World Journal of Pharmaceutical ReseaRch
SJIF Impact Factor 5.045
Volume 3, Issue 4, 734-743. Research Article ISSN 2277 – 7105

THE STUDY OF DRUG USAGE PATTERNS IN PEDIATRIC PATIENTS AT MGM HOSPITAL, NAVI MUMBAI

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Article Received on
01 April 2014,

Revised on 22 April 2014,
Accepted on 15 May 2014

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ABSTRACT

Objective: The present study evaluated the pattern of Drug usage in Pediatrics department at a tertiary care hospital in Navi Mumbai. **Method:** Questionnaires was specifically designed factoring patients' demographical profile, illness history, prescription regimen. **Result:** A total 302 prescriptions (78% OPD and 22% IPD) of children attending Pediatric department were analyzed. Maximum children were of the age group between 0 – 1 yr (40%) followed by 1-2 yr (27%). Of total 302 patients, drugs were mainly indicated for fever (44%), acute diarrhea (42 %), malaria (8%), other disease like, seizure, thrombocytopenia etc (6%). A total of 814 drugs were prescribed in the 302 prescriptions studied. Average number of drugs per prescription was 2.7. Most commonly encountered drugs were antipyretic: paracetamol syp (44%), Nasal decongestant: phenylephrine (44%), Zinc (42%), Oral rehydration solution (40%), Vitamin (40%), antihistaminic: Levocetrizine (20%) and antibiotics (32%). Most widely prescribed antibiotic group was Cephalosporin. Among IPD patients mainly Inj Ceftriaxone was used while in OPD patients, oral Cefixime was used. 23% of the drugs were prescribed by parenteral route. Except ORS, all the drugs were prescribed by brand names. Other medication prescribed were Domperidone, Ondansetron, Diazapam, Chloroquine etc. **Conclusion:** Good prescribing practices adhering to standard WHO prescribing guidelines were followed. However, prescription of drugs by brand names instead of the recommended generic names is a matter of concern.

Key words: Drug use patterns, Pediatrics, Rational prescribing, Subject area: Medical research.

INTRODUCTION

Prescribing practices are a reflection of health professional's abilities to select from the various choices of drugs and determine the ones that will benefit the patients. 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[1,2]. The assessment of medicine utilization is important for clinical, educational and economic purpose.

WHO published its reports on selection of essential drugs in 1977, in order to have the concept of essential drug program to promote rational drug use [3], These guidelines were also updated in 2012. As per WHO Guidelines, appropriate drug utilization studies are important tools to evaluate whether drugs are properly utilized in terms of efficacy, safety, convenience and economic aspects at all levels in the chain of drug use[4]. Importance of drug utilization studies has been increasing due to their close association with other areas like public health, pharmacovigilance, pharmacoeconomics and pharmacogenetics.

Inappropriate prescribing is a recognized worldwide problem of the health care delivery system. In order to be rational, use of a drug must be effective, safe, prescribed for the proper therapeutic indication and the correct dosage in an appropriate formulation, easily available and of a reasonable cost. The general public needs information and education on medicines and appropriate treatment seeking strategies so that individuals and communities can take responsibility for their health. Various indicators were developed by International Network for the Rational Use of Drugs (INRUD) in collaboration with WHO that provides objective indices to allow for assessment of drug use practices and suggesting remedial measures. Many studies point to major misconceptions and misuse of medicines [5, 6]. The European medicine agency (EMEA) and the food and drug agency (FDA) encourage development of studies involving children less than 18 yrs of age[7,8].

While a large number of drug utilization studies are available for adults all over the World, but very few studies provides information on drug usage patterns in Pediatrics. Drug utilization studies have special significance among pediatric age groups as Infants and children represent an about 42% of the population in developing countries. This is vital period of the rapid growth and development. Therefore, dugs should be used very cautiously and rationally among these subgroups.

Moreover, Children are among the most vulnerable population, of infectious diseases, since pharmacodynamic and pharmacokinetics is different in children. The impact of maternal drug intake on neonates is also relevant. Due to ethical issues, children do not often participate in clinical trials and specific knowledge about effect of drugs in children is often inadequate. Prescribing unnecessary drug to children and increased number of consultation rate are additional burden over children. The present study was designed with the aim to assess prevailing prescription patterns among pediatric patients. The information is expected to aid in interventions that would improve the prescribing patterns and rational drug use in children.

MATERIAL AND METHODS

I. **Study site:** This drug utilization study was conducted at the MGM Medical College &Hospital, Kalamboli Navi Mumbai, India.

II. **Study period:** The study was an observational study completed over a period of 10 months, from May 2013 to Feb 2014.

III. **Study design:** Prospective-open label observational study .

IV. **Sample size:** Total 302 patients were recruited for the study .

V. **Patient selection**

- **Inclusion criteria**: Children age less than 12 years, Informed consent by parents
- **Exclusion criteria**: Children who were seriously sick (ICU, emergency) and Patients with HIV/AIDS.

VI. The study protocol was approved by Institutional Ethics Committee and Informed consent were taken from Parents

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, reason for admission, past medical history, any surgical procedures done. Provision is given in the format to enter laboratory investigations, sensitivity to various antibiotics, diagnosis made and number of drugs prescribed.

A prospective observational study was designed and medication utilization form was designed for in-depth interview.

The following drug utilization indicators were assessed:

a. Prescribing Indicators

a. Average number of drug prescribed per patient

b. Percentage of encounters with an antibiotic prescribed

c. Percentage of encounters with an antipyretic prescribed;

d. Percentage of encounters with an injection prescribed.

e. Percentage of drugs prescribed by generic name

f. Percentage of drug by brand name.

b. Other indicators: Age and sex distribution of the child, presumptive or confirmed diarrhea. The most common pharmacological group, and the account most commonly individual drugs prescribed were also being taken into consideration.

RESULTS

Profile of the Patients: A total of 302 outpatient pediatric patients were recruited in the study. Out of 302 patients 250 patients were OPD cases and 52 were from IPD. 62% (187) of the study population were males and 38 % (115) were females as shown in Fig 2. Maximum patients, 40 %(120) belonged to age group of 0-1 year as shown in fig 1.

Prescribing Indicators: The prescribing indicators were calculated for all the patients to determine the differences in the prescription pattern.

Average Number of Medication per Prescription: Table 1 showed that a total of 814 medicines were prescribed to 302 patients. Average drug per prescription was 2.7.

Percentage of Medicines Prescribed by Generic Name: Table 1 showed that only 15% of drug (40) was prescribed by generic name. Mainly ORS and vitamin constituted the major proportion of medicines prescribed by generic name. Almost 85% of the prescription showed brand names of prescribed format. (Table 1)

Percentage of encounters with an Antibiotic: The percentage of antibiotic prescribed was 32% (96) of the total cases. Cefixime (20%) was most commonly prescribed antibiotic followed by Ceftriaxone (10%), amoxicillin (2%), (Fig 4).

Percentage of encounters with an Injection: 28% (84) of the prescription showed drugs prescribed by parenteral route (Table 1).

Complementary Indicators: Polypharmacy practices were seen in 90% of the cases. Other concomitant medication prescribed were domperidone, choloroquine, ondansetron, Diazapam etc. (Table 1).

Diagnostic Characteristics of the Patients: Acute diarrhea were in 42 %(126) of the patients, followed by fever 44 % (114), malaria 8% (24), and other diseases in 6% (18) of the patients. (Fig 3).

Most common drug prescribed: During the study it was observed that paracetamol was the most frequently prescribed drug followed by phenylpherine, Zinc, ORS, Vitamins, Cefixime and levocetrizine. (Fig 4)

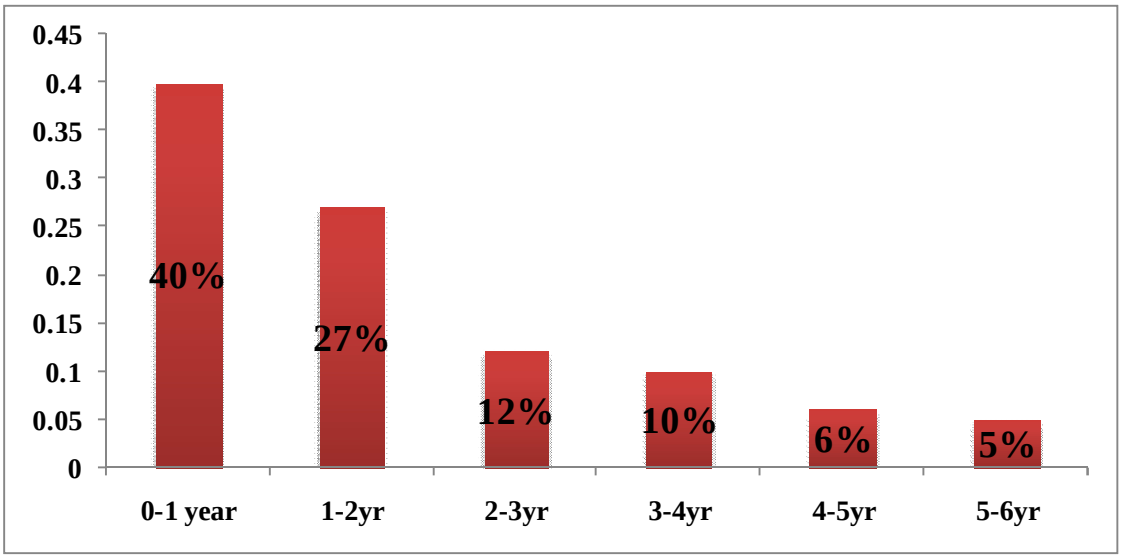

Fig 1 shows: Age wise distribution of Pediatric patients.

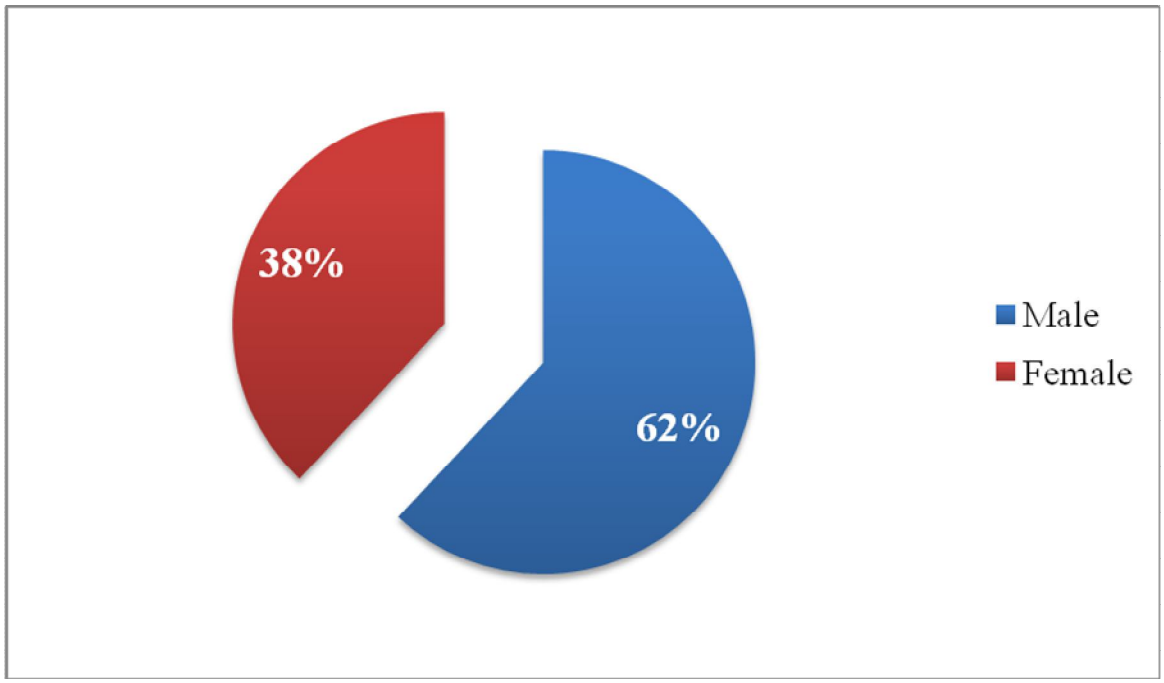

Fig 2 shows: Gender wise distribution of Pediatric Patients.

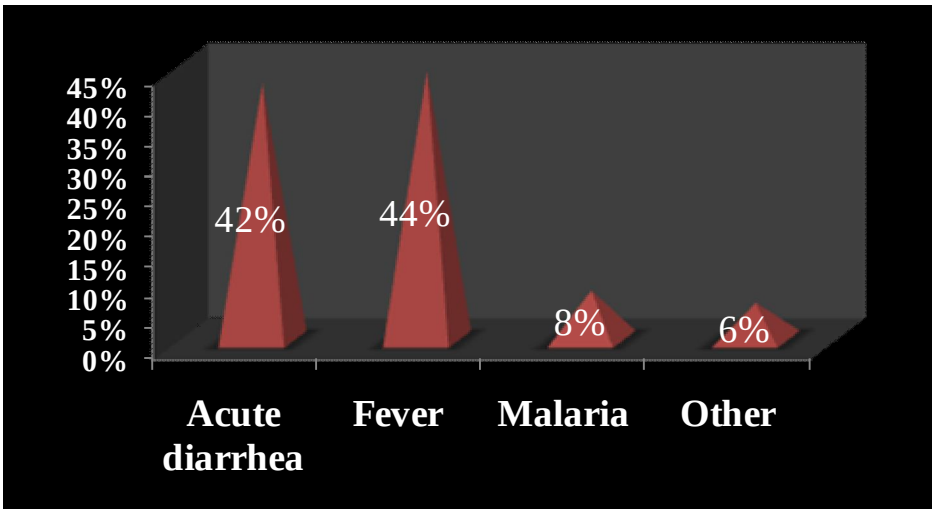

Fig 3 shows: Diagnosis of pediatric patients.

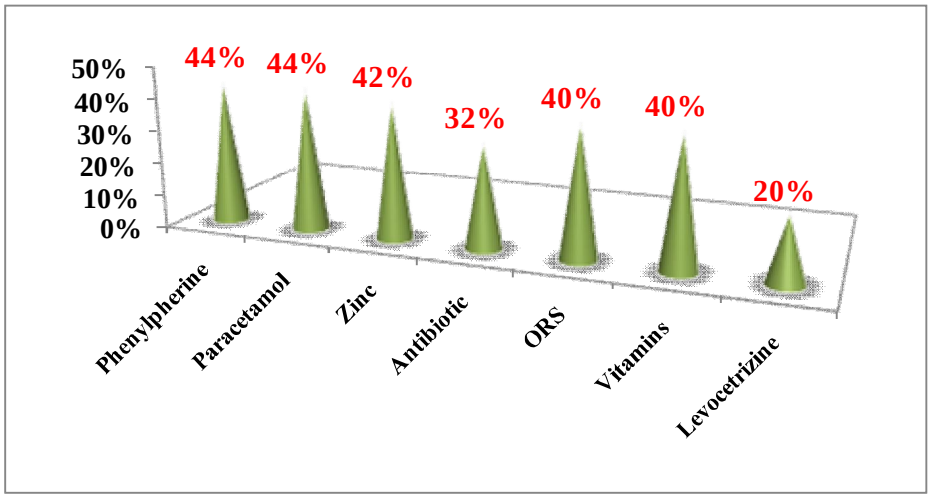

Fig 4 shows: Most commonly prescribed antibiotics among pediatric patients

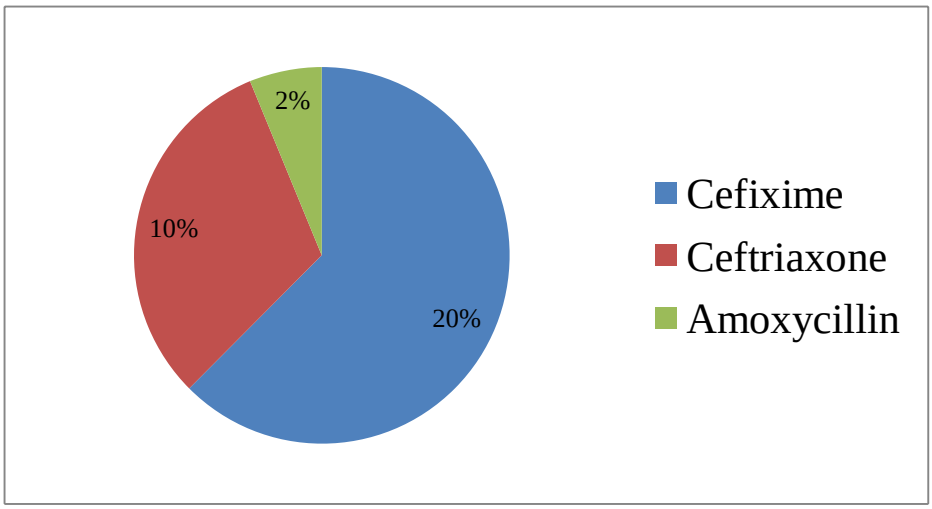

Fig 5 shows: Pattern of antibiotics prescribed among pediatrics

Table 1 shows: Prescribing parameters among Pediatric patients

SN	Name of Parameters	Results
1	Total no. of sample	302
2	Total drug prescribed	814
3	Average drug/ prescription	2.7
4	Poly pharmacy practice	90%
5	Encounter with antibiotics	32%
6	Most commonly prescribed antibiotic	Cefixime
7	Prescribed by brand name	85%
8	Prescribed by generic name	15%
9	Encounter with parenteral preparations	28%
10	Concomitant medication prescribed	Domperidone, Choloroquine, Ondansatron, diazepam

DISCUSSION

Irrational use of drugs is common in developing countries with a high rate of polypharmacy, over use of antibiotics, injections, use of 'off-label' drugs and drugs with poor efficacy. Several studies have documented prescribing practices among adults in different countries. But there is still death of information on the prescribing practices in Pediatrics. Drugs prescribed for children are the same as those originally developed for adults. However, growth and development processes in children, in addition to disease profile, might expose them to different adverse effects. There has been a growing interest in recent years to study the efficacy and safety of drug use in children. For instance, the WHO launched a global campaign in 2007 called "make medicines child size" to address the issues of drug use in pediatric patients [(7)].

In present study we encountered a predominance of boys (62 %) as compared to girls (38%) among the pediatric age group. This finding is similar to study conducted by M S Akhtar et al in Delhi [(8)]. It reflects a deep rooted gender bias in Indian culture where girls are assigned as lesser priority over boys and are therefore less often brought to the hospital for medical attention [(9)]. Maximum patients were in age group of 0-1 year (40%), This may be due to a higher susceptibility of infections at a younger age and deserves a greater concern for infant's health. The results of this study will help in providing lead and rationalizing drug use, decreasing medication errors, and improving therapeutic outcomes, and form the basis for

effective policies to address appropriate medication use in pediatric patients in India. Of total 814 drug prescribed in 302 prescriptions, average number of drugs per prescription was 2.7. This finding was similar to that of the studies conducted in Oman by K. A. Al Balushi et al in 2013[10].Many European countries have found similar results. A large cohort study in three European countries found the highest prescription rate in children aged under 2, ranging from 2.2 to 4.7 prescription per person per year [11]. Furthermore, a study from Sweden showed an average number of drugs per prescription as 2.27[12].A study from Nepal on pediatric inpatients showed an average of 4.5 ± 3.7 drugs prescribed per patient, with 38% of drugs prescribed intravenously[13]. The present study results is similar to the study conducted by S Dimrai et al in Chandigarh[14].

The present study reveals that , acute diarrhea was the most common complication among children followed by fever, malaria and other disease like seizure, vomiting , thrombocytopenia etc. This result differs from study conducted by N. Venkateshwaramurthy et al in Tamil Nadu in 2013 [1] and also by K. A. Al Balushi et al[10] which shows respiratory tract infection, fever, URTI, etc as the common indications for drug usage.

In our study, only 28% of the drugs were prescribed intravenously. The most common route of drug administration observed in our study was the oral route. The most common drugs used in children were Paracetamol 44%, Phenylpherine nose drop 44%, Zinc 42%, antibiotic 32%, ORS 40%, Vitamins 40% and Levocetrizine 20%. These drugs differed in age groups, but in different orders, and also by gender or whether they were prescribed for IPD or OPD cases. Similar studies conducted in various countries showed different results. Study from Italy showed that anti-infective drugs and respiratory drugs were the most commonly prescribed drugs[15] . Similarly, study conducted by Tzimis L et al showed, antipyretics, antibiotic, cough & cold preparations and vitamins were the commonest category of drugs prescribed [16].

In our study, Cefixime was the most common used antibiotic used, followed by amoxicillin. This was similar to the finding of the European study [11]. Paracetamol was the most commonly prescribed drug in our study population. Paracetamol was mentioned in many studies as the most commonly prescribed drug in pediatric patients, ranging from 7 to 14%. Paracetamol and ibuprofen were the two most prescribed drugs in a prospective study on pediatric patients conducted in Switzerland, with a prevalence rate of 23% and 16% in 2005 , 22% and 23% in 2010, respectively. Co-amoxicalv followed by amoxicillin were the most

prescribed antibiotic in Italian pediatric patients, with a prevalence rate of 18% and 13%, respectively.[17] In contrast, the study on Nepalese pediatric inpatients showed that ampicillin (10%) and paracetamol (9%) were the most commonly prescribed drugs[13].

In the present study maximum patients were suffering from acute diarrhea hence prescribing pattern is differing from various study conducted elsewhere. The present study also showed Zinc and ORS prescriptions which was not seen in a similar previous study[1,8,9,10,13,14]. Maximum drugs were prescribed by brand name (85%) and only 15% prescription showed generic prescription. Poly pharmacy prescription remained as a burden as demonstrated in the present study. Corrective interventions should be implemented wherever necessary to promote the safe and rational use of drugs and prevent adverse drug reaction among children.

CONCLUSION

Good prescribing practices adhering to standard WHO prescribing guidelines were followed. However, prescription of drugs by brand names instead of the recommended generic names is a matter of concern. There is a needs to pay special attention by doctors and clinical pharmacists to work together to establish a rational and practical prescribing protocol for common clinical conditions. This study will also help to address the various issues and concerns associated with rational usage and cost control of medications used in the pediatric setting in developing countries.

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