

Assessment of Drug Utilisation among paediatric patients At A Tertiary Carehospital – A Prospective observational Study

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ABSTRACT: **Introduction:** Paediatric pharmacology is a neglected area in terms of rational use of drugs. In paediatric patients there is a high chance of polypharmacy, signs of treatment failures, medication in adherence, medication errors, drug interactions, irrational use of drugs. The need of this research is to gain some insights into the role of the rationality rational use of drug in paediatric population. **Methodology:** This study was conducted at a tertiary care hospital. The records of all patients who meet the inclusion criteria were collected, screened and relevant data was extracted. **Results:** A total no. of 150 patients from the in-patient Department of Paediatrics. The majority age groups was found to be infants male patients. Enteric fever, Acute gastroenteritis, Viral fever, Respiratory distress syndrome are the more prominent illness found in the pediatric groups. Antibiotics, analgesics, antipyretics, multivitamins are widely prescribed. Drug related problems were interpreted. **Conclusion:** Drug related problems were monitored and there is a need to minimize the adverse effects and drug interactions. WHO core indicators were used to observe the prescribing pattern and the study reveals that poly-pharmacy and prescription of brand names were commonly observed. The results of this study will help in rationalizing drug use by decreasing medication errors and improving therapeutic outcome in pediatric patients. **Key words:** INRUD, DUE, ADR, DDD, PDD, WHO CORE INDICATORS.

I. INTRODUCTION:

Pediatrics is the specialty of medical science concerned with the physical, mental, and

social health of children from birth to young adulthood. Pediatric care encompasses a broad spectrum of health services ranging from preventive health care to the diagnosis and treatment of acute and chronic diseases.⁽⁷¹⁾

Drug Use Evaluation (Due): An ongoing, systematic, criteria-based program of medicine evaluations that will help ensure appropriate medicine use. If therapy is determined to be inappropriate, interventions with providers or patients will be necessary to optimize pharmaceutical therapy. This terminology is also known as that drug use review (DUR) and medication use review (MUR).⁽³⁷⁾

II. AIM & OBJECTIVES

Aim: To assess the drug utilisation among pediatric patients at a tertiary care hospital – a prospective observational study.

Objectives of the study: 1. To verify the prescribing patterns of the prescription. 2. To find out the cost of every unit of drug. 3. To find out whether the treatment is effective for that disease. 4. To properly check the doses prescribed to the children according to the body weight and standards. 5. To check the patient medication adherence. 6. To find any medication errors in the prescriptions. 7. To identify the drug-drug, drug-disease, drug-food interactions in the given treatment. 8. To predict the adverse drug reactions in the treatment plan prescribed to the patients. 9. To check the prevalence of pediatric diseases.

III. MATERIALS AND METHODS

Study Design: Study design used in the study is a hospital-based Prospective Observational Study.

Study Site: This study was conducted at a private pediatric hospital, tertiary care hospital in Narasaraopeta. The patients who visit this hospital are usually from in and around the districts of Guntur.

Study Period: The study was conducted over 6 months in a tertiary care hospital in a pediatric department. **Sample Size:** A total of 150 patients from the In-patient of the Department of Pediatrics those who fulfilled the exclusion and inclusion criteria were selected for the study.

Study Criteria: **Inclusion Criteria:** 1. The study

population must be between the age group of new born to 12 years. 2. The study population may be either male or female. 3. The patients must stay in the hospital for more than 24 hours. 4. Any kind of disease or disorder that is experienced by the study population is taken into account. **Exclusion Criteria:** 1. Patients above the age of 12 years. 2. Uncooperative and non-responding patients must be excluded. 3. Outpatients should not be taken into the account. 4. Immune compromised patients cannot be taken as study subjects. 5. Irrelevant categories in respective to our aim is precluded.

Ethical Approval: This study was approved by the Institutional Ethics Committee of Narasaraopeta Institute of Pharmaceutical Sciences, Narasaraopet.

IV. RESULTS

AGE GROUPS	NUMBER OF CASES (N=150)	PERCENTAGE (%)
Neonates (<28 days)	25	16.60%
Infants (0-12 months)	69	46%
Toddlers (1-3 yrs)	35	23.30%
Pre-School (3-5 yrs)	9	6.00%
Schoolage (6-10 yrs.)	8	5.30%
Adolescents (10-12 yrs.)	4	2.60%

Table: 4.1 Age Categorization in Study Population

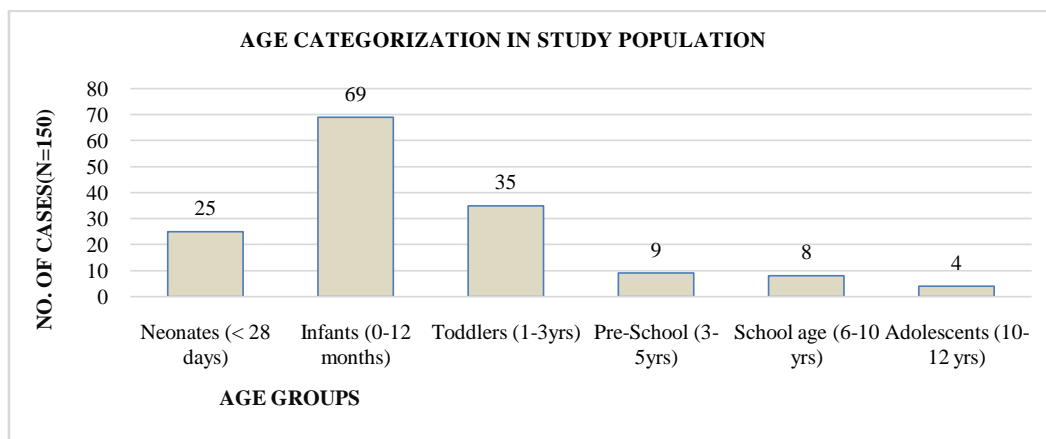


Figure: 4.1 Age Categorization in Study Population

S.no.	Disease	No of patients	Percentage (%)
1.	Enteric fever	20	13.3
2.	Acute Gastro Enteritis	16	10.6
3.	Viral fever	15	10
4.	RDS	14	9.3
5.	Seizures	10	6.6
6.	GI Abnormalities	10	6.6
7.	Acute febrile illness	9	6
8.	Bronchitis	8	5.3
9.	Cold Cough	5	3.3
10.	Hyaline membrane disease with sepsis	4	2.6
11.	Jaundice	4	2.6
12.	Nephrotic syndrome	4	2.6
13.	Viral Hepatitis	3	2
14.	Cystitis	3	2
15.	Meningitis	2	1.3
16.	Cholelithiasis	2	1.3
17.	Burn scald	2	1.3
18.	Atrial septal defects	2	1.3
19.	Others	17	11.3

Table: 4.2 Prevalence of Diseases

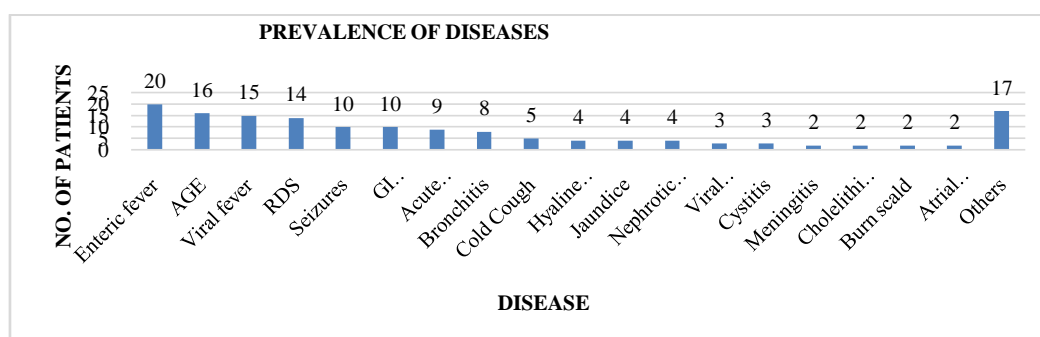


Figure: 4.2 Prevalence of Diseases

Most common pharmacological group (drug category)	No of patients	Percentage (%)
Antibiotics	130	86.6
Analgesics and antipyretics	121	80.6

Multivitamins and mineral supplements	89	59.3
Antihistamine	60	40
Gastric suppressants acid	52	34.6
Anti-diarrhoeal	50	33.3
Anti-emetic	40	26.6
Anti-convulsant	28	18.6
Anti-protozoal	28	18.6
Anti-malarial	26	17.3
Expectorant and bronchodilators	25	16.6
Corticosteroids	23	15.3
Nasal decongestants	20	13.3
Anti-viral	6	4
others	13	8.6

Table: 4.3 Most Common Drugs Prescribed

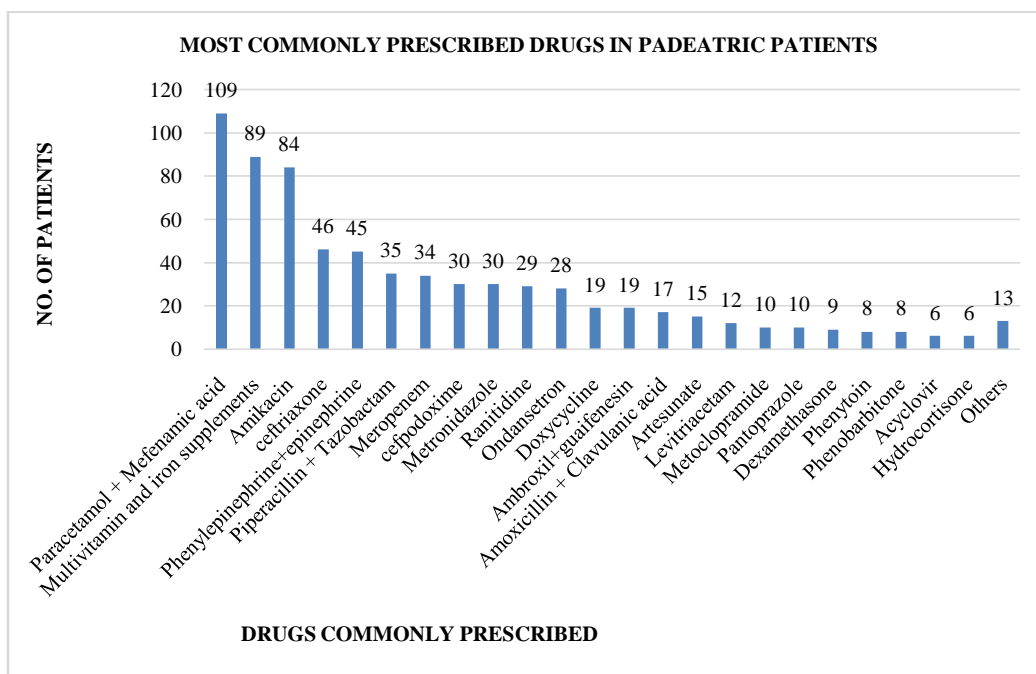


Figure: 4.3 Most Common Drugs Prescribed

DRUG THERAPY PROBLEMS	FREQUENCY (n=178)	PERCENTAGE (%)
Adverse Drug Reactions	70	39.30%

Drug Choice Problems		
Unnecessary	9	5.056%
Drug Therapy Therapeutic	3	1.68%
Duplication	2	1.12%
Contraindicated Drugs	3	1.68%
Untreated Indication	1	0.56%
Dosing Errors	18	10.11%
Over Dose	17	9.55%
Under Dose	1	0.56%
Drug Interactions	72	40.45%
Medication Errors		
Prescribing Unavailable	9	5.056%
Strengths Incorrect	6	3.37%
Frequency	3	1.68%

Table:4.4 Interpretation of Drug Therapy Problems

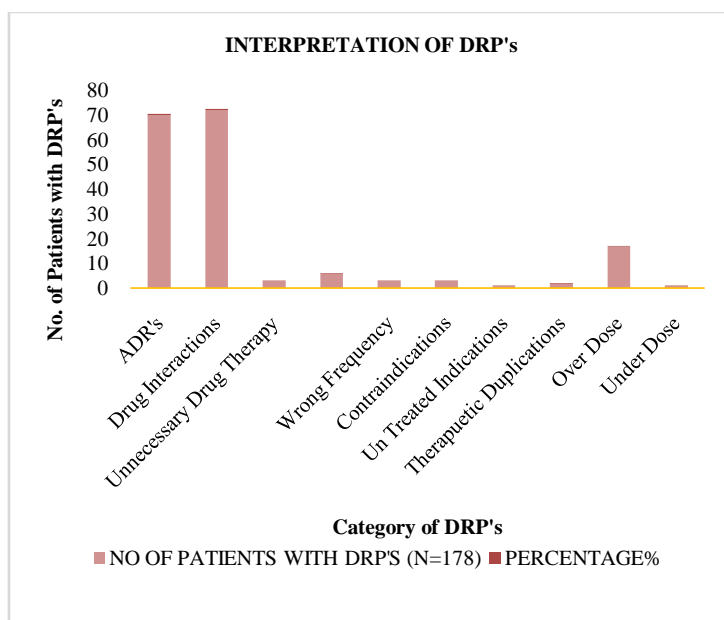


Figure:4.4 Interpretation of DRP'S

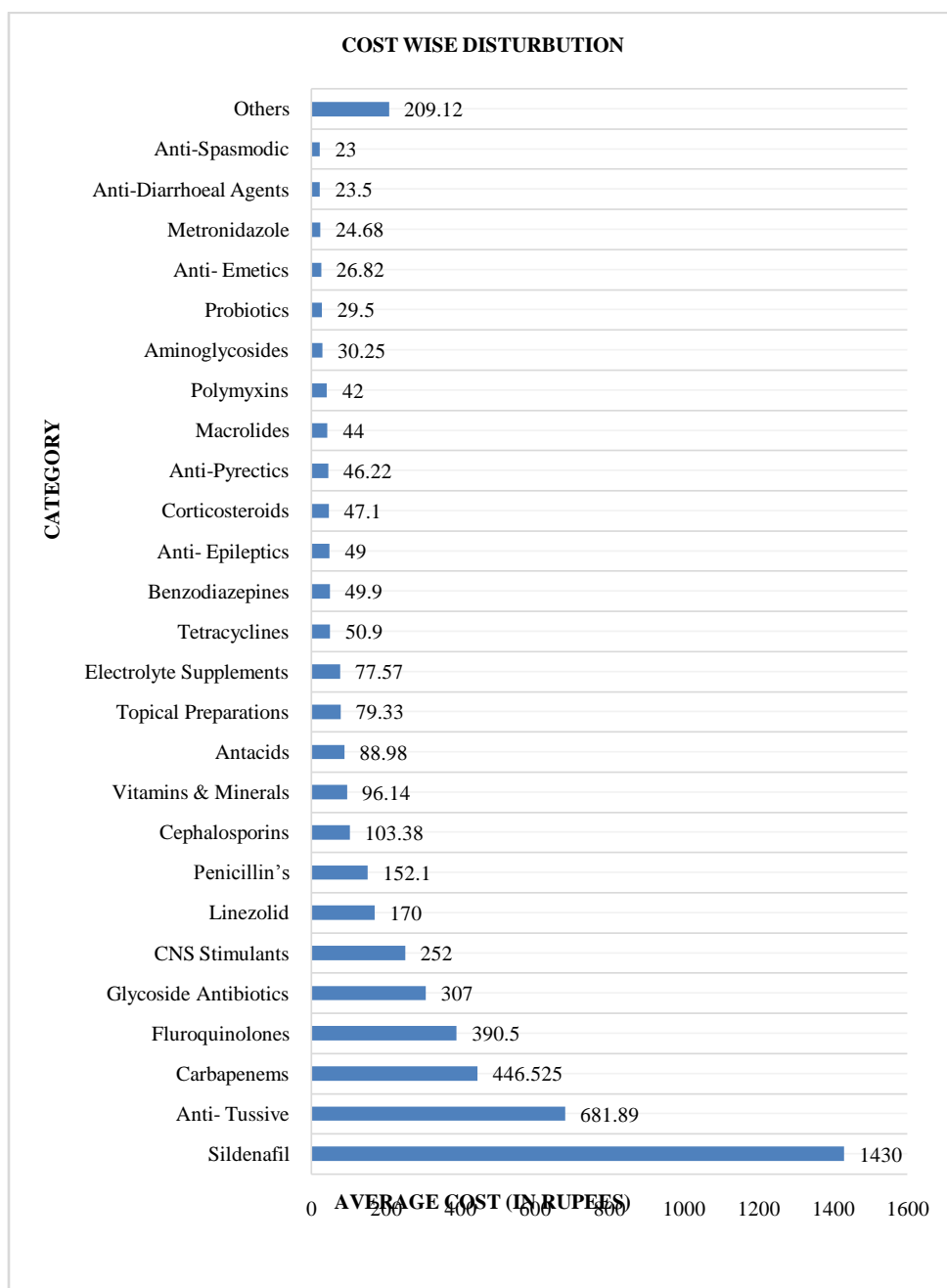


Figure: 4.5 Cost Wise Distribution

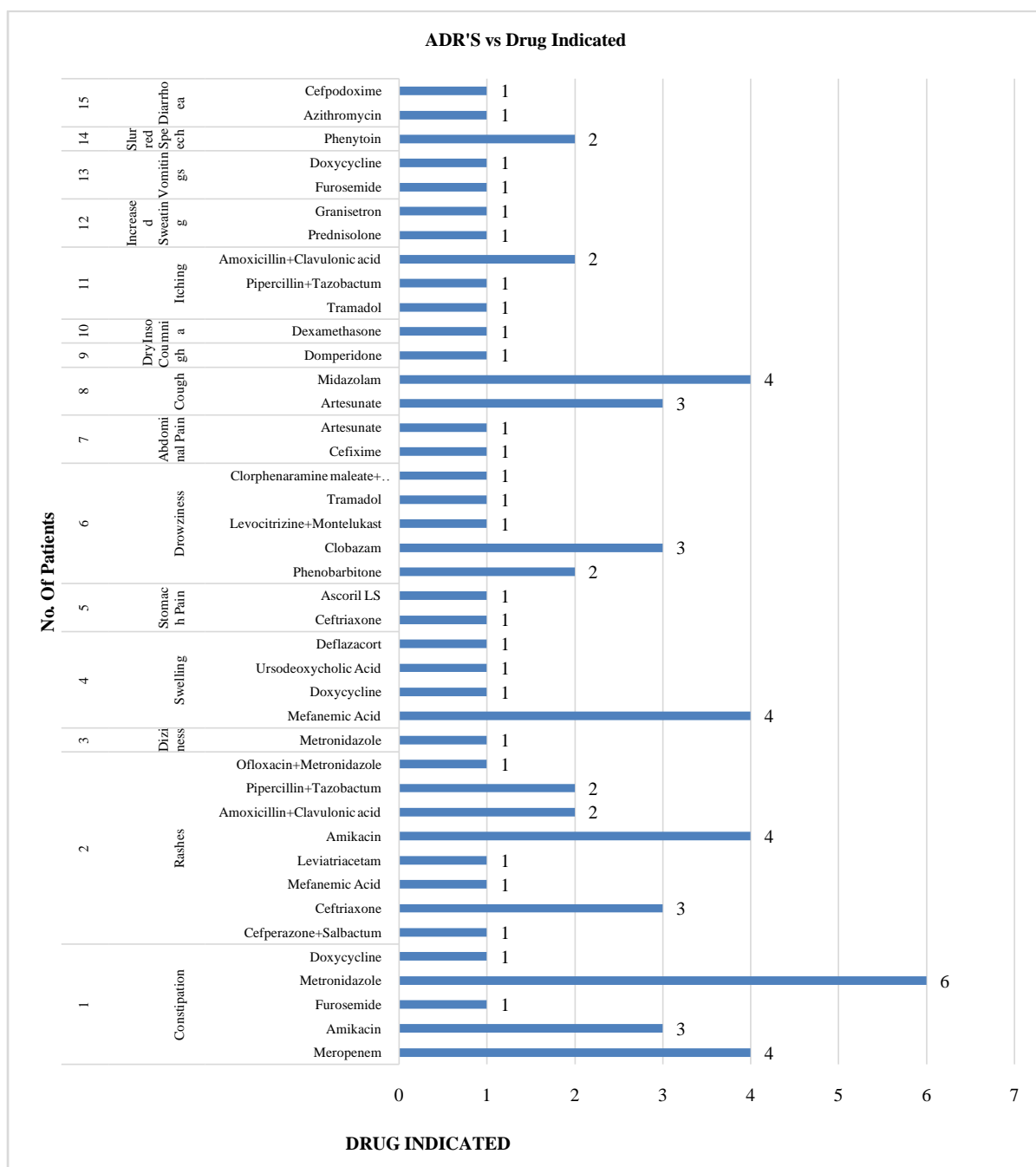


Figure:4.6ADR'svsDrug Indicate

Table: 4.5InterpretationofWHOcoreindicators

WHO DRUG USE INDICATORS:	AVG/PERCENTAGE
Prescribing indicators	
Average number of medicines prescribed per patient encounter	4.74
Percent medicines prescribed by generic name	42.19%

Percent encounters with an antibiotic prescribed	86.60%
Percent encounters with an injection prescribed	80%
Percent medicines prescribed from essential medicines list or formulary	20.11%
Patient-care indicators	
Average consultation time (minutes)	< 5 min
Average dispensing time (seconds)	9-10 min
Percent medicines actually dispensed	100%
Percent medicines adequately labelled	100%
Facility-specific indicators	
Availability of essential medicines list or formulary to practitioners	YES
Percent key medicines available	90%

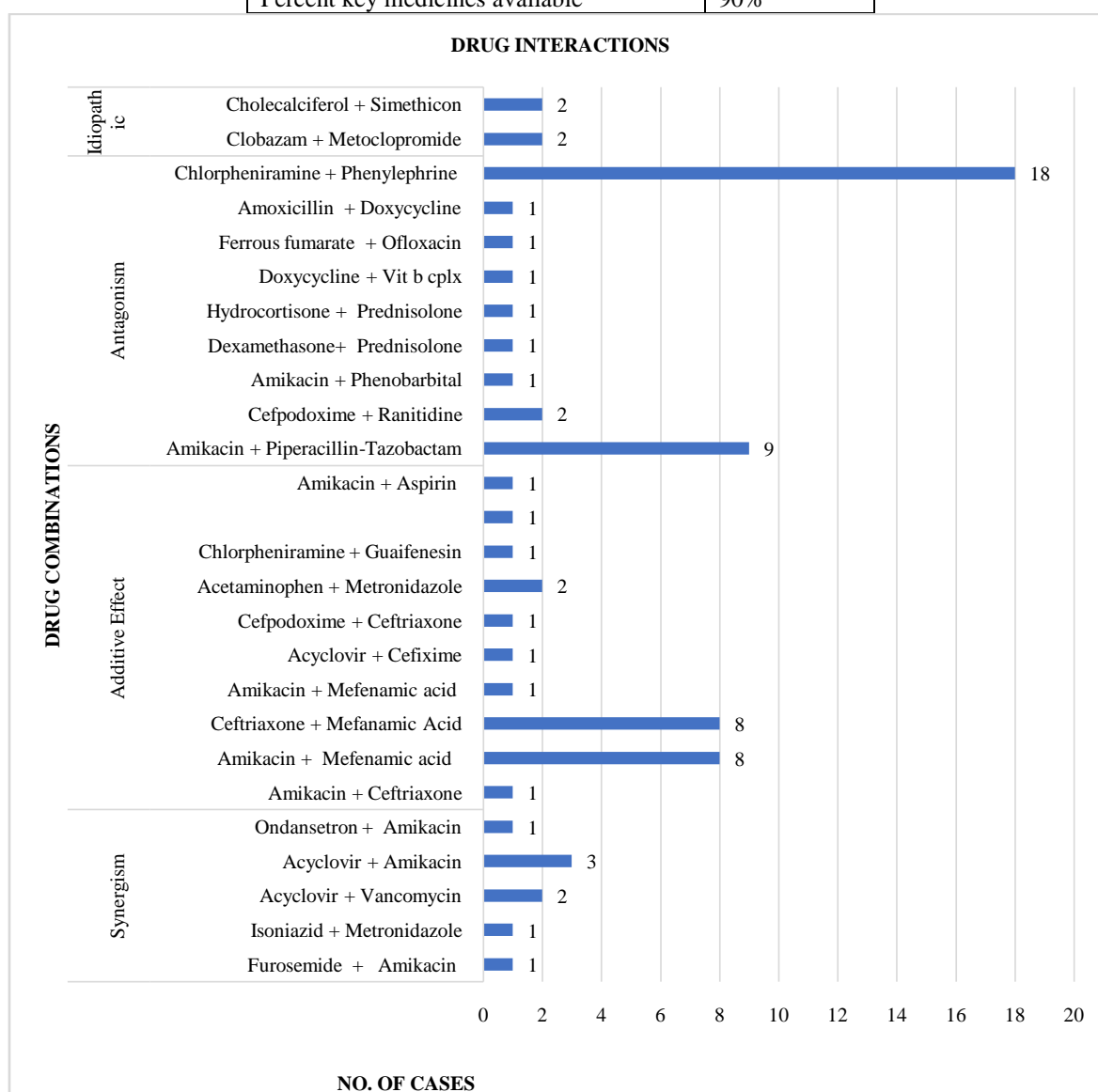


Figure:4.7DrugInteractions

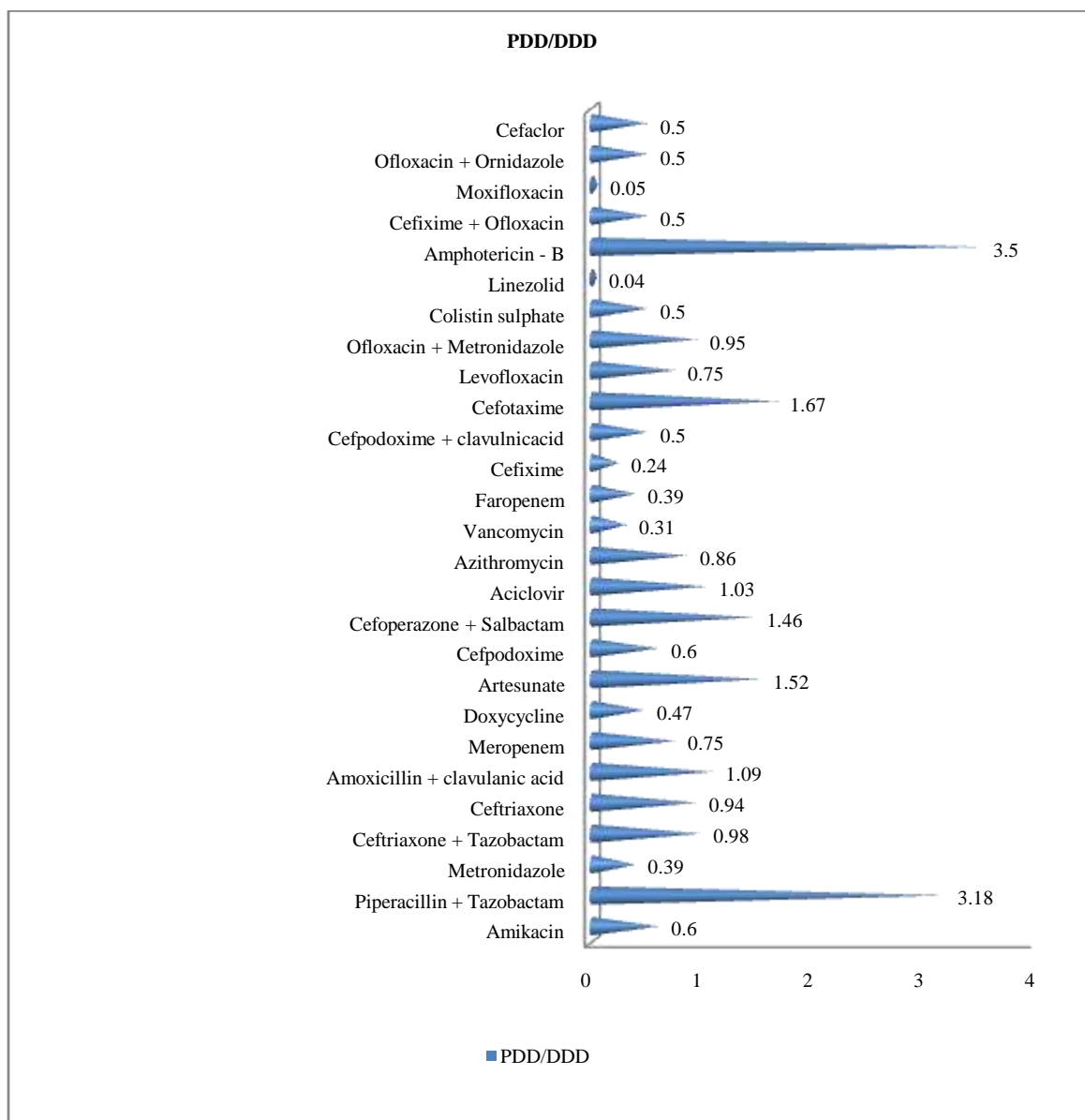


Figure.4.8 PDD/DDD ratio wise distribution

V. DISCUSSION:

The socio-demographic details of the patients revealed that the out of 150 study population, males (n=91) were admitted to the hospital more predominantly than the females(49) (n=59).Age wise distribution shows that infants were most admitted to the hospital and adolescents were least admitted respectively. (27) In this scenario the infants are more prone to diseases because of their prematurity and they are easily prone to diseases compared to adolescents. Enteric fever,

Acute gastroenteritis, Viral fever, Respiratory distress syndrome are the more prominent illness found in the pediatric groups. Atrial septal defects and cholelithiasis are less predominantly reported. In pediatrics hygiene and sanity are very poor this may increase the incidents of attacking the microorganisms fourfold in comparison with adults. (24) The most common pharmacological group or drug category prescribed was antibiotics and analgesics, antipyretics, multivitamins, are more commonly prescribed and nasal decongestants and anti-viral drugs are least

prescribed drugs. Diuretics, anti- cholinergic, anti-coagulants were also prescribed in lesser amounts. ⁽³⁰⁾Under the category of most commonly used drugs, the paracetamol-mefenamic acid combination ⁽²⁷⁾ was used in maximum of cases followed by amikacin and ceftriaxone. Starting from one drug to eight number of drugs prescribed for each prescription in this study, on an average four drugs were prescribed for each prescription encountered. Generally, minimum of one antibiotic were prescribed per encounter and combination 2,3,4 antibiotics were prescribed to the patients based on the condition of the patient. ⁽²⁹⁾ Drugs are double edged swords hence the benefit comes with an associated risk as follows. Monitoring for the drug related problems may maximize the rationality of the ongoing therapy. Drug Interactions, (Chlorpheniramine, Phenylephrine (n=18) combination prescribed in patients has reported major interaction than other drug interactions), Adverse Drug Reactions ⁽²⁴⁾ Rashes (n=17, 24.28%) is the major complaint reported in contrast to the other ADR's reported), Drug Choice Problems (49) (Unnecessary Drug Therapy, Therapeutic Duplication, Contraindicated Drugs, Untreated Indication), Dosing Errors (Over Dose, Under Dose), Medication Errors ⁽⁴⁹⁾ (Prescribing Unavailable Strengths, Incorrect Frequency). WHO core indicators were used for prescribing, patient care and facility indicators ⁽³²⁾. The therapy was shown to be rational, Drugs prescribed were in the form of generic drugs was less compared to branded drugs. Consulting time was seen to be an average of 5 min and hand writing was legible in majority of the cases. Prescriber was busy in his work schedule due to the over load hence patient interaction is less compared to other clinical settings. Off-label use was ⁽⁴⁹⁾ Only 3 drugs were prescribed there are Ondansetron (not approved for patients for less than 1 month), Doxycycline (not approved for patients less than 5 years (can be prescribed in serious illness)), Fluroquinolones (this drug category was not approved for prescribing in infants and adolescents.). The ideal range for the PDD/DDD ratio was found to be >1 (58). The ranges for the values don't cross the limits only piperacillin- tazobactam, amphotericin-B, cefotaxime was prescribed more than the referral range. ⁽⁸³⁾ Category wise distribution was and majority of the drugs was found to be in the limits, Phosphodiesterase enzyme Inhibitors were found to be costly and anti-spasmodic was found to be less costly. Cefaperazone-sulbactam combination bears higher cost Racecadotril+ Saccharomyces boulardii combination bears lesser cost. ⁽⁴⁹⁾ Therefore, from

the brief glimpse of our study, we found that drugs are prescribed based on the presenting complaint and antibiotic usage was irrational and may leads to resistance and there is no proper culture sensitivity tests for the drug usage in case of antibiotics. There is further more requirement for the monitoring of the drug therapy problems such as drug interactions and adverse reactions and dosing errors.

VI. CONCLUSION:

Assessment of drug utilization among pediatric patient at a tertiary care hospital was conducted, and the study revealed that out of 150 patients' males were more admitted in the hospital than females. Among them infants are more prone to diseases. In our study out of all the diseases enteric fever, viral fever, acute gastroenteritis, respiratory distress is majorly observed and they are prescribed mostly with drug category are antibiotics, analgesics, antipyretics. Majority of the patients received more than 4 drugs and as the patients were pediatric majority of drugs were prescribed as injections. Drug related problems were monitored and there is a need to minimize the adverse effects and drug interactions. WHO core indicators were used to observe the prescribing pattern and the study reveals that polypharmacy and prescription of brand name were commonly observed. Consulting time is less than 5 min which may lead to misdiagnosis or inappropriate prescription of drugs. The cost of the drugs was also high per patient. The PDD/DDD ratio of all the drugs was found to be less than 1. The antibiotic consumption was high in pediatric patients so there is a need to achieve appropriate use of antibiotics to prevent the risk of developing resistance to antibiotics. Use of generic name in prescription needs to be promoted. Consulting time has to be increased to avoid any kind of errors. The results of this study will help in rationalizing drug use by decreasing medication errors and improving therapeutic outcome in pediatric patients. As the sample size is small and sample distribution is also not even as it is only from few area of city. Further studies have to be conducted in more clinical setups and with large sample size for getting more accurate reports for decision making.

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