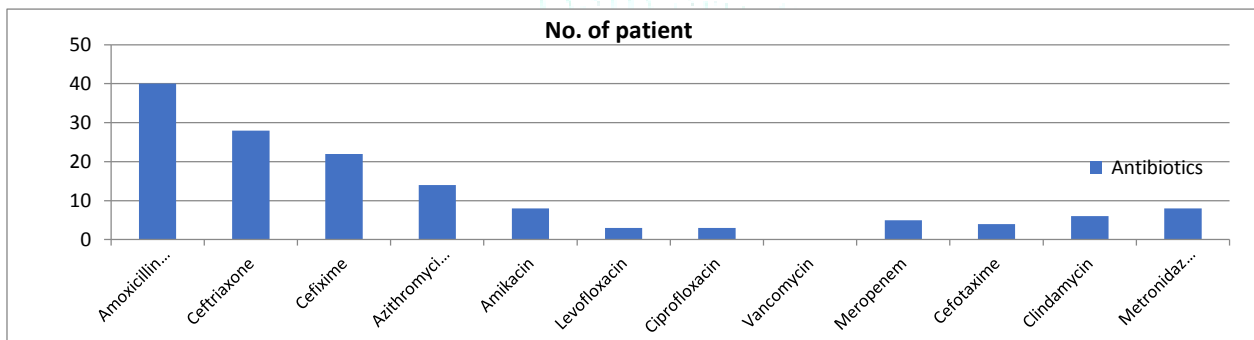
**Figure 2: Medical Conditions responsible for prescribing of antibiotics in paediatrics.**

**Disease diagnosed graph:** The above table 2 and graph shows that URTI (Upper respiratory infection) was diagnosed in 34 patients, Malaria was diagnosed in 16 patients, PUO(Pyrexia unknown origin) was diagnosed in 15 patients, Enteric fever was diagnosed in 15 patients, Pneumonia was diagnosed in 14 patients, UTI(Urinary tract infection) was diagnosed in 13 patients, RH fever(Rheumatic fever) was

diagnosed in 12 patients, Diarrhoea was diagnosed in 10 patients, Acne was diagnosed in 7 patients, Otitis infection was diagnosed in 6 patients, Meningitis was diagnosed in 5 patients, . The highest disease was diagnosed URTI 34 patients (23.12%), and lowest disease was diagnosed Otitis patients 6(408%) and Meningitis patients 5(3.40%).

**Table 3: Use of various antibiotics in the pediatric patients**

Sr.No.	Antibiotic	No. of patient	Percentage%
1	Amoxicillin+ Clavulanic acid	40	27.21%
2	Ceftriaxone	28	19.04%
3	Cefixime	22	14.96%
4	Azithromycin	14	9.52%
5	Amikacin	08	5.44%
6	Levofloxacin	03	2.04%
7	Ciprofloxacin	03	2.04%
8	Vancomycin	06	4.08%
9	Meropenem	05	3.40%
10	Cefotaxime	04	2.72%
11	Clindamycin	06	4.08%
12	Metronidazole	08	5.44%
		Total =147	Total = 100%



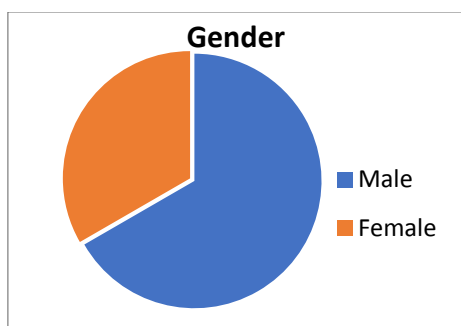
**Figure 3: Use of various antibiotics in the pediatric patients**

**Antibiotics prescribed graph:** As shown above in the table and graph no 3 the prescribed antibiotics were commonly prescribed as Amoxicillin Clavulanic acid(27.21%), Ceftriaxone(19.04%), Cefixime (14.96%), Azithromycin (9.52%), Levofloxacin (2.04%), In the above list Amoxicillin Clavulanic acid (27.21%), is highest prescribed antibiotics and Levofloxacin (2.04%) is the lowest prescribed antibiotics,

**Gender distribution:** As shown above 98(66.66%) patients were found to be male out of total 144 study population and similarly 49(33.33%) patients were found to be female out of total study population. The number of male patients was found to be high (34.63%).

**Table 4: Gender distribution of patient in study population**

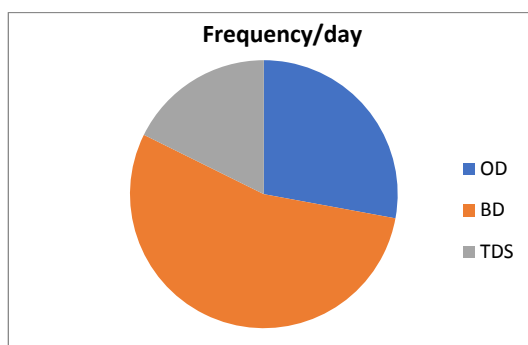
Gender	No. of patient	Percentage
Male	98	66.66%
Female	49	33.33%



**Figure 4: Gender distribution**

**Table 5: Frequency of antibiotics per day in study population**

Frequency of antibiotics/day	No. of patient	Percentage
Once a day	41	27.89%
Twice a day	80	54.42%
Three time a day	26	17.68%



**Figure 5: Frequency of antibiotics per day in study population**

**Frequency:** As shown above table and figure 5, out of 147 antibiotics prescribed 80 (54.42%) were given as twice a day, followed by 41 (27.89%) were given as once a day and 26 (17.68%) were given as three time a day. Frequency of drugs twice a day was found to be more as compared to other two frequencies.

## DISCUSSION

Antibiotic are the drugs that inhibit or destroy the growth of the microorganism and used in the treatment of external or internal infections. The use of antibiotic had become a routine practice or the treatment of pediatric illness like URTI (Upper respiratory tract infection). In this disease Amoxicillin antibiotics are mostly prescribed, in enteric fever Cefixime or Azithromycin orally or ceftriaxone intravenous antibiotics are mostly prescribed. In case of PUO (pyrexia unknown origin), early use of antipyretics drugs paracetamol or antimicrobials drugs amoxicillin antibiotics are used in outpatient and ceftriaxone antibiotics used in inpatient. In UTI (Urinary Tract Infection) Levofloxacin antibiotics mostly used. In malaria anti-parasites drugs along with ceftriaxone or Doxycycline antibiotics mostly prescribed. In RH fever oral penicillin or amoxicillin mostly prescribed. In severe Pneumonia amoxicillin clavulanate and levofloxacin antibiotics prescribed, for Acne disease clindamycin antibiotics orally as well as topically used for local application on face and sometime erythromycin antibiotics are also prescribed for acne. In PICU (Pediatric Intensive Care Unit), for severe disease and chronic diseases Meropenem and Vancomycin antibiotics are prescribed. the study 147 prescription were studied, that containing antibiotic were monitored from total no. of prescription (147) collected from department of pediatric patient at National Institute of Medical science and Hospital Jaipur. The number of male patient found to be 98(66.66%) and 49(33.33%) patient were found to be female out of 147 study population. The number of male patients was found to be high (33.33%). In the study average number of drugs per patient was five. Neonates patients were 2(1.36%), Infants patients were 14(9.52%), Children patients 109(74.14%) the highest patients in this age group. Adolescents patients were 16(10.88%), undefined age 17 years patients were 6(4.08%), Most patient were found to be in the age group 1 to 11 years were 109(74.14%), and less patient were found to be in the age group of Neonates 2(1.36%).

## CONCLUSION

The study was conducted at department of pediatrics, National Institute of Medical Science and Hospital, among 147 antibiotic prescribed pediatric patients according to WHO guideline. The patients were mostly from rural areas where it is very inconvenient for them to get the refill of prescription and to come all the way from their villages to hospital.

From the data it is understood that the administration of antibiotics was inappropriate in some case as the duration of treatment was insufficient (3days), as most of the patients required treatment of not more than five days due to poor medication adherence of pediatric patients. Insufficient duration may increase the risk of antibiotic resistance or tolerance. In patient having common cold irrational prescription of antibiotics such as amoxicillin was done even though the causative agent is virus which leads to increase unwanted treatment cost. In PUO (Pyrexia Unknown Origin), the condition in which antibiotic is not prescribed without proper investigation, due to the delay in investigational reports antibiotic was prescribed prophylactically. In this study the maximum numbers of antibiotics prescriptions were found in the age group 1-11 years. Almost 70% of

antibiotics were given parenterally and the average no. of antibiotics per prescription was higher than recommended by WHO guideline.

Our study suggests that strategies to control irrational use of antibiotics should be implemented according to guidelines of WHO and IPA, for rationalized prescription in treatment of pediatric patients. As per the WHO recommendations surveillance system is required in all the Hospitals to assess the antibiotic use, to monitor the prevalence of microbial resistance and to provide rational use of antibiotics. The active participation of clinical pharmacists in the clinical ward rounds and documentation of pharmacist observation on prescription in patient folder is highly recommended for safety and drug monitoring.

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