

Research Article



Prescription Pattern of Antimicrobial Drugs in Paediatric Outpatient Department in a Tertiary Care Teaching Hospital

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ABSTRACT

The objective of the study is to evaluate the prescription pattern of antimicrobial drugs in paediatric outpatient department in a tertiary care teaching hospital. The prescriptions of 140 patients who attended the paediatric outpatient department were analysed and following data were collected - patient demographics, presenting complaints, investigation & diagnosis, brand name, generic name, dose & duration, dosage form, cost, the total number of drugs per prescription and Fixed Dose Combination (FDC), composition of the prescribed FDC. A descriptive analysis of data was done. The most common presenting complaints were fever due to Upper respiratory tract infections 38(27.14%), Lower respiratory tract infections 18(12.85%), Urinary tract infections 9(6.42%) followed by diarrhoea and vomiting due to acute gastroenteritis 32(22.85%). Antimicrobials are prescribed in almost every paediatric patients. A total 431 drugs were prescribed to the study population in which 193 drugs were antimicrobials constituting 44.77% of prescribed drugs. The average number of drugs per patient was 3.07 and the average number of antimicrobials per patient was 1.37. Polypharmacy (>3 drugs) was found in 73 (52.14%) prescriptions. The commonly prescribed antibiotics group was cephalosporins 64(45.71%) followed by penicillins 28(20%). The results suggested that antibiotics are frequently prescribed by paediatrician in outpatient department. However various diseases presenting with fever, diarrhoea & vomiting are viral in origin where use of antibiotic is irrational which causes increased cost of therapy and development of bacterial resistance. This study was focused on rational use of antibiotics for prescribers in paediatric population.

Keywords: Antimicrobial drugs, Paediatric patients, Polypharmacy, Prescription pattern.

INTRODUCTION

India has the largest child population in the world with more than a third of its population below the age of 18 years. Various acute and chronic diseases can affect this population.

The discovery of antibiotics in the 20th century is one of the great achievements in the field of healthcare.

Antibiotics are among the most frequently prescribed classes of medications for children.¹ They are prescribed for various bacterial infections for treatment and cure and also they are used prophylactically to prevent infections. The combination of global immunization programs and the use of such antimicrobial agents led to a significant fall in mortality of the paediatric population from infectious diseases during the 20th century.²

The antimicrobial agents prescribed routinely for the treatment of paediatric diseases and antibiotics are among the most frequently prescribed drugs in paediatric outpatient department (OPD). In paediatric OPD some patients having viral infections like common cold and diarrhoea were prescribed antibiotics which have no benefit.

Irrational prescribing and use of antibiotic drugs can lead to resistance of bacteria against antibiotic drugs.³

Now a day's many paediatricians include antibiotics in their prescription without thinking carefully whether it is appropriate or inappropriate. Therefore, an effective step should be taken for appropriate and effective use of antibiotics, especially in the paediatric population.^{4,5} One such step is to find out the prescription pattern of the paediatric OPD and to report it. Prescription pattern is influenced by many factors such as unethical drug promotion, lack of knowledge, individual inexperience with the more efficacious drug, parent pressure, direct manufacturer to consumer advertising, and unavailability of drugs. Hence, there is always a chance of irrationality in the prescription.⁶ Irrational use of drugs can lead to high cost of medical treatment, increase incidence of adverse drug events and drug misuse.⁷ Most of the drugs prescribed for children have not been tested in the paediatric population due to difficulties in carrying out clinical studies in children, and ethical issues to participate in a clinical trial.⁸ Some of the reasons for this lack of testing are small financial benefits to the pharmaceutical companies. The assessment of the prescription will help to know the attitude of the physicians toward prescribing and to provide rationality in the prescription. Thus, rational prescriptions help the paediatrician to upgrade the knowledge and improves attitude toward selecting the rational and cost-effective treatment.⁹ Hence the present study is taken to know the



prescription pattern of antimicrobial in paediatric outpatient.

This study hopefully will help to promote the rationality in the prescribing pattern and minimizing the errors in the prescriptions.

In view of this, it is important to do study the pattern of prescribing in paediatrics patients on continuous bases.¹⁰

MATERIALS AND METHODS

This was a prospective and observational study conducted at paediatric OPD of Indira Gandhi Institute of Medical Sciences, Sheikhpura, Patna (IGIMS, Patna) a tertiary care teaching hospital.

The study protocol was approved from Institutional Ethics Committee of IGIMS, Patna.

A total of 140 prescriptions of paediatric patients were collected from paediatric outpatient department (OPD) on daily basis for a period of 3 months from March 2015 to May 2015.

Inclusion Criteria

- 1) Patients of above 1 month and below 16 years of age
- 2) Patients of both sexes
- 3) Patients attending paediatric outpatient department (OPD) on daily basis
- 4) Prescription containing Antimicrobial agents

Exclusion Criteria

- 1) Patients of below 1 month and above 16 years of age
- 2) Indoor patients
- 3) Prescription without Antimicrobial agents
- 4) Any serious systemic illness

Each prescription was analyzed for

- 1) Patient's information such as patient name, age & sex
- 2) Presenting complaints
- 3) Investigation & Diagnosis
- 4) Prescribed drug: brand name, generic name, dose & duration, dosage form, cost
- 5) Total number of drugs in each prescription
- 6) Composition of the prescribed FDC

Statistical Analysis

A descriptive analysis of the data was done using Microsoft Excel and results were expressed as percentage.

RESULTS

The study was conducted in patients (n=140) who visited the paediatrics outpatient department during the study

period. 82(58.5%) were males and 58(41.5%) were females. Majority of the patients 58(41.4%) were in the age range of 1-5years followed by 54(38.5) in age ≤1 year and 28(20%) in age >5 years (Table 1).

Table 1: Paediatric Outpatient Prescription Characteristics

Age	Number of Patients	Percentage (%)
≤1 year	54	38.6
1-5 years	58	41.4
>5 years	28	20
Total	n=140	100
Sex		
Male	82	58.6
Female	58	41.4

Parameters Evaluated for Prescribing Pattern

The most common presenting complaints for paediatric OPD visit were fever 89(63.578%) followed by diarrhoea & vomiting 32(22.85%), breathlessness 14(10%), worm infestations 2(1.42%) and others 3(2.14%) out of 140 patients. The spectrum of diseases that were provisionally diagnosed in the paediatric OPD patients were as follows: Out of 140 patients; 38(27.14%) patients had Upper respiratory tract infections, 26(18.57%) had lower respiratory tract infections, 32(22.85%) patients had diarrhoea and vomiting, 9(6.42%) had urinary tract infections, 2(1.42%) were diagnosed with helminthiasis and 33(23.57%) had other diagnoses which included Acute febrile illness, Rheumatic fever, Pyrexia of Unknown origin (PUO), Asthma, cellulitis/impetigo, general weakness, poor appetite.

Infection was the most common cause for illness affecting 129 (92.14%) of the study population (Table 2). Only few investigations were done. Majority of the cases were managed empirically or symptomatically by the clinical judgment.

Antibiotics were the highest prescribed drug in the paediatric patients which correlated with the diagnosis. Cephalosporins were prescribed for 64 (45.71%) patients followed by Penicillins in 28(20%), Macrolides in 24 (17.14%), Nitroimidazole in 7(5%), Fluroquinolone in 8 (5.71%), Anthelmintic in 4 (2.85%) and Nitrofurantoin in 4 (2.85%) patients (Figure 1). The cephalosporins prescribed included cefalexin in 6(4.28%) patients, cefuroxime in 7(5%) patients, cefixime in 34(24.28%) patients and cefpodoxime in 17(12.14%) patients.

Of the 28 patients prescribed with penicillins, majority of them were prescribed with amoxicillin + clavulanic acid in 17(12.14%) patients followed by amoxicillin 11(7.85%) patients. Azithromycin, a macrolide antibiotic was prescribed in 24 (17.14%) patients. Of the fluroquinolone antibiotics, norfloxacin and ofloxacin were prescribed in 5(3.57%) and 3(2.14%) patients respectively. Other antimicrobials like Anthelmintics, nitrofurantoin were also prescribed in paediatric patients as indicated in Table 3.



Table 2: Presenting Complaints & Provisional Diagnosis in Patients who Visited Paediatric OPD

Presenting Complaints	Provisional Diagnosis	Number of Patients	Percentage (%)
1. Fever	Upper respiratory tract infections (URTI)	38	27.14
	Lower respiratory tract infections (LRTI)	18	12.85
	Urinary tract infections (UTI)	9	6.42
	Acute febrile illness	12	8.57
	Rheumatic fever	3	2.14
	Pyrexia of Unknown origin (PUO)	5	3.57
	Cellulitis/Impetigo	4	2.85
2. Diarrhoea & vomiting	Acute gastroenteritis	32	22.85
3. Breathlessness	Asthma	6	4.28
	LRTI	8	5.71
4. Worm infestation	Helminthiasis	2	1.42
5. Others	Weakness, poor appetite	3	2.14

Table 3: Drugs Used in Each Class of Antimicrobial Agents (AMA)

AMA	Drug	Number of Patients (n=140)	Percentage (%)
Penicillins	Amoxicillin	11	7.85
	Amoxicillin+Clavulanic acid	17	12.14
Cephalosporins	Cefalexin	6	4.28
	Cefuroxime	7	5.00
	Cefixime	34	24.28
	Cefpodoxime	17	12.14
Fluroquinolone (FQ)	Ofloxacin	3	2.14
	Norfloxacin	5	3.57
Macrolide	Azithromycin	24	17.14
Nitroimidazole derivative	Metronidazole	3	2.14
	Tinidazole + FQ	4	2.85
Anthelmintic	Albendazole	4	2.85
Urinary antiseptics	Nitrofurantoin	4	2.85
Others		1	0.71

Table 4: Number of Drugs & Number of Antimicrobials Prescribed per Prescription

Number of Drugs	No. of Patients	Percentage (%)
One	6	4.28
Two	24	17.14
Three	73	52.14
Four	27	19.28
Five	10	7.14
Number of Antimicrobials per Patient		
One	96	68.57
Two	35	25.00
Three	9	6.44
Total	n=140	100

Brand Name Vs Generic Name

After evaluation of paediatric OPD prescription data it was observed that 96.42% antimicrobials were prescribed by brand name while only 3.58% with generic name.

Dose & Duration

Among the 140 prescriptions analysed 19(13.57%) were prescribed for 3 days, 68(48.57%) prescriptions for 7 days and remaining 43(30.71%) prescriptions for 10 days.

The duration of antibiotic therapy which was 7 days on an average for all the patients.

Dosage Form & Cost

The various dosage form which were prescribed to the paediatric OPD patients were Syrups 45(32%) followed by tablets, Suspensions, nasal drops, oral drops, liquid, capsules and others in 41(29%), 14(10%), 11(8%), 9(7%), 7(5%), 3(2%) and 10(7%) respectively. Capsules were the least preferred dosage form in all age groups (Figure 2).

The average cost of the prescription was Rs. 76.50 ± 6.50 per prescription while the cost of antimicrobial was Rs. 46.50 ± 2.50 per prescription.

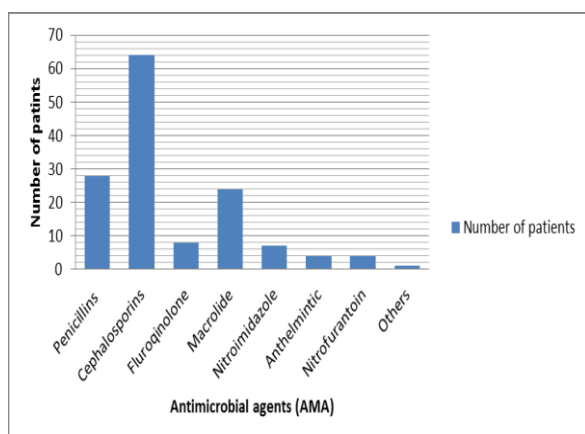


Figure 1: Antimicrobial Agents Prescribed in Paediatric OPD Patients

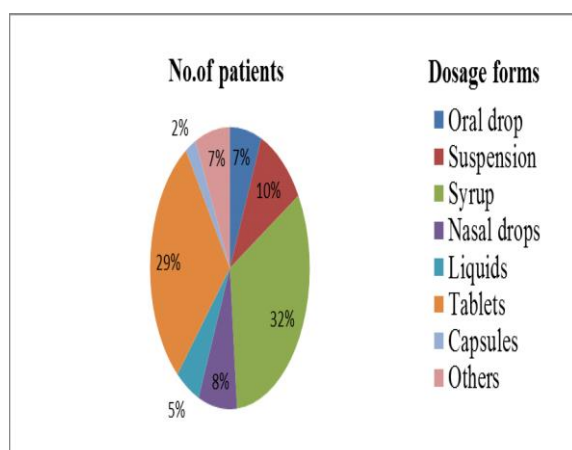


Figure 2: No. of Patients Vs Dosage Forms

Observation of the prescriptions revealed that among the total (140) prescriptions three drugs were most commonly prescribed in 73(52.14%) patients, followed by

4 drugs in 27(19.78%) patients. Single antimicrobial was prescribed in 96(68.57%) patients, two antimicrobial in 35(25%) as shown in Table 4.

A total 431 drugs were prescribed to the study population in which 193 drugs were antimicrobials constituting 44.77% of prescribed drugs. Polypharmacy was clearly evidenced in most of the prescriptions. Polypharmacy (>3 drugs) was found in 73 (52.14%) prescriptions.

DISCUSSION

In our study, which included 140 paediatric patients, 58.5% were males and 41.5% were females with age range of 1 month to 16 years. Majority of the patients were in the age range of 1- 5 years (41.4%), followed by (38.6%) of ≤ 1 year and (20%) in age >5 years out of analysed OPD prescription.

Fever due to upper and lower respiratory tract infection, diarrhoea and vomiting, breathlessness are the common presenting complaints accounting for the major proportion of paediatric OPD visits. Unfortunately fever of viral origin is not differentiated from bacterial origin.

Use of antibiotic for bacterial infection is rational but our study shows that there is an irrational use of antibiotics, especially the cephalosporins, for these common childhood viral infections, which can lead to a number of consequences in terms of cost, increased incidence of adverse drug reactions, the development of antibiotic resistance towards the commonly used drugs.¹¹

The percentage of prescription containing antibiotic was 44.77% in the present study as against the WHO recommendation of 20% antibiotic use for these common childhood illnesses.¹²

A total of 431 drugs were prescribed for the study population of which, 193 (44.77%) drugs were antibiotics. Antibiotics were prescribed without investigation mainly based on clinical judgment with an average of 1.37 per prescription.

Cephalosporin group of antibiotics was the leading antibiotic prescribed (45.70%). Cefixime was the leading antibiotic prescribed within the group as well as a whole among the antibiotics prescribed. Other antibiotics prescribed of this group were Cefpodoxime, Cefuroxime and Cefalexin. Penicillins were the next commonest antibiotics prescribed (19.99%), among which FDC of Amoxicillin + Clavulanic Acid was the most frequently prescribed of all. Among the Macrolides, Azithromycin was prescribed mainly.

These drugs were prescribed mainly for upper/lower respiratory infections. Quinolones were least (5.71%) used as a single drug. Among the imidazoles, the metronidazole and tinidazole were prescribed in almost equal frequency as a single drug as well as in FDC of tinidazole with fluoroquinolones. In some prescriptions of worm infestation and urinary tract infections, uses of Albendazole & Nitrofurantoin were also found.

Our results consistent with the study done by Ballestas where antibiotics were prescribed for 77.5% of all diagnosis.¹³ Similarly in a study carried by Ashraf in an outpatient paediatric department, it was found that at least one antibiotic was prescribed in 72.2% prescriptions.¹⁴ Antibiotic of Cephalosporin group was the top most frequently prescribed antibiotic followed by Penicillin group was also observed by Palikhe N.¹⁵

In our study, only 3.58% drugs were prescribed by generic name while 96.42% antimicrobials were prescribed by brand name that is inconsistent to previously reported studies and similar with study conducted by Saurabh MK.¹⁶ The WHO guidelines recommend 100% generic prescription.¹² Generic drugs are cheaper than brand name drugs. Moreover, ours is a tertiary care hospital where prescription of generic drugs is always emphasized. Prescribing by brand name may be an evidence of vigorous promotional strategies by pharmaceutical companies that may undermine some of the goals of essential drug list concept. On the other hand, prescribing by generic name may reduce overall expenditure on drugs especially on newer antibiotics etc. The practice of brand name prescribing thus should be discouraged as use of generics is a cheaper alternative. The drugs especially antibiotics is also thought to be administered only when needed.

Various dosage forms were prescribed for the children. The study showed that 62% of medicines were prescribed as syrup/suspension/oral drops/liquids/nasal drops and 31% was prescribed as tablets/capsules. All other dosage forms comprised about 7%. The age at which children can swallow conventional tablets is of great importance for their safety. Liquid medicines are usually recommended for infants and younger children so the ability to mask unpleasant taste with sweeteners and flavours is crucial.¹⁷

We also observed the incidence of polypharmacy. It is expressed as number of drugs per prescription. It is an important index of the scope for review and educational intervention in prescribing practices. In the present study on an average 3.07 drugs were prescribed per prescription, which is higher than the recommended value of 2¹⁸ and as observed by Vijay S et al,¹⁹ Results similar to those in our study, were also found by Ashraf H in their study where the average number of drugs per prescription was 3.96.¹⁴ We also found that around more than two third (78.56%) of the patients were given three or more drugs.

Thus it is evident that the polypharmacy and over prescribing are common in India, an economically developing country, as compared to economically developed western countries. Various reasons can account for this situation like lack of self confidence in doctors for diagnosing and treating common childhood illnesses; unrealistic expectations and demand for quick relief from the patients; availability of non-essential and irrational drug combinations; and aggressive medicine promotion and unethical marketing practices of

pharmaceutical companies.²⁰

The present study has some limitations such as the small population size, underestimation of real exposure to antibiotics prescribed by private paediatrician or antibiotics obtained over the counter.

CONCLUSION

The present study provides valuable information about the prescribing pattern of antimicrobials among the paediatric population.

The finding suggest that there is a urgent need to lay more emphasis on irrational prescribing and polypharmacy. Inappropriate and unnecessary use of antibiotics should be discouraged. CME and awareness programme on irrational prescription and usage of drugs should be organized on regular basis to reduce the irrational prescribing and polypharmacy. This will improve their future prescribing skills and eventually reduce cost of therapy and emergence of drug resistance.

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