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Research Article

DRUG UTILIZATION REVIEW IN PEDIATRICS AT THE TERTIARY CARE TEACHING HOSPITAL

Ahammed Fuwad C.H[1*], Amal Sebastian[1], Muhammed Ashique K[1], Ren Joy Mathew[1], Rajeswari Ramasamy[2], B Ravichander[3].

[1]Pharm D Interns, Krupanidhi College of Pharmacy, Bangalore-560035

[2]M. Pharm (Ph. D.), Department of Pharmacy Practice, Krupanidhi College of Pharmacy, Bangalore-560035

[3]MD, Medical Superintendent, MVJ Medical College and Research Hospital, Hoskote-560029

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ABSTRACT

To understand the prescribing patterns of various classes of drugs in Pediatrics and to identify the barriers associated with rational prescribing of pediatric drugs. **Methodology:** A Prospective-observational study was carried out in the tertiary care research hospital over a period of 6 months using a specially designed Case Report Form (CRF). **Results:** There were 126 (63%) prescriptions collected from male patients and (37%) from female patients with a total of 630 prescribed drugs. Seizure was the most common disease with 107 cases (54%) followed by various LRTIs (26%) and Pneumonia (9.5%) respectively. WHO prescribing indicators were used in the study. Average number of drugs per prescription was 3.15 which was higher than standard (1.6-1.8). Percentage of drugs prescribed with generic names was found to be 38.2%. Among 200 prescriptions 10.2% was found to be Antibiotics with Penicillin was most common (56%) followed by Cephalosporins (28%). About 14.7% of drugs were given as Injections, which was within WHO recommended range of 13.4%-24.1%. Nearly 41.4% drugs were from EDL. Salbutamol was the most commonly prescribed for Off-label use (70%) for children under age of 2 years (Infants) out of 20 Off-label use. Illegible writing and time scarcity were the commonly seen barriers associated with the Physicians. About 93.5% prescription orders were found to be rational. **Conclusion:** This study provides few insights into the drug use patterns in pediatric department of the tertiary care teaching hospital and Continuous medical education with a focus on rational drug use and evidence based medicine should form part of the program of the hospital.

Keywords: Drug Utilization, Indicators, EDL, Off-label.

INTRODUCTION:

Drug Utilization studies are useful tool to facilitate rational prescribing of drugs. Children are more vulnerable to contact illness and various adverse events related to drugs. Periodic evaluation of drug utilization studies needs to be done to enable prescription of suitable medications, to improve the therapeutic benefits and reduce the adverse effects. Drug utilization in the in-patient setting can provide a mechanism to assess drug prescribing trends and efficiency of hospital formularies[1].

Drug Utilization Review (DUR) is defined as "authorized, structured, ongoing review of prescribing, dispensing and use of medication" [2].

Children constitute 40% of India's population. They suffer from frequent but usually non serious illnesses. Most of these are self-limiting and often treated not only inappropriately but also resorting to polypharmacy. Acute respiratory infection, seizures, acute diarrhea and viral fever are the common childhood illnesses accounting for the major proportion of pediatric visits. Current child health scenario indicates that pneumonia and diarrhea continue to result in high mortality among children less than 5 years of age. Epidemiological evaluation of medicine use in elderly is now a highly visible topic, but drug prescribing studies in pediatric patients have been limited. The need for the safe and effective drugs for use in sick neonates, infants and children requires the establishment of thoughtful drug therapy strategy [1]. The irrational use of drugs is

*Corresponding author: Ahammed Fuwad C.H | E-mail: fuwad321@gmail.com

known to an increase in the cost of treatment, incidence of adverse drug reactions. Most of the drugs prescribed for children have not been tested in the pediatric population due to the difficulties in carrying out clinical studies in children and ethical issues due to children not being able to make their own decisions to participate in a clinical trial. Therefore, many medications have not been approved by the Food and Drug Administration for children [3].

Regular audit of prescriptions is essential in identifying the various types of irrational prescribing such as polypharmacy, irrational use of antimicrobials and injectables among others. It is also necessary to describe trends and follow adherence to various treatment guidelines. Irrational use of antimicrobials has been identified as a major problem in many pediatric prescription studies; this could lead to antimicrobial resistance and treatment failures [4].

Polypharmacy and other forms of inappropriate forms of prescribing could be extremely harmful in children because of their physiological peculiarities. The rational prescribing can be assessed with the help of conducting prescription audit and the results of such studies help in developing the quality of rational drug use in a health facility. World Health Organization (WHO) has formulated a set of core drug use indicators, which measure the performance of prescribers, patients experience at health facilities and whether the health personnel can function effectively. The assessment of WHO core indicators help to improvise the prescribing pattern, identify significant problems involved in the knowledge gap of patients or caretakers understanding of instructions provided by consultants [5].

WHO Prescribing Indicators [6]

The WHO Prescribing Indicators include:

- The average number of prescribed drugs,
- Percentage of prescribed drugs by generic name,
- Percentage of encounters with antibiotics,
- Percentage of encounter with injection and
- Percentage of drugs prescribed from Essential Drug List (EDL).

Essential medicines as defined by World Health Organization are “those drugs satisfy the health care needs of the majority of the population; they should therefore be available at all times in adequate amounts and in appropriate dosage forms at a price the community can afford”.

Off-label drug use [7]: Off-label drug use, defined as use of a drug in manner that deviates from its approved use defined by drug’s FDA label. This practice is common and provides a pathway for clinical innovation. Off-label use in to some extend inevitable because not every condition can be tested during pre-approval. Regulatory agencies and clinical researchers can use knowledge of emerging-off label uses to identify potential benefits or risks that require further investigation. A single prescription can be categorized as off-label use in several categories, of which most common are shown in table:

Table 1: Off-label categories [8]:

Off-label category	Description
Age	Drug not recommended in the Summary of Product Characteristics (SmPC) below a certain age
Weight	Drug not recommended in the SmPC for children below a certain weight
Absence of pediatric information	No mention at all in the SmPC regarding pediatric use
Lack of pediatric clinical data	Stated lack of evidence of efficacy and safety in the pediatric patients in the SmPC
Contraindication	Statement in the SmPC that the drug is contraindicated in children
Indication	Drug prescribed for indication outside of those listed in SmPC
Route of Administration	Drug administered by a route not described in the SmPC.

METHODOLOGY

Study design and period: Prospective Observational study for 6 months (October 2015 to March 2016)

Study population and sites: 200. Department of Pediatrics, MVJ Medical College and Research Hospital, Hoskote & Department of Pediatrics, BGS Global Hospital Kengeri, Bengaluru.

Study criteria:

Inclusion criteria:

All pediatric patients who are receiving any category of drug therapy.

Exclusion criteria:

Those patients and patient's parents who are not willing to participate.

Ethical Approval:

The research study protocol was submitted for ethical approval to the Ethical head of Ethical Committee, MVJ Medical College and Research Hospital, Hoskote. Ethical approval was given by the board members for the study and ethical certificated were issued on 23.11.2015.

Method:

The study was conducted after gaining approval from the institutional ethical committee at MVJ Medical College and Research Hospital, Hoskote. The study was carried out in the subjects who were admitted in the In-patient pediatric department at the study site.

All patients who met the inclusion criteria were enrolled in the study after taking Informed Consent (IC) before commencing the study. The basic demographics, medication related details and laboratory investigation values were collected by the researchers personally using the Case Report Form (CRF).The CRF format included the details such as Name, Age, Gender, Height, Weight, IP number, DOA, DOD, Reason for admission, Patient past medical and medication history, Vital signs, Blood sugar levels, Blood counts, Liver function tests, Renal function tests, Electrolytes, Urine examination, Lipid panel, Diagnosis, medications prescribed with dose, strength and frequency, Off-label usage, Prescribing indicators, Rationality and barriers associated with rational use. All the medication orders were observed and evaluated for legibility, the use of generic names, route of administration, dose, frequency of administration and off-label usage, using Micromedex drug database and other standard references. WHO Prescribing indicators used in the study were -the number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with an antibiotic, percentage of encounters with an injection and percentage of drugs prescribed from the Essential Drug List (National List of Essential Medicines). The results were analyzed and reported to the department of Pediatrics, MVJ Medical College and research hospital, Hoskote.

RESULTS

A total number of 200 cases were observed in a study period of 6 months and following evaluations were made from the observed data.

Demographic characteristics:

Gender categorization (N=200):

Out of 200 cases, male population (126 male patients-63%) was more than female population (74 female patients-37%).

Table 2 (a):

GENDER	FREQUENCY (N=200)	PERCENTAGE (%)
MALE	126	63%
FEMALE	74	37%

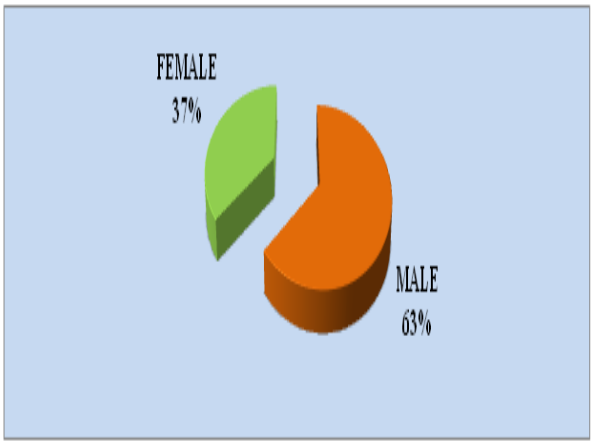


Figure 1: Gender categorization (N=200)

Age distribution (n=200):

The most common age group were Child (6-12 Years) and Infants with 72 (36 %) and 56 (28%) cases respectively.

Table 2 (b)

AGE GROUPS (YEARS)	FEQUENCY (N=200)	PERCENTAGE (%)
INFANTS (0-2)	56	28%
YOUNG CHILD (2-6)	47	23.5%
CHILD (6-12)	72	36%
ADOLESCENT (12-14)	25	12.5%

Number of drugs per prescription order (N=200):

Average number of drugs per prescription was 3.15 with range 1-4 were highest with 51% among all prescription orders.

Table 3:

PRESCRIBING RANGE	FREQUENCY(N=200)	PERCENTAGE (%)
1-4	102	51%
5-8	84	42%
>8	14	7 %

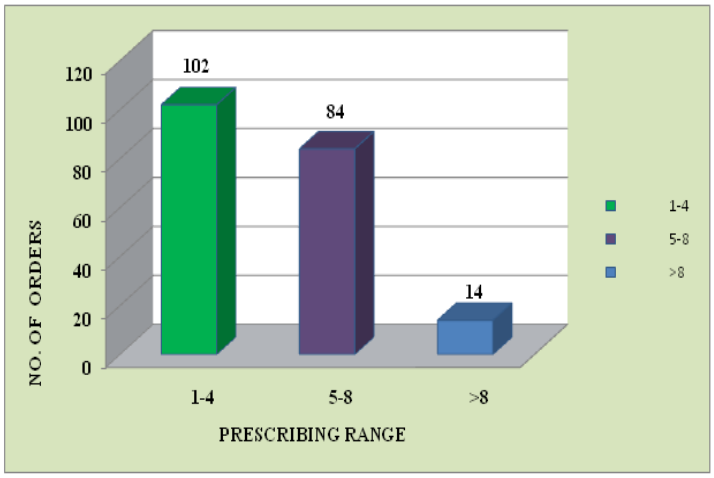


Figure 2: Number of drugs per prescription order (N=200)

Distribution of various diseases (N=200):

Seizure was the most common disease with 107 cases (54%) followed by various LRTIs (26%) and Pneumonia (9.5%) respectively. (Table 4)

Table 4:

DISEASE TYPE	FREQUENCY (N=200)	PERCENTAGE (%)
SEIZURE	107	54%
PNEUMONIA	19	9.5%
LRTI (Other)	53	26%
OTHERS	21	10.5%

Figure 3: Distribution of various diseases (N=200)

Types of dosage forms (n=630):

Tablet was the most common dosage form which constitutes 45.7% of all drugs prescribed followed by Syrup (31.2%). (Table 5)

Table 5:

DOSAGE FORMS	FREQUENCY (N=630)	PERCENTAGE (%)
TABLET	288	45.71%
SYRUP	197	31.26%
INJECTION	94	14.76%
OTHERS	51	7.93%

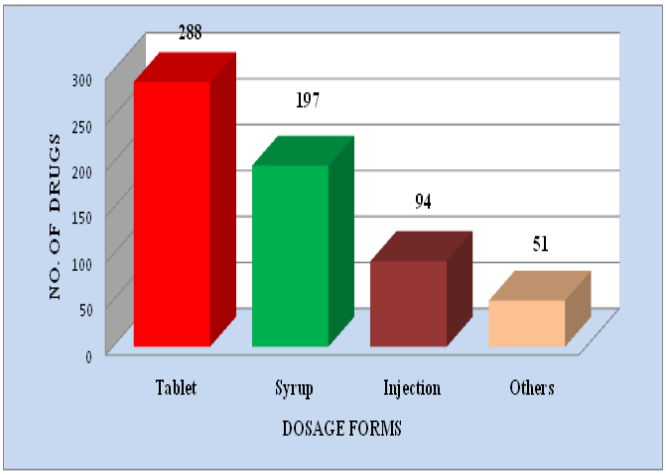


Figure 4: Types of dosage forms (N=640)

Distribution of various routes of administration (N=630):

Oral route was most preferred route among 630 drugs with 76.98%.

Table 6:

ROUTE TYPES	FREQUENCY (N=630)	PERCENTAGE (%)
ORAL	485	76.98%
IV	93	14.70%
INHALATION	24	3.8%
RECTAL	10	1.5%
OTHER ROUTES	28	4.44%

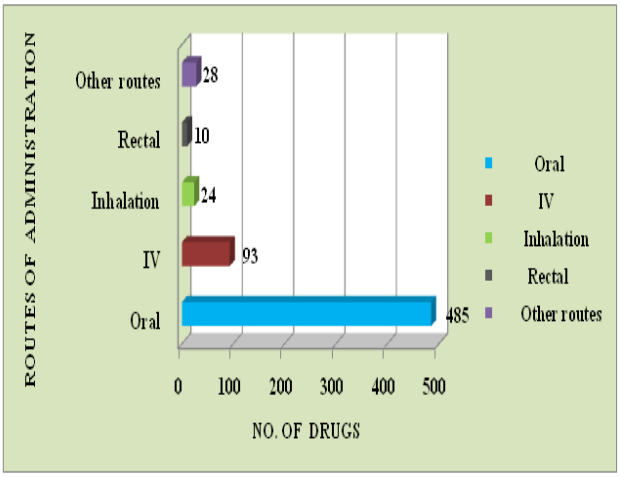


Figure 5: Distribution of various routes of administration (N=630)

WHO prescribing indicators:

Percentage of drugs prescribed with generic names was found to be 38.20%, which was comparatively lower. Among 200 prescriptions 10.2% was found to be Antibiotics with Penicillin was most common (56%) followed by Cephalosporins (28%). About 14.7% of drugs were given as Injections, which was within WHO standard (13.4%-24.1%). Nearly 41.4% drugs are from EDL. (Table 7)

Table 7

WHO Prescribing Indicators	Average/ Percentage (Standard)
AVERAGE NUMBER OF DRUGS PER ENCOUNTER	3.15 (1.6-1.8)
PERCENTAGE OF DRUGS PRESCRIBED BY GENERIC	38.20% (100%)
PERCENTAGE OF ENCOUNTERS WITH ANTIBIOTICS	10.20% (20-26.8%)
PERCENTAGE OF ENCOUNTERS WITH INJECTION	14.70% (13.4-24.1%)
PERCENTAGE OF DRUGS FROM ESSENTIAL DRUG LIST	41.40% (100%)

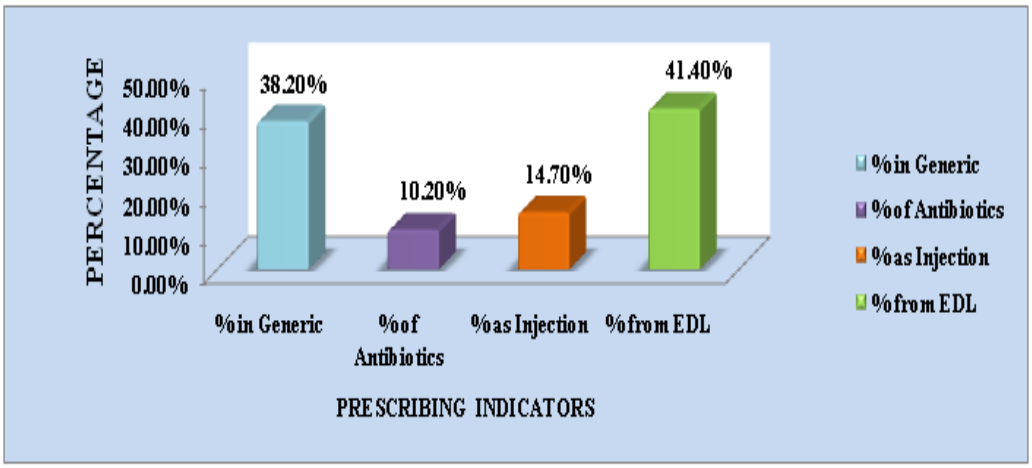


Figure 6: WHO Prescribing Indicators

Prescribing trend by drug class (N=630):

Table 8 shows Antiepileptics (32.85%) were most prescribed class among 200 orders with 1.03 AEDs per prescription followed by NSAIDs (15.55%).

Table 8:

DRUG CLASS	FREQUENCY (N=630)	PERCENTAGE (%)
ANTIEPILEPTICS	207	32.85%
ANTIBIOTICS	64	10.20%
NSAIDS	98	15.55%
BETA 2 AGONISTS	58	9.20%
ANTACIDS	42	6.67%
VITAMINS	43	6.82%
STEROIDS	12	1.90%
ANTIEMETICS	44	6.98%
MUCOLYTICS	40	6.34%
OTHERS	22	3.49%

Classes of antibiotics prescribed (N=64):

Penicillin was the most commonly prescribed Antibiotic class with 56.25% of total 64 antibiotics**.** (Table 9)

Table 9

ANTIBIOTIC CLASS	FREQUENCY (N=64)	PERCENTAGE (%)
PENICILLIN	36	56.25%
CEPHALOSPORIN	18	28.12%
MACROLIDE	10	15.62%

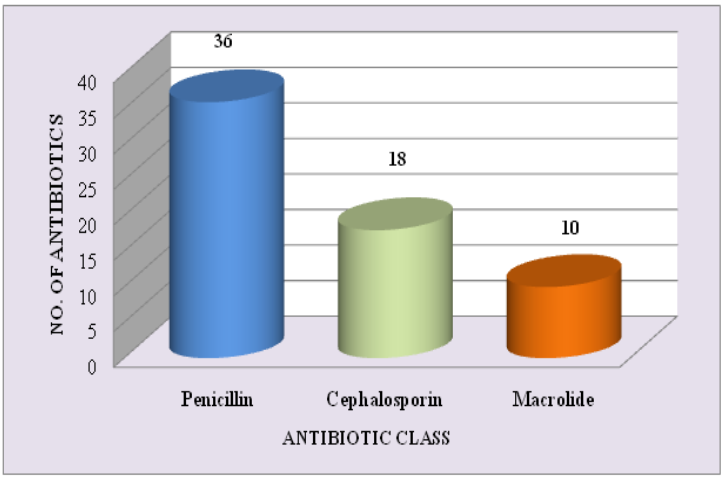


Figure 7: Classes of antibiotics prescribed (N=64)

Dosage forms of prescribed antibiotics (N=64):

Most of the Antibiotics were prescribed as tablet (42.18%). (Table 10)

Table 10

DOSAGE FORMS	FREQUENCY (N=64)	PERCENTAGE (%)
TABLET	27	42.18%
SYRUP	19	29.68%
INJECTION	18	28.12%

Categorization of various seizures (N=107)

Table 11 shows GTCS was the most common type of seizure among 107 Epilepsy prescriptions with 41 (38.31%) cases followed by febrile seizure 33 cases (30.84%).

Table 11

SEIZURE TYPES	FREQUENCY (N=107)	PERCENTAGE (%)
GTCS	41	38.31
FEBRILE SEIZURE	33	30.84
ABSENCE SEIZURE	18	16.82
PARTIAL SEIZURE	15	14.01

Classes of AEDs prescribed (N=207):

Sodium valproate was highly prescribed anti-epileptic (34.78%) followed by Phenytoin (20.77%) and Levetiracetam (9.17%) respectively. (Table12)

Table 12

ANTIEPILEPTIC DRUG (AED) CLASS	FREQUENCY (N=207)	PERCENTAGE (%)
SODIUM VALPROATE	72	34.78
PHENYTOIN	43	20.77
CLOBAZAM	14	6.76
LEVETIRACETAM	19	9.17
LAMOTRIGINE	16	7.72
CLONAZEPAM	8	3.86
TOPIMERATE	9	4.30
CARBAMAZEPINE	14	6.76
PHENOBARBITAL	12	5.79

Dosage forms of prescribed AEDs (N=207):

Out of 207 AEDs, syrup was the most preferred dosage form for AED with 43.96% of total. (Table 13)

Table 13:

NO. OF DRUGS (N=207)	FREQUENCY (N=207)	PERCENTAGE (%)
SYRUP	91	43.96
TABLET	77	37.19
INJECTION	39	18.84

AED prescribing pattern:

AED Monotherapy (47%) were most preferred in managing epilepsy, followed by 2-drug combination (35%).

MONOTHERAPY (47%)

***With conventional drug (*PHT, VPA or PHE)**

2-DRUG COMBINATION (35%)

***Combining any of the above or add* LVT or LMG**

Polytherapy 3-DRUG COMBINATION or more (18%)

***Combining one or two of the conventional drug(s) with* LVT or LMG.**

Table 14: AED prescribing pattern:

"CONVENTIONAL/OLDER" AEDS	"NEWER" AEDS	BENZODIAZEPINES
PHENYTOIN (PHT)	Lamotrigine (LMG)	Clobazam (CLB)
VALPROATE (VPA)	Levetiracetam (LTM)	Clonazepam (CLM)
PHENOBARBITONE (PHE)	Topimerate (TPM)	

Preferred AEDs in monotherapy (N=38):

Table 15 shows Sodium valproate was the most commonly used AED in monotherapy with 57.89% followed by Phenytoin (28.94%).

Table 15

AEDs	NO. OF DRUGS (N=38)	PERCENTAGE (%)
SODIUM VALPROATE	22	57.89%
PHENYTOIN	11	28.94%
CARBAMAZEPINE	3	7.89%
LAMOTRIGINE	2	5.26%

Frequent dosing of AEDs prescribed (n=207):

Table 16:

AEDS	TABLET	SYRUP	INJECTION
PHENYTOIN	5mg/kg/day q 12h	3ml q 12h	15mg/kg q 12h
VALPROATE	250mg q 12h	2.5ml q 12h	10-15mg/kg/day q 12h
CLOBAZAM	2.5mg q 12h	-	-
LEVETIRACETAM	250mg q 12h	3ml q 12h	-

Off-label drugs prescribed (N=20):

Off-label usage has been identified with Salbutamol as most frequent usage in 14 70%) orders for infants (<2yrs) followed by Lorazepam and Nifedipine with 4 (20%) and 2 (10%) respectively. (Table 17)

Table 17

OFF- LABEL DRUGS	FREQUENCY (N=20)	PERCENTAGE (%)
SALBUTAMOL	14	70%
LORAZEPAM	4	20%
NIFEDIPINE	2	10%

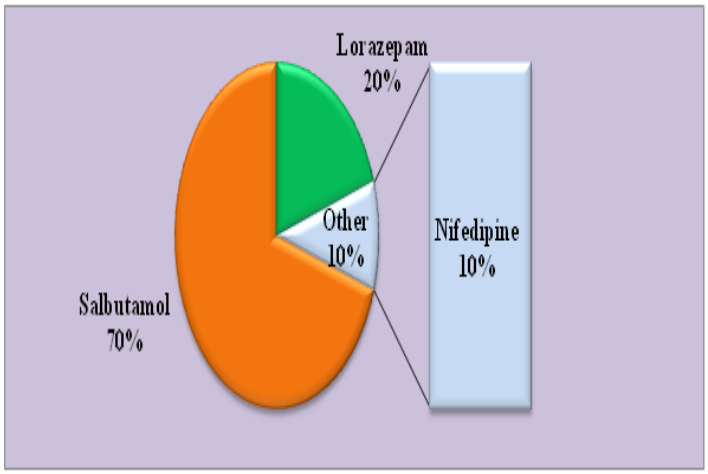
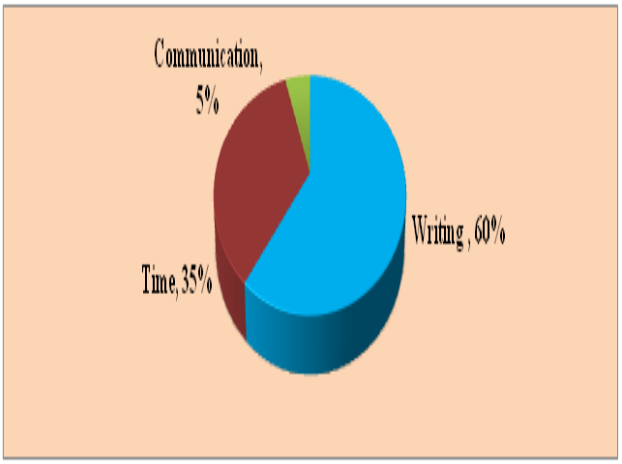


Figure 8: Off-label drugs prescribed (N=20)

Barriers for rational drugs use:

Figure 9 (a) shows illegible writing and time scarcity were the commonly seen barriers associated with the Physician, which was due to increasing number of consultations per physician. Transcribing errors, which was due to carelessness and lack of time were commonly observed nurse based barriers. (Figure 9(b))



Physician based barriers: Figure 9 (a)

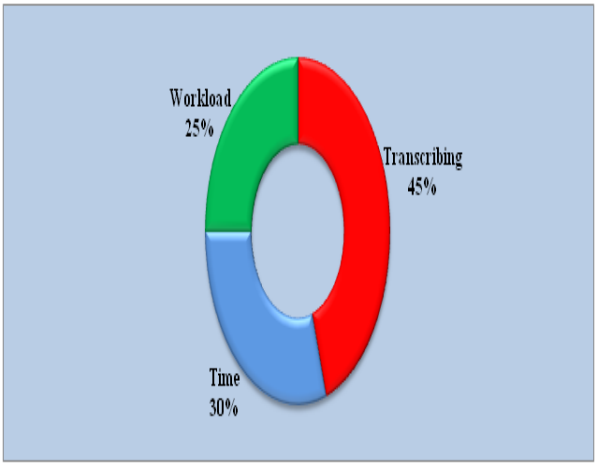


Figure 9 (b): Nurse based barriers:

Rationality of prescription orders (N=200):

Rationality of prescription orders was assessed. About 93.5% of prescription orders were rational and6.5% was irrational. (Table 18)

Table 18:

RATIONALITY	NO. OF ORDERS (N=200)	PERCENTAGE (%)
RATIONAL	187	93.5%
IRRATIONAL	13	6.5%

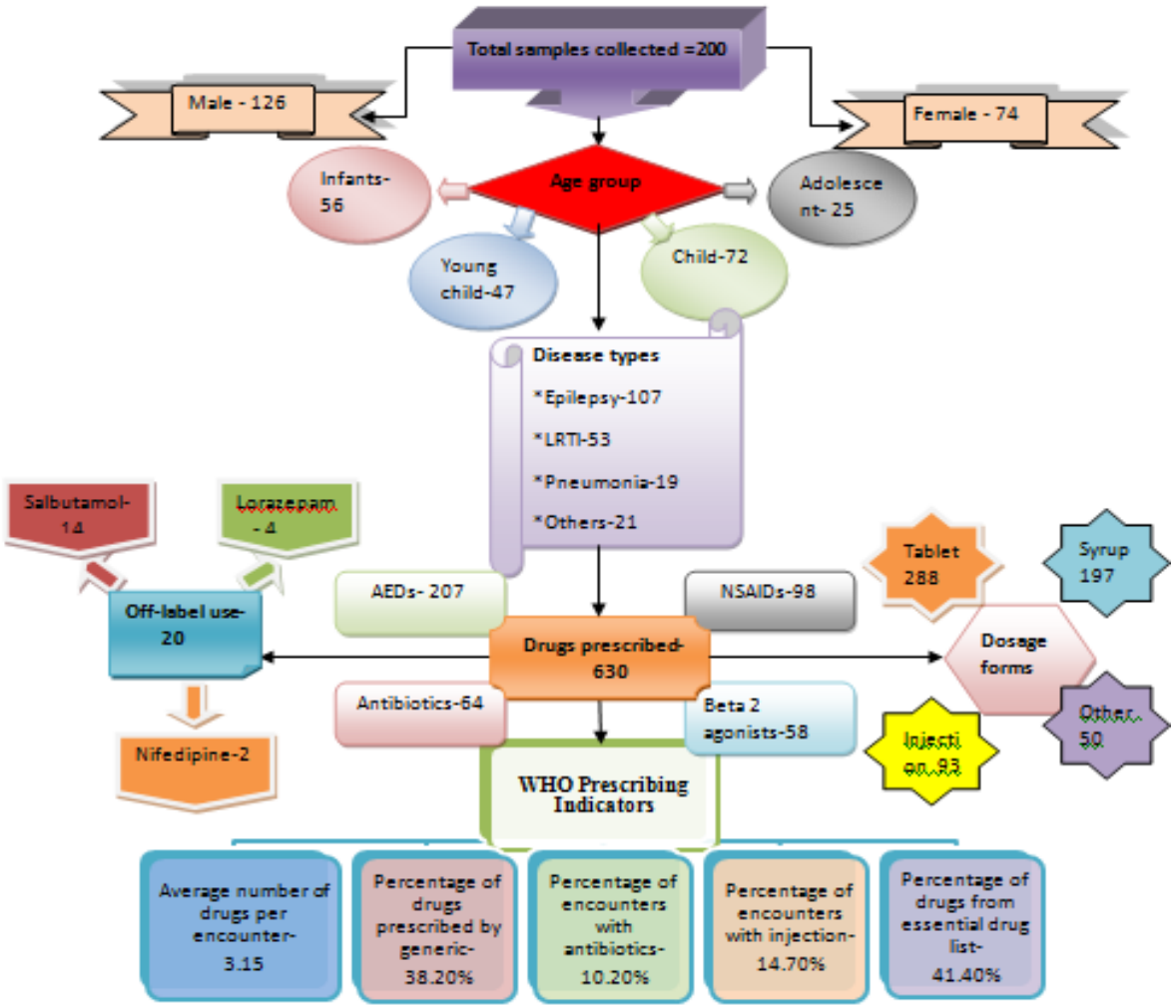


Figure 10: Summary of results

DISCUSSION

The results of the present study were based on the data obtained from 200 patients. Out of 200 patients most of the patients were male 63%. Our results were similar to the studies conducted by Dinesh *et al*[9], and Karande *et al*.[10] at the tertiary care teaching hospitals in Chennai and Mumbai respectively. Our study reveals that male children are more vulnerable to various diseases especially in the first decade of life. The most number of patients was from the category of children 36% followed by Infants 28%. Majority of the cases, 102(51%), were within the prescription range of 1-4, out of which 38(19%) cases with monotherapy (for managing epilepsy usually monotherapy is preferred).

Out of 200 orders, seizure was the most common disease with 107 (54%) cases followed by various Lower Respiratory Tract Infection (LRTI) with 53 (26%) cases, since hospitals in which we carried out our study were specialized in neurological disorders and number of such cases were high. Most of the studies conducted on assessing WHO core indicators in the pediatric population were limited only to prescribing indicators. This study was successful in analyzing the WHO prescribing indicators. In the present study, on an average 3.15 medicines were prescribed per patient, which was higher when compared with 2.9 and 2.07 in similar studies from Karande *et al*.[9] and Dinesh *et al*.[10], and higher than WHO recommended average number of drug per prescription of 1.6-1.8. About 42% of total prescription order had 4 or more drugs, which can increase the risk of drug interactions.

Prescribing generic name is known to reduce the cost of drug treatment and rationalizing drug therapy. This varies from 13.3% to 93% across the globe. About 38.2% drugs were prescribed in

generic which is higher than the similar studies carried by Nazima *et al* [11] in Bangladesh (30.7%). One of the reasons for poor prescribing by generic name is the non-availability of the pediatric formulations in the hospital pharmacy. Prescribing of antibiotics did not fell within the WHO recommended range of 20-26.8%, but it was lower at 10.20%, than the recommended range because majority of our cases doesn't involve any infection. The prescribing of injections was within than the recommended range, 14.70% of WHO's standard 13.4-24.0%. A lower rate of injections was prescribed in other Indian studies.

About 41.40% prescribed were from EDL, which was a higher percentage than studies of Dimri *et al*.[12], Pramil *et al*.[13], and lower in percentage than Karande *et al*. Antiepileptic Drugs (AED) were the most prescribed class with 32.85% followed by NSAIDs (15.55%), since majority of cases studied were Epilepsy (54%). Among 200 prescriptions, 10.2% was found to be Antibiotics with Penicillin was most common (56%) followed by Cephalosporins (28%) because oral penicillin (Amox-clav) were most preferred in Children >6 years than Injection in managing infection.

Our study results states that most of the patients were prescribed with 45.71% tablet followed by 31.26% as syrup whereas, in Dinesh *et al*., study, 60.4% of medicines were prescribed as syrup, 32% was prescribed as tablet, since our study had more children of age group 6-12(36%) where tablets were more preferred and convenient.[9] A higher percentage of patient were found to have Generalized tonic-clonic Seizures (GTCS), 38.31%, so as in other study done by Ajay Kumar *et al.*[14]. In this study most of the patients were prescribed monotherapy (47%) whereas polytherapy were given to 18% of patients. Like earlier studies. 35% of patients were used two drug combination therapy. Oral therapy in the form of Syrup (44%) was most commonly used for managing seizure in Children. Polytherapy may leads to increase in side effects, drug interactions and adversely affect quality of life hence monotherapy is most preferred in pediatrics.

Among conventional AED, Sodium valproate was most commonly preferred AED as monotherapy (57.89%), followed by Phenytoin. This was in contradiction with the study by Shih-Hui *et al*[15], where Carbamazepine (28.94) was found to be most commonly used AED as monotherapy. In another study done by Juny Sebastian *et al.* Phenytoin was most commonly used AED as monotherapy (41.7%) followed by valproate (41%). Whereas, like this study, Sachchidanad Pathak *et al*[16] found that Sodium valproate as most commonly used AED as monotherapy. Sodium valproate along with Phenytoin was also more commonly used in two drug combination therapy and in polytherapy as well. Due to its broad spectrum of activity, Sodium valproate was used to control most of the GTCS, partial seizure and absence seizure, which also constitute majority of our study cases. Lamotrigine, Levetiracetam and Topiramate were the newer AEDs used in this study, which were least prescribed because of its higher cost compared to conventional AEDs.

Around 3.17% of total 630 drugs were Off-label use. The most common reasons for off label use were that the medicine was prescribed at a different dose or frequency, in a different formulation, or in an age group for which it had not been licensed. The Off-label use of drugs in our study were similar to the research by Sharon Conroy *et al*[17] in European countries in which bronchodilator Salbutamol was the most commonly prescribed for Off-label use (70%) for children under age of 2 years (Infants) since there's no approved standard alternative was available to manage the condition specifically for such age group. The efficacy of bronchodilators in children under the age of 2 years is variable, especially in infants under the age of 12 months. Studies are required to determine whether the off label use of bronchodilators is justified by good scientific evidence. Illegible writing and time scarcity were the commonly seen barriers associated with the Physician, which was due to increasing number of consultations per physician. Transcribing errors, which was due to carelessness and lack of time were commonly observed nurse based barriers. About 93.5% of total 200 prescription orders were found to be rational.

Limitations:

1. The data entered in some of the patient case sheets were incomplete and needed extensive help from nurses and physicians to document details.

2. No categorization of prescribers was taken into consideration (Junior or senior doctors).
3. The information provided by the parents about their child condition may be wrong or inappropriate due to forgetfulness.

Future outlook:

Any significant deviation from the acceptable WHO standard in prescribing antibiotics and injectable medications requires special attention. Use of many antibiotics may accelerate drug resistance, which is a global challenge that threatens the effective treatment of different infectious diseases. Also, overuse of injectable drugs may contribute to the spread of serious communicable diseases like HIV/AIDS and hepatitis. It seems that interventional measures are needed to improve the drug-prescribing patterns in these areas in the future. To overcome extensive Off-label usage , new approaches on the clinical investigation of medicinal products in children will encourage pharmaceutical companies that wish to introduce new products to investigate in children when clinically appropriate.
Changes should be made to encourage pharmaceutical companies to carry out clinical trials in children. These changes in regulations may improve knowledge for new products. Health professionals are concerned about the lack of information regarding the use of drugs in children are in a difficult situation. They need to raise awareness of the problem in society as a whole without causing undue anxiety among parents. To ensure that children are not exposed to unnecessary risks, controlled clinical trials are required to determine the most appropriate dose in children of different ages. By describing the volume of off-label drug use, the number of children affected by the use of particular drugs off-label, and the costs associated with off-label use. With greater cooperation between industry, academia, and government, necessary studies and extensive research could be carried out to ensure that the pediatric patient does not remain a “therapeutic orphan”.

CONCLUSION

This study provides few insights into the drug use patterns in pediatric department of the tertiary care teaching hospital. The assessment of WHO indicators helped to understand the prescribing pattern of various drugs used in paediatrics. The study revealed that polypharmacy and prescription by brand name were common. Use of ‘generic name’ in the prescriptions needs to be promoted. The encouraging data on the choice of drugs from EDL can go a long way in creating awareness and application of essential drug concept(s) and thus improving rationality. Better prescribing practices as suggested above would lead to improvement in quality of health care provided to children. Educational interventions towards improving prescribing practices are also required.Continuous medical education with a focus on rational drug use and evidence based medicine should form part of the program of the hospital. They should be involved in the collection and presentation of prescribing data as part of clinical audit and also the education of patients/caretakers.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

AED	- Antiepileptic Drugs
AIDS	- Acquired Immuno Deficiency Syndrome
BZD	- Benzodiazepine
CLB	- Clobazam
CLM	- Clonazepam
CRF	- Case Report Form
DOA	- Date of Admission
DOD	- Date of Discharge
DUR	- Drug Utilization Review
EDL	- Essential Drug List
FDA	- Food and Drug Administration
GP	- General Practitioner
GTCS	- Generalized Tonic- Clonic Convulsions
HIV	- Human Immuno deficiency Virus
IC	- Informed Consent
IV	- Intravenous

LRTI - Lower Respiratory Tract Infection
LMG - Lamotrigine
LVT - Levetiracetam
NLEM - National List of Essential Medicine
PHE - Phenobarbital
PHT - Phenytoin
SmPC - Summary of Product Characteristics
TPM - Topimerate
VPA - Sodium Valproate
WHO - World Health Organization

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