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## Original Research Article

## Observational and cross-sectional study of prescription pattern in the pediatric out-patient department at a tertiary care center of Bihar

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## ABSTRACT

**Introduction:** Medical therapy is the most common form of health care provided to the patients. More the practice, more the error is substantiated by the fact that medication errors are probably the most common medical error. Detailed information on these errors is the first step to prevent these errors becoming a health hazard for the individual as well as the society.

**Objective:** To generate data on the extent of rational/irrational prescribing pattern, to review the prescribing practices.

**Materials and Methods:** An observational study with cross sectional design Prescriptions of the patients attending the pediatric OPD were reviewed to collect required data.

**Result:** 1200 prescriptions were reviewed that had 3384 drugs listed. The mean age was  $8.3 \pm 4.62$  years with male > female. Weight of the patient was recorded in 82.8% of the prescriptions. The average number of drugs per prescription was 2.82. The range of drugs per encounter varied from zero to 5. Ailments like minor scratches or other non-organic problems were those where no drugs were prescribed. Around 50% of the drugs prescribed were in generic names. Syrups were most commonly prescribed followed by tablets and capsules. Injection use was very less. Antibiotics were widely used for treatment with 73.8% of the prescriptions had at least one antibiotic.

**Conclusion:** The findings of the current study highlight the continuing crisis of the irrational drug practice in this part of the country. This will help authorities to take necessary action and formulate guidelines on proper and rational drug prescription.

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## 1. Introduction

Paediatrics is medicine that deals with the development, diseases and disorders of children.<sup>1</sup> The core of paediatric management is the drug therapy. The effectiveness of which depends on making an accurate diagnosis and prescribing correct drug in optimum doses and duration. Childhood is an important age when the brain development takes place. It is the age of rapid growth and development. At the same time, this age group also constitute the most vulnerable population for communicable diseases. While many of these

infections are self-limiting, another major group are treated over the counter by not only inappropriate therapy, but also resorting to polypharmacy.<sup>2,3</sup> There has been a practice of irrational use of antimicrobial agents, especially antibiotics over the past few decades in pediatric practice.<sup>4</sup> Many a times, this led to worse super added infections by micro-organisms that are resistant to most of the conventional antibiotics.<sup>5</sup>

In this context, the assessment of pattern of drug usage is quintessential for clinical, educational and economic purposes.<sup>6</sup> Recent past has witnessed evidences that the pediatric prescription pattern has shifted from generic drugs to the marketed branded drugs out of National List of

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Essential Medicines for India.<sup>7,8</sup> Solution for this irrational practice is to make a provision of regular prescription audit. Data on drug usage patterns from India are particularly lacking and inadequate.

To address this dearth of information, the current study was planned to define the pattern of drug use in the paediatric out-patient department. The main objective of this study was to evaluate the drug prescription patterns in patients attending the paediatric out-patient department at a tertiary care center in Bihar, India. This study also tried to generate data on the extent of rational/irrational prescribing pattern in this institute. The report of this study would help both the physician and institutional authorities to review the prescribing practices and make or suggest any modification, if needed to facilitate better health care delivery.

## 2. Materials and Methods

An observational study with cross sectional design was planned by the Department of Pharmacology, Nalanda Medical College & Hospital, Patna, Bihar. The total duration of study was 6 months that is from December 2019 to June 2020. Out of this, 2 months was dedicated for data collection. Prior clearance was obtained from the Institutional Ethics Committee to conduct the audit.

Prescriptions of the patients attending the pediatric Out Patient Department were reviewed to collect data on age of the patient, drug dose, route, dosage form, frequency of administration, indications for which prescribed, and duration of therapy. These recorded forms were used to analyze the average number of drugs per prescription, number of encounters with antibiotics, percentage of drugs prescribed by generic name, fixed dose combinations, and whether the dosage form, frequency of administration, and duration of therapy were rational or not. Following the protocol, a total of 1200 prescriptions were reviewed during the period of data collection.

The children within the age group of 28 days to 12 years were included in the study. Written informed consent was obtained from the parents or guardian. Those who came for vaccination and those not willing to give consent were excluded from the study. The “core drug use indicators” formulated by World Health Organization (WHO) and the parameters in the prescription format prescribed by the Medical Council of India forms the basis of the study. WHO specifies drug use indicators for adoption in drug utilization studies.<sup>9,10</sup> The following basic drug use indicators (core indicators) were used in the study to describe the prescribing pattern: a) average number of drugs per encounter, b) percentage of drugs prescribed by a generic name, c) percentage of encounters with an antibiotic prescribed, d) percentage of encounters with an injection prescribed and e) percentage of drugs prescribed from the essential drug list. A few parameters like average consultation time and average dispensing time could not be measured. Other

patient care indicators like percentage of medicines actually dispensed, whether it is adequately labelled, and the parent’s knowledge of when and in what quantity each drug that the child should receive were analyzed.

### 2.1. Statistical analysis

Data was compiled and analyzed using the Statistical Package for the Social Sciences (SPSS), Version 20.0 (IBM Corp., Chicago, Illinois, USA). Descriptive statistics was done. Frequencies and percentages were reported for categorical variables, and the result has been expressed in terms of tables and figures.

## 3. Results

A total of 1200 prescriptions were reviewed during the 2 months duration dedicated for data collection. The mean age of the patients was 8.3 years with a standard deviation of 4.62 years. A little more than half of the participants were male. Weight of the patient was recorded in 82.8% of the prescriptions. All prescriptions under the age of five years were recorded the weight of the child.

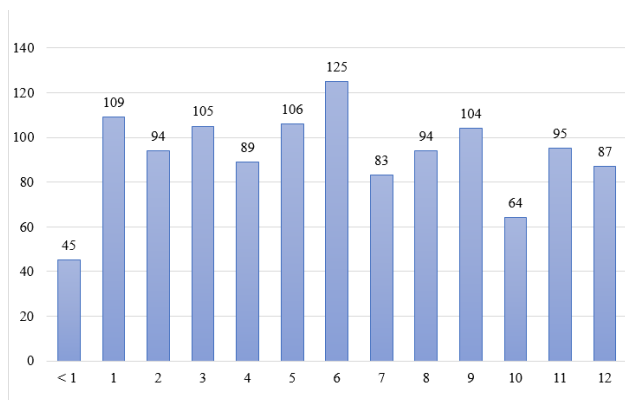
None of the prescriptions were written in capital letters but all of them had details of the child along with provisional diagnosis along with signature of the prescribing doctor. None of the prescriptions contains the signature of the dispensing person. A total of 3384 individual drugs were prescribed. The most common diagnosis was respiratory infection. The average number of drugs per prescription was 2.82. The range of drugs per encounter varied from zero to 5.

Ailments like minor scratches or other non-organic problems were those where no drugs were prescribed. Around 50% of the drugs prescribed were in generic names. Syrups were most commonly prescribed followed by tablets and capsules. Injection use was very less. Antibiotics were widely used for treatment with 73.8% of the prescriptions had at least one antibiotic. Antibiotics were prescribed to all children diagnosed with acute upper respiratory infections, lower respiratory tract infections, conjunctivitis, chicken pox and children with wounds.

Among the antibiotics-azithromycin, amoxicillin-clavulanic acid, amoxicillin and cephalexin were prescribed for children with acute tonsillitis. Azithromycin and cefixime were prescribed for children with acute otitis media. Azithromycin, amoxicillin-clavulanic acid were the two antibiotics prescribed for children diagnosed with lower respiratory tract infection. All children diagnosed with acute conjunctivitis were given tobramycin eye drops.

Acyclovir was prescribed for children with varicella. Azithromycin was the most commonly prescribed antibiotic. Every child with acute gastroenteritis was prescribed oral rehydration salts and zinc syrups. No anti-diarrheal drugs and antibiotics were prescribed in these

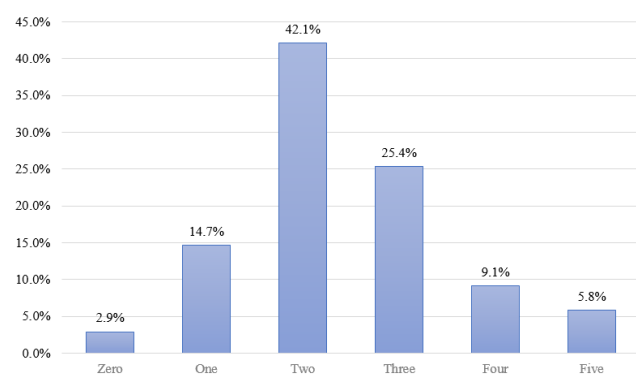
children.



**Fig. 1:** Bar diagram showing age distribution of the study participants

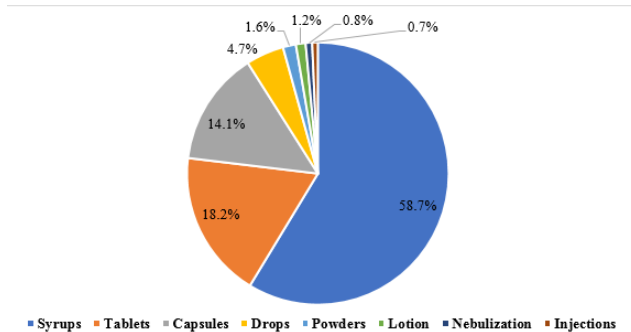
**Table 1:** Table showing distribution of study participants according to the diagnosis and number of drugs prescribed

Diagnosis	Number of children	Number of drugs
Upper respiratory tract infection	725	1567
Viral fever	137	563
Acute diarrhea	116	254
Worm infestation	114	145
Cut or wounds	109	83
Conjunctivitis	96	105
Lower respiratory tract infection	87	446
Bronchial asthma	31	68
Varicella	13	65
Others	72	88



**Fig. 2:** Bar diagram showing distribution of study participants based on the number of drugs given

Around 3/4<sup>th</sup> of the prescribed drugs was actually dispensed by the hospital pharmacy. All the dispensed drugs were in the same strength as prescribed. Each and



**Fig. 3:** Pie diagram showing distribution of children according to prescribed drug forms

every dispensed drug was correct and in right dosages and adequately labelled. When attendants’ understanding about the dosage was checked, more than 90% knew the correct dosage schedule for all the drugs prescribed.

#### 4. Discussion

The current study tried to measure the performance of prescribers by scrutinizing the prescriptions written by the doctors in the institution. The average number of drugs per patient was 2.82, that is slightly higher than 2.0, the value recommended by the WHO<sup>11</sup> and is less than previous studies.<sup>12,13</sup> While number of drugs per prescription ranges from 0 to 5, overall it is less than some similar studies.<sup>12,13</sup> The number of drugs per prescription should be as low as possible to minimize drug interaction as well as to increase the patient compliance. It also reduces episode of adverse events. The mean age of patients was 8.3 years and is more than similar studies done previously.<sup>12</sup> So, this shows that breast feeding is adequate in the children offering protection in the toddler age. Half of the drugs were prescribed in generic name and this is less than other studies.<sup>12–14</sup>

The number of prescriptions with antibiotic was 73.8% of the total prescriptions and is much higher than one study<sup>15</sup> but slightly less than another study.<sup>13</sup>

All diseases diagnosed with upper respiratory infection were given antibiotic and this should be of concern since most of the upper respiratory infections were of viral origin for which antibacterial agents have no role.<sup>16,17</sup>

This over prescription of antibiotics may be a reason for hindrance in preventing drug resistance, the core objective of antibiotic stewardship program. So, this aspect should be taken care of and proper protocol should be laid by the concerned authority.

No antibiotics were prescribed for acute diarrheal diseases which is a positive finding in this study compared to other studies.<sup>18,19</sup> The usage of injections were also very less in the present study.

## 5. Conclusion

This study created evidences regarding drug use patterns in the Pediatrics Out Patient Department of a tertiary care teaching hospital in Bihar. It is well known fact that only prescribing the current medicine is not sufficient to achieve the goal of rational practice, it is important to use the drugs in an appropriate manner. There is an ample scope of improving prescribing pattern by maintaining lesser number of medicines, prescribing medicines by generic name, using medicines appropriately after selecting and consciously keeping the cost of therapy low. This will also help in addressing the issue of drug resistance as this also increases the risk of resistance. Apart from this, a proper laid protocol to evaluate clinical feature to make an appropriate clinical diagnosis may also avoid overlap that exists in irrational use of antibiotics for Viral URI. The study provides baseline data that will assist researchers to plan further study with more detailed analysis.

## 6. Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

## 7. Source of Funding

None.

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