STUDY OF RATIONAL DRUG PRESCRIBING PATTERN FOR RESPIRATORY TRACT INFECTION IN PEDIATRICS IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: In developing countries Respiratory tract infections are the major cause of morbidity and mortality in pediatric population. There is polypharmacy, over use and also inappropriate use of antibiotics without culture sensitivity test worldwide. The present study was conducted to study the rational prescribing pattern of respiratory tract infections. **Objective:** To evaluate the prescribing pattern of drugs in respiratory tract infection in paediatrics. **Methods**: This reterospective study was conducted for a period of six months in a hospital for paediatric inpatients. **Results:** A total of 150 cases were studied. Male 96(64%), Female 54(36%). Age wise distribution was done 0-30 days 3(2%), 1-12 months38 (25.3%), 1-14 years 109(73%). Out of 150 cases the most commonly prescribed category of drugs was antibiotics(19.06%). In this study, the highly prescribed category of antibiotics were penicillins106(38.12%), followed by betalactum antibiotics 101(36.33%). In our study it was observed that 21.05% of the cases were treated with single antibiotic therapy, 60.9% of the cases were treated with 2 drug antibiotic therapy.15.7% of the cases were treated with 3 drug combination of antibiotics and 2.25% cases were treated with four drug combination of antibiotics. **Conclusion**: In above study the prescription pattern of antibiotics is not rational as there is polypharmacy, over use and also inappropriate use of antibiotics without culture sensitivity test. There is a need of educational programmes in order to bring up the rational use of antibiotics and make prescribers to follow standard antibiotic prescribing guidelines for Respiratory tract infections.

KEYWORDS: Polypharmacy, penicillins, pediatric.

INRODUCTION

Pediatrics: It deals with the study of medical care in infants, adolescents and children.

Respiratory tract infection is defined as any number of infectious diseases that involves the respiratory tract. The respiratory tract infection can be classified into upper respiratory tract infection and lower respiratory tract infection. The lower respiratory tract infection are one of the leading causes of death in children below 5 years of age.[1]

Respiratory tract infections worldwide are associated with morbidity and mortality in pediatrics patients.[2] Respiratory tract infections are recurrent especially in the young children. In developed countries, 25% of the children below the age of age of 1year is affected. In the age group of 1-4 years, 18% of children are affected.[3] Respiratory tract infections are the leading cause of childhood mortality in the developing countries resulting in over 2 million deaths per year.[4,5]

Pediatric respiratory tract infection can result in frequent complications due to which multiple medical visits are necessary.[6]

In developed countries, despite the availability of healthcare respiratory tract infections have become a tremendous clinical and economic burden. Recurrent pediatrics respiratory tract infections globally has made it difficult for the patient families and it has become a clinical challenge for treating physicians.[7]

In pediatric patients antibiotics are the most preferred category of drug for treatment of respiratory tract infection.

The prevalence of respiratory tract infections is increasing and polypharmacy is common mostly in children. Hence there is a need to monitor the dosing of drugs in those patient to avoid the adverse effects, antibiotic resistance, reduce the length of stay in the hospital and to control unnecessary cost of medication.

METHODOLOY

6.1 Aim

To evaluate prescribing pattern of drugs on respiratory tract infection in paediatric.

OBJECTIVES OF STUDY

The objective of present study are:

Primary objective

To evaluate drug prescribing pattern for respiratory tract infection in paediatric.

Secondary objective

- To access the prescribing pattern of drugs in respiratory tract infection in paediatric.
- To correlate association of respiratory tract infection with demographic details of patients.
- To access the co-morbidities associated with respiratory tract infection and treatment given.
- To asses the safe use of drugs in patients
- To evaluate most preferred category of drugs used for treatment of respiratory tract infections in patients

Duration of Study

The study will be conducted for a period of six months.

Site of Study

The study will be conducted at Sapthagiri general Hospital.

Studydesign

A hospital based prospective observational study.

Sources of Data Andmaterials

Patient case sheet Laboratory data reports Medication / treatment chart

Suitable design documentation form

Study criteria

Inclusion criteria

Prescriptions from all respiratory tract infection patients of either gender of paediatrics are included.

Exclusion Criteria

Prescriptions from psychiatric patients, outpatients and patients above the age of 14 are excluded.

Method of Datacollection

i. Data collectionform

Data will be collected by using a self-designed data collection form, which consists of details like patient demographics, laboratory data, drug therapy and other relevant information.

ii. Patient MedicalRecord

Data will be collected from Patient Medical Record which comprised of patient demographics, history of patient, general physical examination, laboratory data, and drug therapy.

Study Procedure

This is a prospective observational study,the patients who are satisfying the inclusion criteria will be enrolled into the study with the help of patient consent form. The clinical pharmacist will review the patient case notes, medication chart, laboratory data and other prevalent data.

A structured data collection form will be used to record all the necessary data including patient demographic details, patient medication history, co morbid conditions and reason for admission, medication details and lab investigation. The pattern of drug dosing will be recorded.

Statistical Analysis

Statistical analysis was performed using MSexcel and the result was statistically analysed using appropriate statistical method (MSexcel).

RESULTS

Gender Wise Distribution

Gender	Number of patients	Percentage
Male	96	64%
Female	54	36%
Total	150	100%
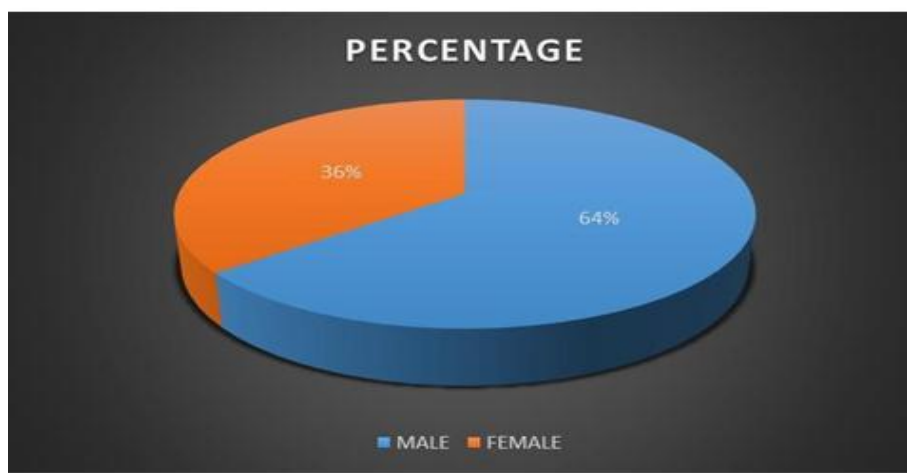
Conclusion: Out of 150 patients included in this study, 96(64%) patients were male and 54(36%) patients were female. The number of male was comparatively high.

Age Wise Distribution

Age	Number of patients	Percentage
0-30 Days(Neonates)	3	2%
1-12 Months(Infants)	38	25.3%
1-14 Years(children)	109	73%
Total number of patients	150	100%
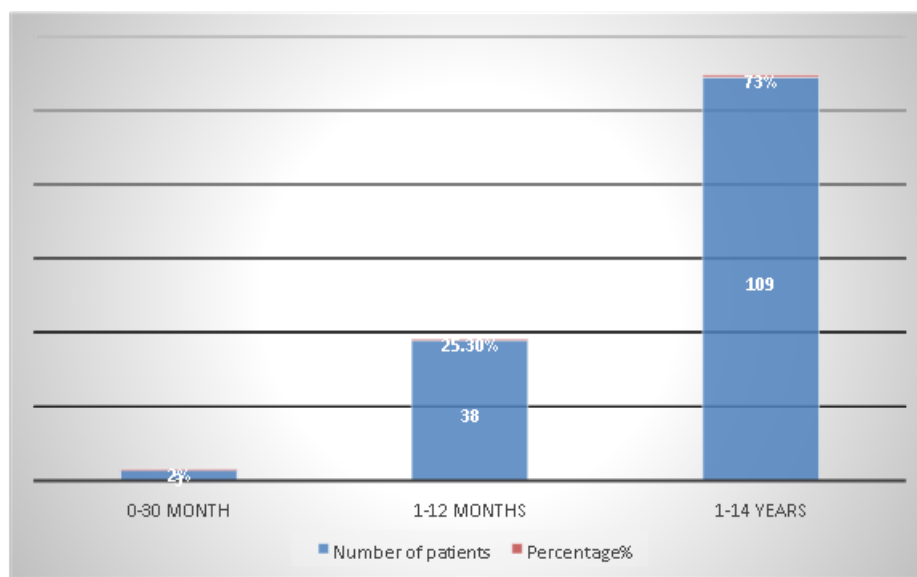
Conclusion: Out of 150 cases of pediatric patients, 3(2%) were neonates, 38(25.3%) were infants, 109(73%) were children, patient within the age of 1-14 years 109(73%) are found to be more.

Age Wise Distribution of Diseases

Age	Lrti	Urti	Pneumonia	Bronchiolitis	Total
NEONATES	1	0	0	2	3
INFANTS	9	9	10	10	38
CHILDREN	55	19	31	4	109
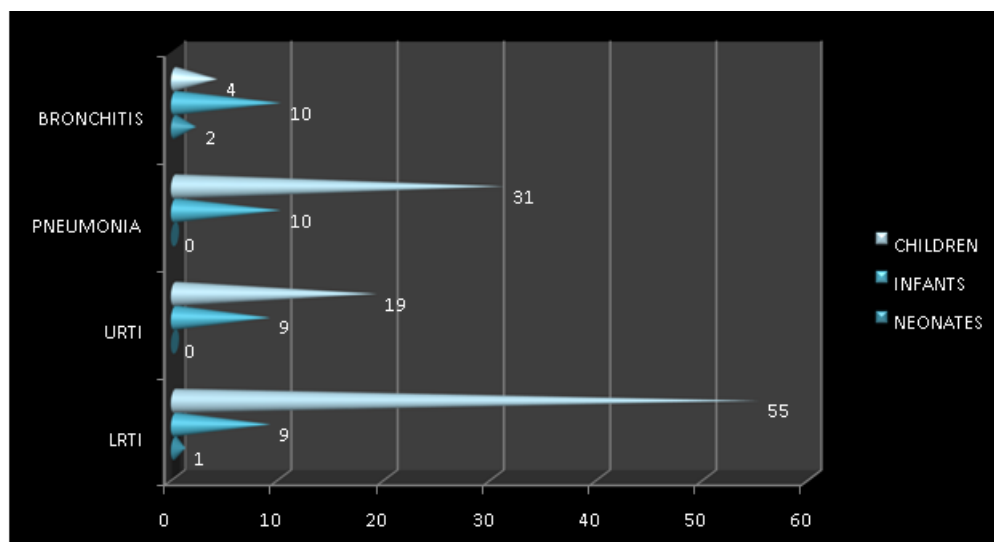
Result: In the neonates (0-30 days) there is one case of LRTI and 2 cases of bronchiolitis. In infants (1-12months) there are 9 cases of LRTI, 9 cases of urti, 10 cases of pneumonia and 10 cases of bronchiolitis. In children (1-14years) there are 55 cases of LRTI, 19 cases of URTI, 31 cases of pneumonia and 4 cases of bronchiolitis.
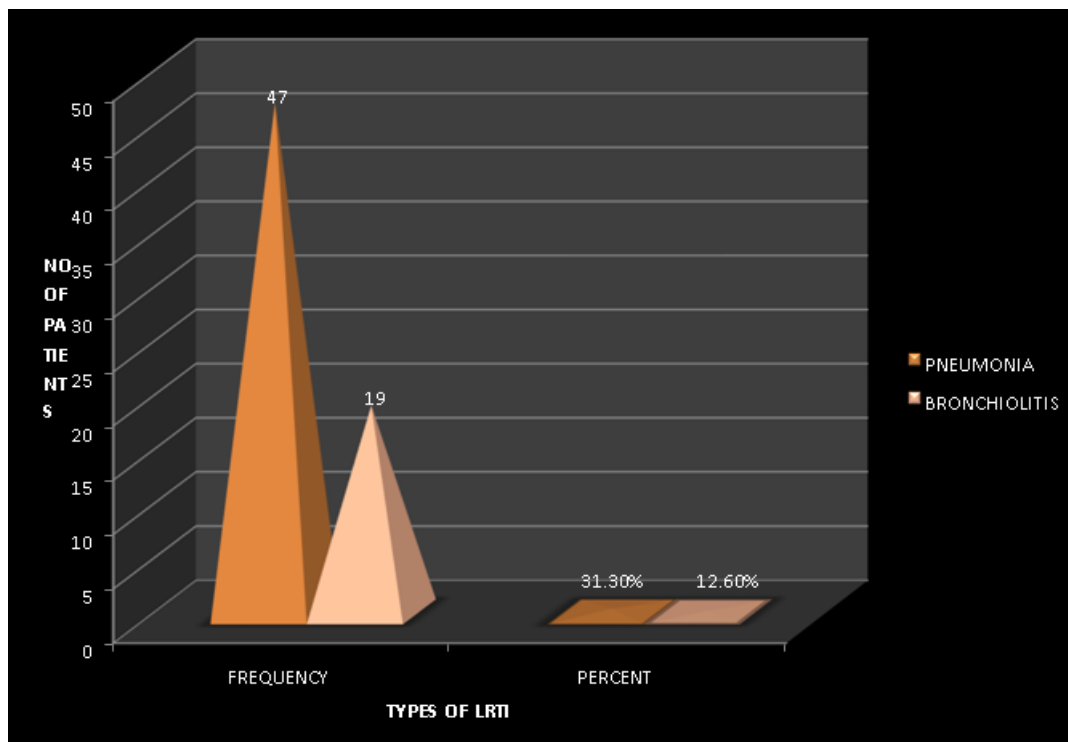
Diagnosis of Diseases

Diseases	Frequency	Percent
LRTI	116	77.3%
URTI	34	22.6%
TOTAL	150	100%
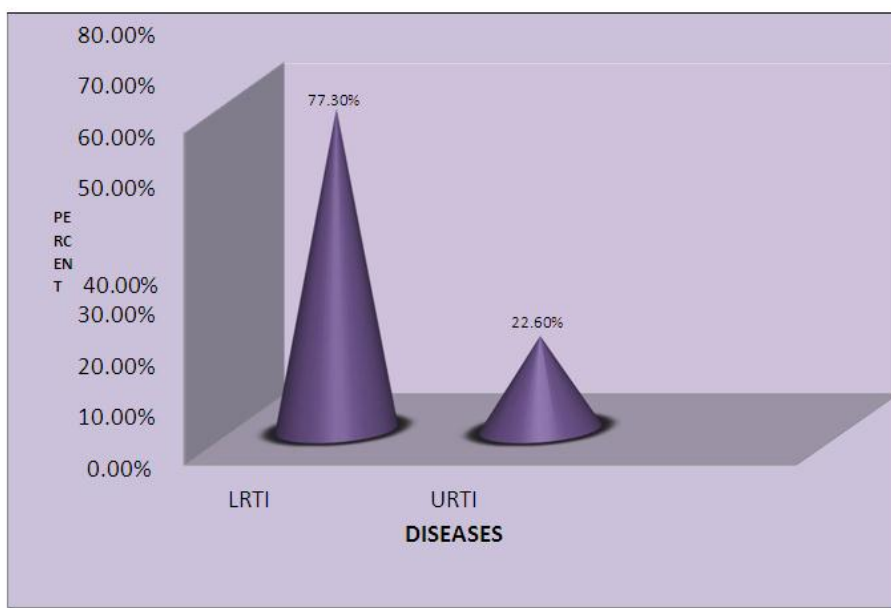
Result: A total of 150 cases were studied and it is found that 77.3% of the population is suffering from LRTI and 22.6% was found to be suffering from URTI.
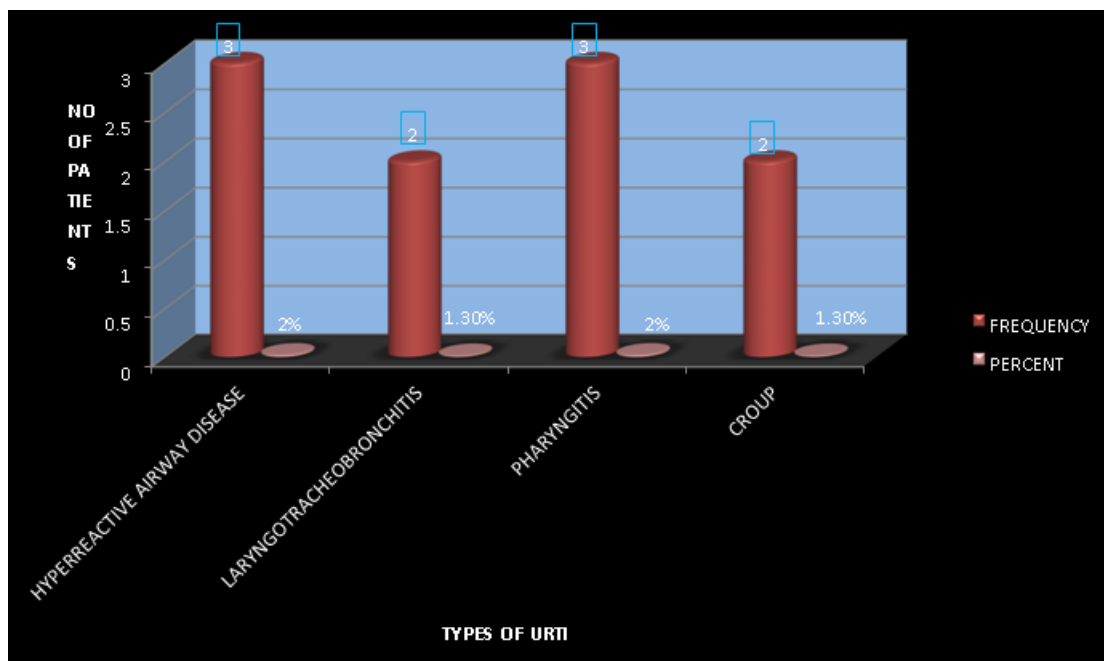
Types of Lrti And Urti

Types of lrti	Frequency	Percent
Pneumonia	47	31.3%
Bronchiolitis	19	12.6%

Result: The different types of LRTI are pneumonia and bronchiolitis, 31.2% of the population suffers from pneumonia and 12.6% had bronchiolitis.

Types of urti	Frequency	Percent
Hyperreactive Airway Disease	3	2%
Laryngotracheobronchitis	2	1.3%
Pharyngitis	3	2%
Croup	2	1.3%

Result: The different types of URTI include Hyperreactive Airway Disease(2%), Laryngotracheobronchitis (1.3%), Pharyngitis (2%), CROUP (1.3%).
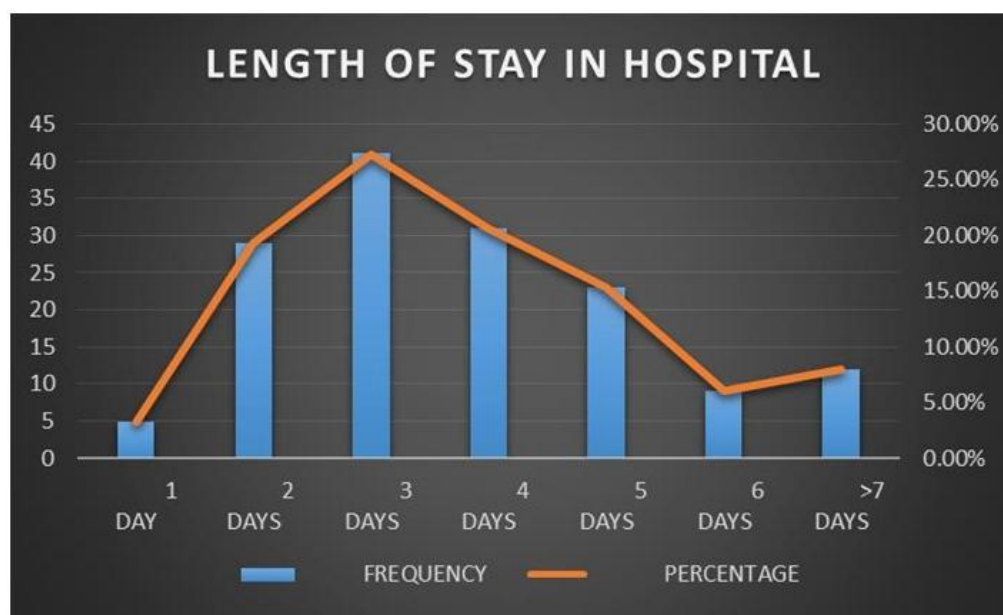
**LRTI: lower respiratory tract infection

URTI: upper respiratory tract infection

Duration of Hospital Stay of Patients

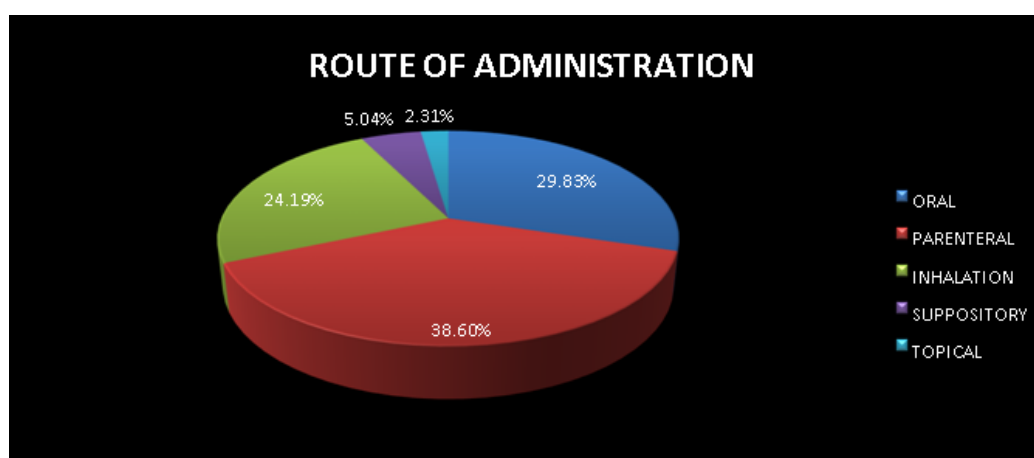| DAYS	Frequency	Percentage
1 DAY	5	3.33%
2 DAYS	29	19.33%
3 DAYS	41	27.33%
4 DAYS	31	20.66%
5 DAYS	23	15.33%
6 DAYS	9	6.00%
>7 DAYS	12	8.00%
TOTAL	150	100%

Conclusion: Length of stay in hospital in above study ranges from 1 day to 7 days and most number of patients is treated in hospital for 3 days with (27.33%) followed by 4 days (20.66%), 2 days (19.33%), 5 days(15.33%), more than 7 days (8.0%), 6 days(6.00%) and 1 day with (3.33%) of patients.

Route of Administration

Route of administration	Frequency	Percent
ORAL	296	29.83%
PARENTERAL	383	38.6%
INHALATION	240	24.19%
SUPPOSITORY	50	5.04%
TOPICAL	23	2.31%

Conclusion: Most of the antibiotics were administered through parenteral route of administration (38.6%) followed by oral dosage form (29.83%), inhalation, suppository and topical.

Category of Drugs Prescribed

| Category of drugs	Frequency	Percent
Antiemetic	21	2.14%
Antipyretic	157	16%
Bronchodialator	125	12.74%
Corticosteroid	61	6.21%
Antibiotic	187	19.06%
Expectorant	77	7.84%
Supplement	35	3.56%
Analgesic	2	0.20%
Anticholinergic	2	0.20%
Proton pump Inhibitor	37	3.77%
Antihistamine	31	3.16%
Antiepileptic	4	0.40%
Laxative	7	0.71%
Adrenaline	24	2.44%
Intravenous fluids	103	10.49%
Antidiarrheal	2	0.20%
Antihypertensive	4	0.40%
Nasal saline	102	10.39%
Total	981	100%
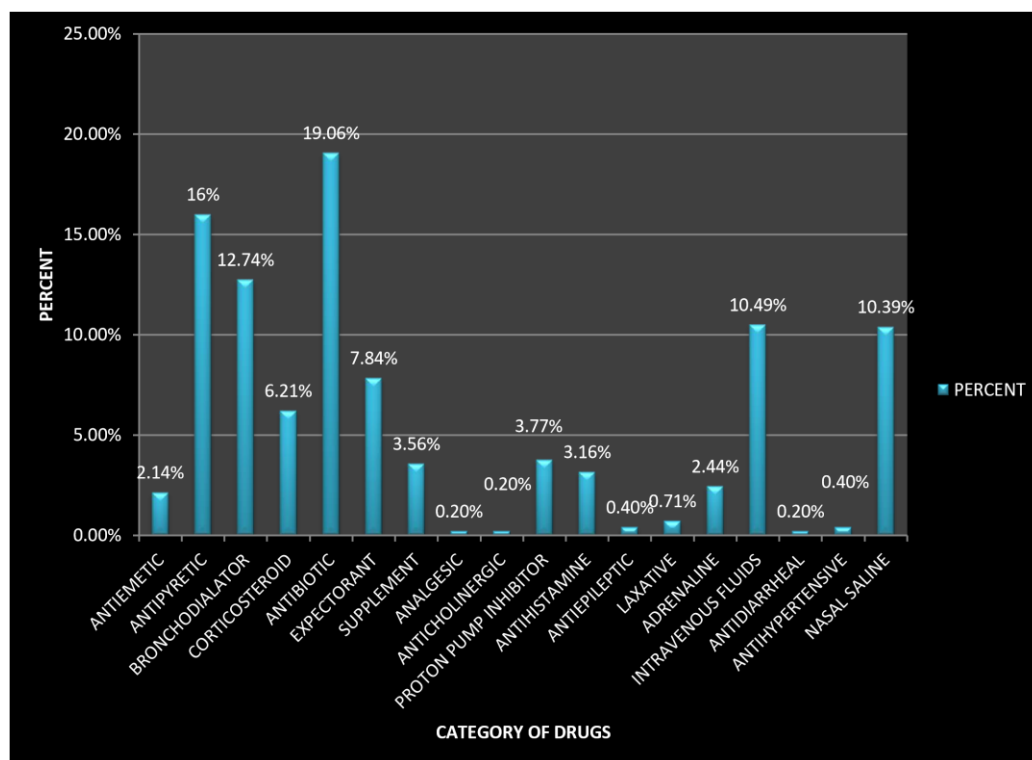
Conclusion: Out of the 981 drugs prescribed, the most commonly prescribed category of drug is antibiotics(19.06%) followed by antipyretics(16%), bronchodilator(12.74%), IV fluids, nasal saline, expectorant, corticosteroid.

Reasons for Admission

Out of 150 cases of respiratory tract infection, the most common symptom was cold (28.8%). Others are fever 117(25.54%), cold 67(4.62%), wheeze 39(8.515%), loose stools 21(4.6%), vomiting 23(5%), cough with sputum 15(3.3%), breathlessness 11(2.4%), running nose 8(1.74%), chills 7(1.52%), pain in abdomen 7(1.52%), burning micturition 4(1%).

Reasons for admission	Number Of Patients	Percentage
Cold	67	14.62%
Cough	132	28.82%
Fever	117	25.54%
Vomiting	23	5%
Seizure	4	1%
Wheeze	39	8.51%
Loose stools	21	4.6%
Cough with sputum	15	3.3%
Breathlessness	11	2.4%
Running nose	8	1.74%
chills	7	1.52%
corzya	3	1%
Pain in abdomen	7	1.52%
Burning micturition	4	1%
TOTAL	458	100%
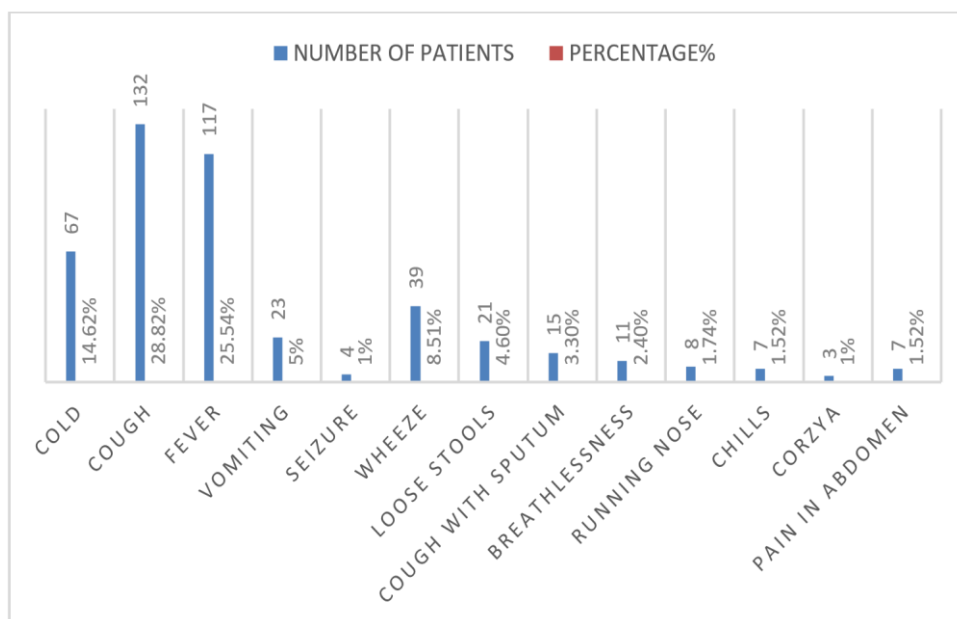
Comorbidities

| Co-morbidities	Number of patients	Percentage %
Malnutrition	5	19.2%
CHD	1	3.9%
Acute gastro enteritis	13	50%
UTI	6	23%
Seizure	1	3.84%
Total	26	100%
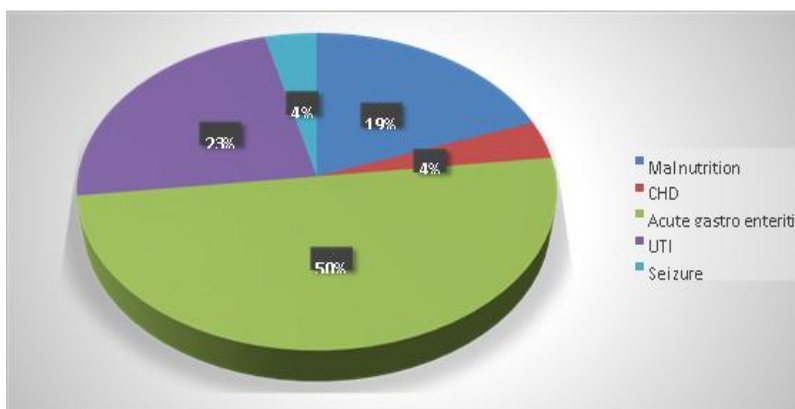
Conclusion: Out of 150 cases of respiratory tract infection in pediatrics, the comorbidities found was malnutrition 5(19.2%), CHD 1(3.90%), Acute gastritis 13(50%), UTI 6(23%), seizure 1(3.84%) among this acute gastritis was found to be more 13 (50%).

Clasifications of Antibiotics Prescribed: Different classes of Antibiotics used in following study of 150 cases of pediatric Respiratory tract infections are.

Penicillins, cephalosporins, Betalactums, Glycopeptides, Aminoglycosides, tetracyclins and Macrolides.

Classification of antibiotics	Frequency	Percentage
PENICILLINS	106	38.12%
CEPHALOSPORINS	36	12.94%
BETALACTUM	101	36.33%
GLYCOPEPTIDES	1	0.35%
AMINOGLYCOSIDES	18	6.47%
TETRACYCLINS	1	0.35%
MACROLIDES	14	5.03%
TOTAL	**278**	**100%**

CLASSIFICATION OF ANTIBIOTICS PRESCRIBED
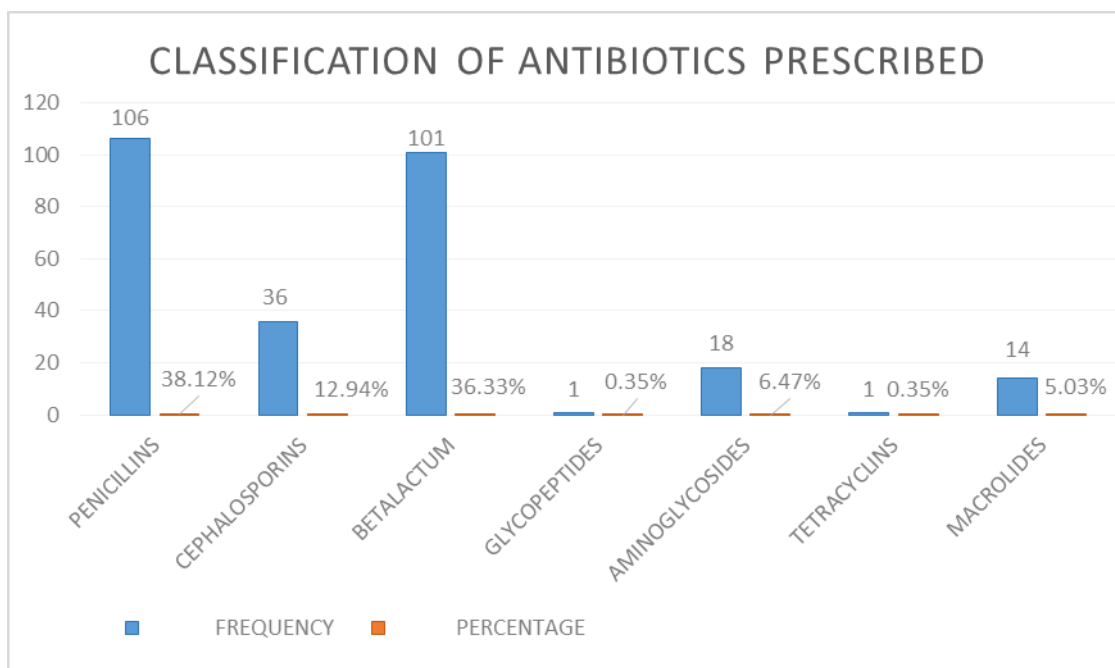
Conclusion: In above study, Antibiotics of class penicillin (Amoxicillin, Ampicillin and piperacillin) and Betalactum(clavulanic acid and tazobactum) are widely used in treating respiratory tract infections with 38.12% and 36.33% cases, followed by Cephalosporins (12.94%), Aminoglycosides(6.47%), Macrolides(5.03%), Glycopeptides and Tetracyclins (0.53%).

Sub classifications of antibiotics

Classification of antibiotics	Sub Classifications Of antibiotics	Frequency	Percentage
PENICILLINS	AMOXICILLIN	100	94.33%
	AMPICILLIN	5	4.71%
	PIPERACILLIN	1	0.94%
CEPHALOSPORINS	CEFTRIAXONE	28	77.77%
	CEFOTAXIME	8	22.22%
BETALACTUM	CLAVULANIC ACID	100	99.00%
	TAZOBACTUM	1	0.99%
GLYCOPEPTIDES	VANCOMYCIN	1	100%
AMINOGLYCOSIDES	AMIKACIN	18	100%
TETRACYCLINE	DOXYCYCLINE	1	100%
MACROLIDES	AZITHROMYCIN	13	92.85%
	ERYTHROMYCIN	1	7.14%

SUBCLASSES OF ANTIBIOTICS PRESCRIBED
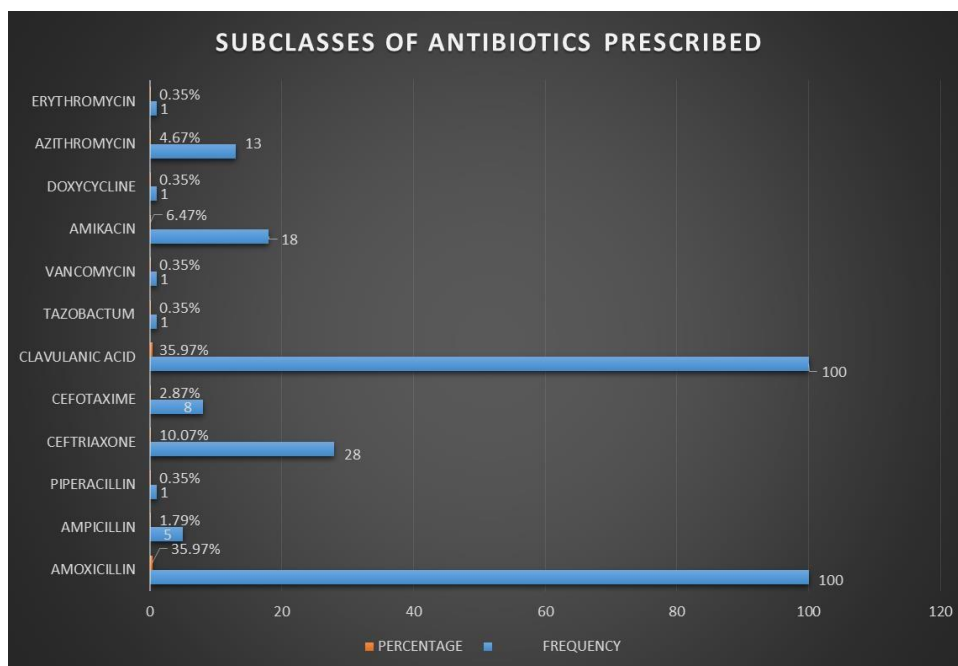
Conclusion: Among the subclasses of Antibiotics Amoxicillin and clavulanic acid combination is widely used to treat respiratory tract infection in above study of 150 cases with(35.97%) followed by Ceftriaxone (10.07%), Amikacin (6.47%), Azithromycin (4.67%), Cefotaxime (2.87%), Ampicillin (1.79%) and Erythromycin, Vancomycin, Doxycycline, piperacillin with 0.35%

**Prescribing Pattern of Antibiotics In Lowerrespiratory Tract Infection**

No. of drugs	Name of drug	Frequency	Percentage
ONE DRUG	Ceftriaxone	10	19.67%
	Doxycycline	1	
	Ampicilline	1	
TWO DRUGS	Amoxicillin+clavulinic Acid	38	72.13%
	Piperacillin+amikacin	2	
	Ampicillin+azithromycin	1	
	Ampicillin+ceftriaxone	1	
	Azithromycin+ceftriaxone	1	
	Ceftriaxone+vancomycin	1	
THREE DRUGS	Amoxicillin+clavulinic Acid+azithromycin	1	8.19%
	Amoxicillin+clavulinic Acid+amikacin	3	
	Amoxicillin+clavulinic Acid+levofloxacin	1	
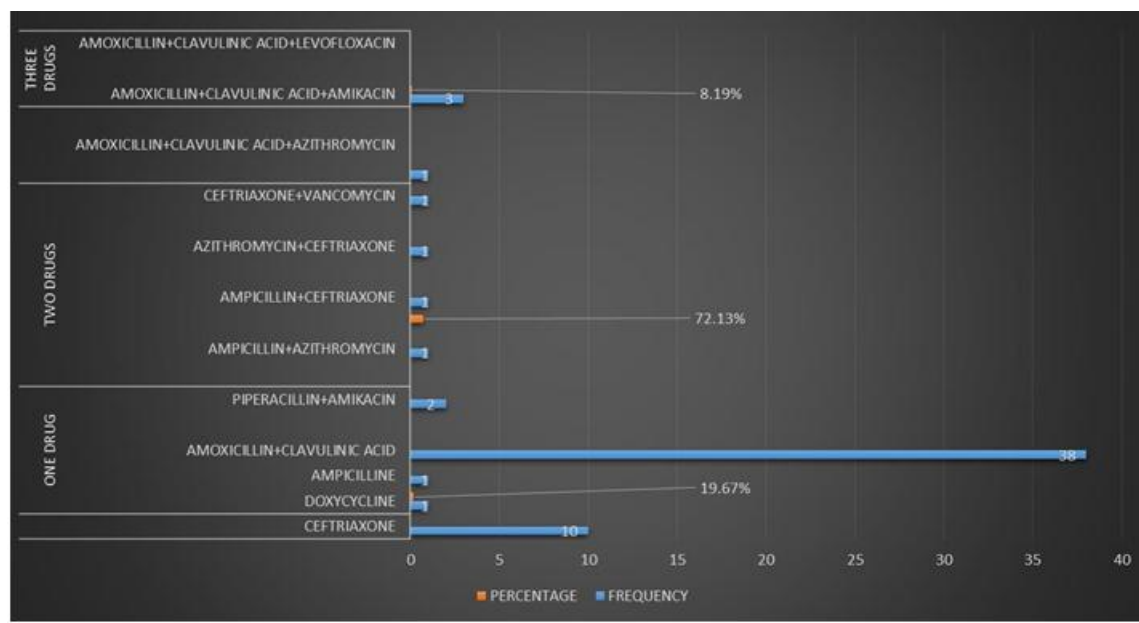
Conclusion: In a study of Lower respiratory Tract Infection in paediatric out of 61 cases with LRTI 13 (19.67%) patients are treated with single antibiotic, 44(72.13%) patients are treated with two antibiotics and 5 (8.19%) patients are treated with 3 antibiotics.

Prescribing Pattern of Antibiotics In Upperrespiratory Tract Infection

| No. of drugs	Name of drug	Frequency	Percentage
ONE DRUG	CEFTRIAXONE	1	10%
	AZITHROMYCIN	1	
TWO DRUGS	AMOXICILLIN+CLAVULANIC ACID	13	65%
THREE DRUGS	AMOXICILLIN+CLAVULANIC ACID+CEFTRIAXONE	2	25%
	CEFOTAXIM+AZITHROMYCIN+AMIKACIN	3	
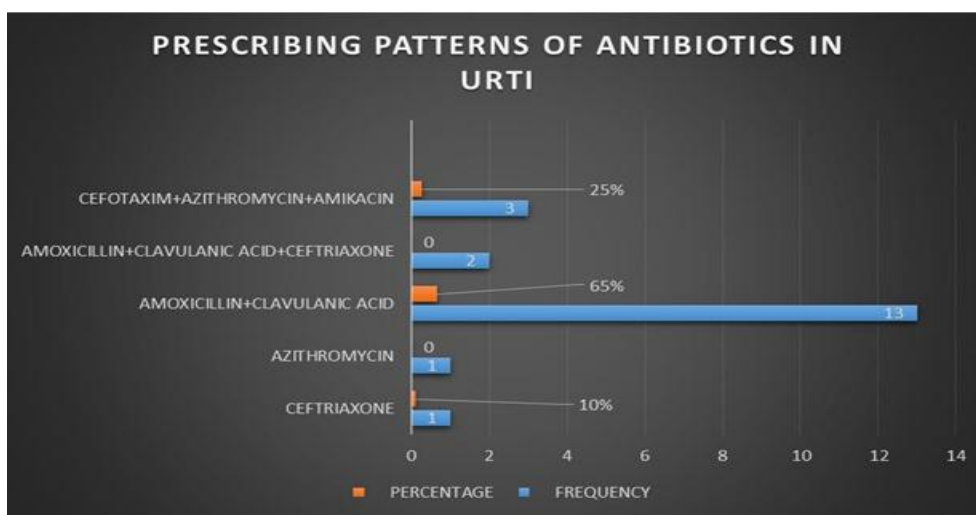
Conclusion

In a study of Upper respiratory Tract Infection in paediatric, out of 20 cases with URTI 2 (10%) patients are treated with single Antibiotic,13 (65%) patients are treated with two antibiotics and 5 (25%) patients are treated with three Antibiotics.

Prescription Pattern of Bronchiolitis

| DRUG THERAPY	ANTIBIOTICS	No OF PATIENTS	PERCENT
ONE DRUG	AMIKACIN	2	20%
	CEFTRIAXONE	1	10%
	CEFOTAXIME	1	10%
TWO DRUG	AMOXICILLIN +CLAVULANIC ACID	4	40%
THREE DRUG	AMOXICILLIN +CLAVULANIC ACID+AZITHROMYCIN	2	20%
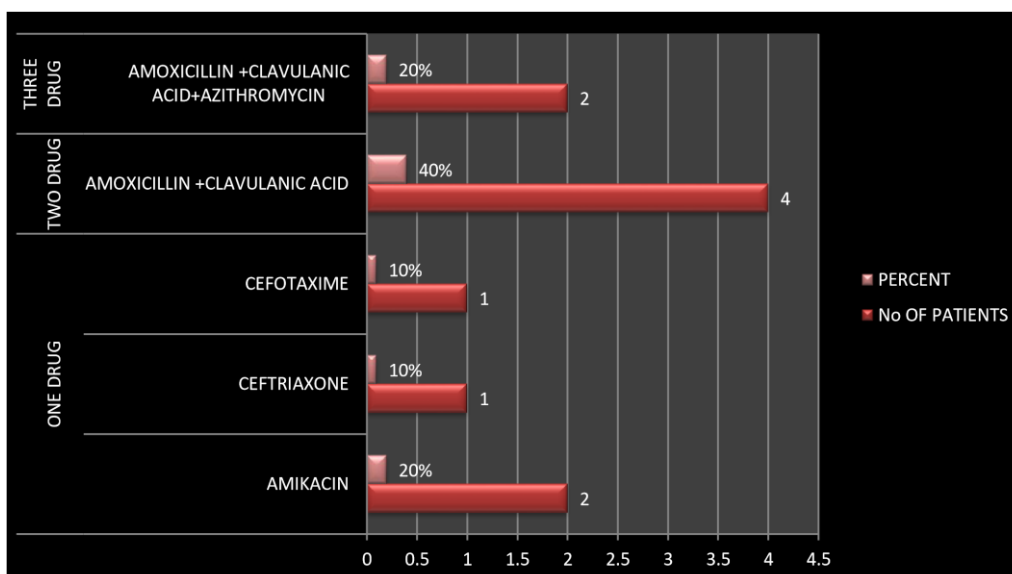
Result

In the study of prescribing pattern of bronchiolitis, 40% of the patients were treated with single antibiotic, 40% were treated by two antibiotics and 20% were treated by three antibiotics.

Prescription Pattern of Pneumonia

Drug therapy	Antibiotics	No of patients	Percent
ONE DRUG	CEFTRIAXONE	8	19.04%
	CEFOTAXIME	1	2.38%
	AMPICILLIN	1	2.38%
TWO DRUG	AMOXICILLIN +CLAVULANIC ACID	19	45.23%
	CEFTRIAXONE+ AMIKACIN	1	2.38%
THREE DRUG	CEFOTAXIME+ AMOXICILLIN +CLAVULANIC ACID	2	4.76%
	AMOXICILLIN +CLAVULANIC ACID+ AMIKACIN	5	11.90%
	AMOXICILLIN +CLAVULANIC ACID+ CEFTRIAXONE	1	2.38%
	CEFTRIAXONE+ AMIKACIN+ AZITHROMYCIN	1	2.38%
FOUR DRUG	AMOXICILLIN +CLAVULANIC ACID+ AZITHROMYCIN+ AMIKACIN	3	7.14%
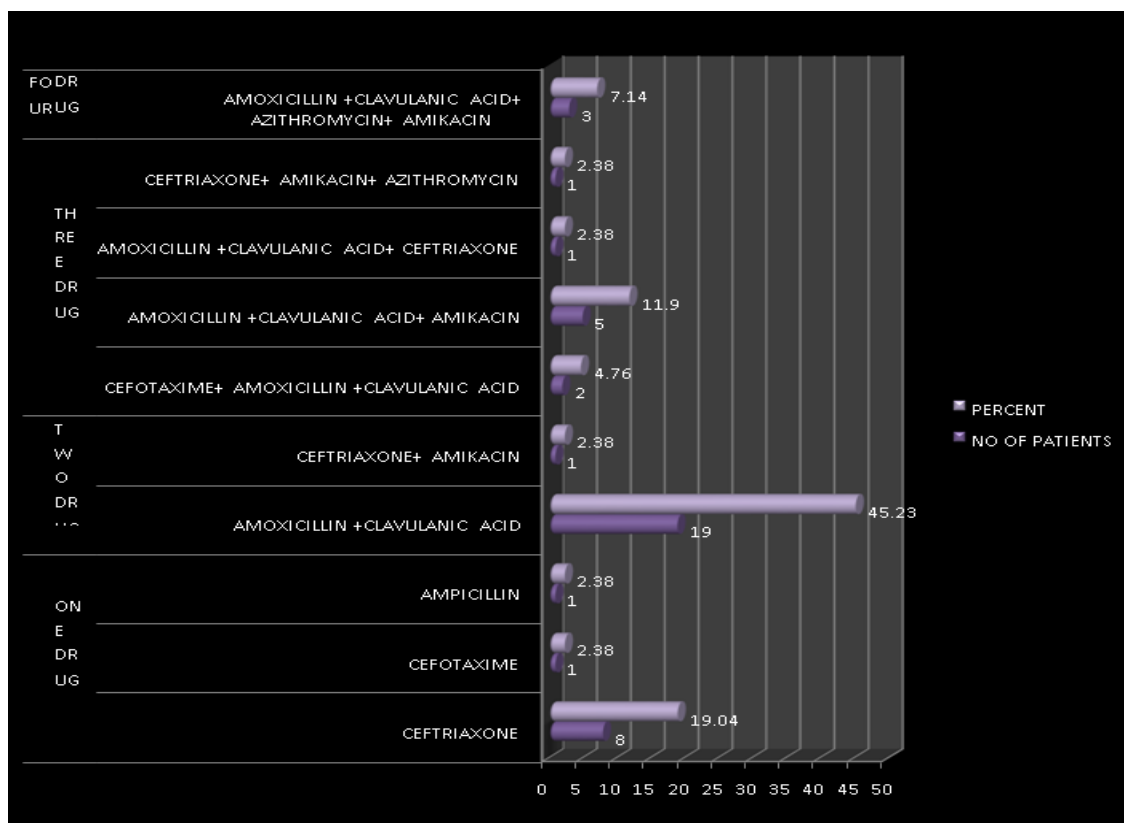
Conclusion: In the study of prescribing pattern of antibiotics for pneumonia, 23.8% of the patients were treated by single antibiotic, 47.6% were treated by two antibiotics, 21.42% were treated by three antibiotics and 7.14% were treated by four antibiotics.

Who Prescribing Indicators

INDICATOR	VALUE
average number of drugs per prescription	6.82
Percentage of drugs prescribed from NLEM	85%
Percentage of drugs prescribed by generic name	5%
Percentage of encounters with injections prescribed	38.6%
Percentage of encounters with antibiotics prescribed	88.6%

DISCUSSION

It is necessary to consider the etiopathogenesis of the disease condition in case of prescribing for children.

Prescriptions can be rational and irrational with consequences such as adverse drug reaction increased frequency of Drug-Drug interaction and increased health care cost, prescription auditing is necessary for identifying various types of irrational prescribing like polypharmacy and over prescription of injectables. A major problem in the paediatrics prescription studies

are the irrational use of antibiotics which could result in antibiotic resistance treatment failures and increase health care cost.

Out of 150 patients included in the study 96(64%) were Males and 54(36%) were Females which is similar to study by M A Beg et.al were 56.41% were Male and 43.59% were Female.

In the study Neonates (0-30 days) were 3(2%), Infants (1-12months) were 38(25.3%) and Children (1-14years) were 109(73%) which were similar to Deshmuk et.al whose result showed Neonates 10%, Infants 28% and Children 62%.

Among 116 LRTI patients most common infectious disease diagnosed was Pneumonia 47(31.3%) followed by Brochiolitis 19(12.6%). Out of 34 patients of URTI most common type was Laryngotracheobronchitis 1.3%, Hyper reactive airway disease 2%, Pharyngitis 2%, and Croup 1.3%.

In this study 27% of patients were treated in the hospital for 3 days followed by 20.66% were treated for 4 days 19.3%.

Most of the antibiotics were prescribed through parenteral route 38.6%, 29.83% of drugs were administered in oral dosage form.

Out of 150 cases the most commonly prescribed category of drugs is antibiotics (19.06%).

In present study the highly prescribed antibiotics were penicillinS (38.12%) for example amoxicillin followed by betalactam antibiotics (36.33%). Niviljoseph et.al reported that penicillins are highly prescribed drugs that is amoxicillin+clavunilic acid 55(45.8%) was preferred drug for all URTI's.

In our study it was observedthat, In LRTI 19.7% of the cases were treated with single antibiotic therapy, 72.13% of the ccases were treated with 2 drug antibiotic therapy. 8.19% of the cases were treated with 3 drug combination of antibiotics. In URTI 10% of cases were treated with single antibiotic, 65% were treated with two drug antibiotic therapy and 25% were treated with three drug antibiotic therapy. In Bronchiolitis 40% of cases were treated with single antibiotic, 40% were treated with two drug antibiotic therapy and 20% were treated with three drug antibiotic therapy. In Pneumonia 23% of cases were treated with

single antibiotic, 47% were treated with two drug antibiotic therapy, 19% were treated with three drug antibiotic therapy and 7.14% were treated with four drug antibiotic therapy. Combination antibiotic therapy is widely used in india. It has a lot of disadvantages and irrational use of the antibiotics can result in antibiotic resistance.

The most commomly observed symptoms of respiratory tract infections were cold 28.8% followed by fever 25.5%.

Out of 150 cases the most common comorbidity is acute Gastro entrities 50%.

According to the WHO prescribing indicators the average number of drugs per prescription should be less than 2. In our study average number of drugs prescribed per case was 6.82. Maheswari p et.al study shows average drugs per prescription was found to be 7.2 which is more than the present study.

The percentage of drugs prescribed from the national list of essential medicine is 85%.

The percentage of drugs prescribed by generic name is only 5%. Prescribing the drugs by brand names can undermine the goals of essential medicine concept.

Percentage of encounters with injections prescribed was found to be 38.6%.

Percentage of encunters with antibiotics prescribed was 88.6% which is less than maheswari et.al study which has 90% antibiotics.

CONCLUSION

In above study the prescription pattern of antibiotics is not rational as there is polypharmacy, over use and also inappropriate use of antibiotics without culture sensitivity test. Strict policy of antibiotic prescribing pattern significantly overcome the over or inappropriate use of antibiotics and it also reduces the antibiotic resistance bias.

The doses prescribed for paediatric cases should be calculated according to the weight of patients to avoid adverse reactions of drugs.

There is a need of educational programmes in order to bring up the rational use of antibiotics and make prescribers to follow standard antibiotic prescribing guidelines for Respiratory tract

infections, essential drug list and standard treateament guidelines can help in the management of Respiratory tract infections.

Practicing with prescri**b**ing of generic names of drugs helps hospital pharmacy to have better inventory control, it reduces the confusion among the pharmacists while dispensing. Generic drugs are often more economical than branded drugs.

To ensure the rationality of drug prescription, monitoring the disease parameters time to time and evaluation is absolutely essential change in health releted behaviour usually take longer to achieve.

It is important that health care professionals use upto date concepts, diagnostics and therapeutic approach in clinical practice.

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