



## A PROSPECTIVE STUDY ON PRESCRIBING PATTERN OF ANTIBIOTICS IN PEDIATRICS

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### ARTICLE INFO

### ABSTRACT

#### Key Words

Antibiotics, Misuse,  
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Antibiotic Resistance.



**Background:** Antibiotics are the powerful medicines that fight with bacterial infections but the inappropriate use of these can cause bacterial resistance. Misuse of antibiotics due to lack of knowledge on it becoming a public health problem world widely. Consequently, auditing antibiotic prescription patterns can improve efficacy and safety. **Methodology:** This is a prospective observational study conducted in vijayakrishna multi speciality hospital, a 250 bedded speciality hospital with Pediatric inpatient department, the present study conducted during the period of April to September 2017. **Results:** Total of 105 patients was enrolled in the study and majority of the patients belong to the age group of 1 month – 13years. Demographic and clinical data was analyzed and assessed by using the statistical software SPSS 11.0 and systat 8.0. **Conclusion:** It was found that most of the patients were suffering from respiratory tract infections and acute gastroenteritis. Antibiotics were prescribed to the patients twice daily. Standard treatment guidelines for Antibiotics prescribing in pediatrics were supplied to all the doctors of Pediatric division. Assuring the safe medications to the patients, this study has created awareness among the medical practitioners on the necessity of the clinical pharmacist in the institutional healthcare setup to prevent irrational prescribing and to promote rational use of antibiotic drugs.

### INTRODUCTION:

Infants and children's are the most vulnerable population group who get illness or infections very quickly. Because of the use of antimicrobial agents, especially antibiotics have become a routine practice for the treatment of the pediatric patients.<sup>1</sup>Antibiotics are used to treat bacterial infections and are designed to slow the growth of bacteria or to kill the bacteria. Antibiotics do not have any effect on viral infections. Antibiotics are one of

the most commonly prescribed drugs for pediatrics or especially in inpatients of any age. These antimicrobials have saved many lives from the dreadful infectious diseases.<sup>2</sup> There is an increase in the resistance to antibiotics to some bacterial infections which are encountered in PICU (Pediatric Intensive Care Unit) and there is need to develop new antimicrobials and at the same time antibiotics has to be used judiciously. Antibiotic resistance further leads to higher medical costs, prolonged

hospital stays, increased mortality and many problems.<sup>2, 3</sup> The development of new medicines without any behavior changes and the antibiotic resistance will remain a major threat and it includes the actions to reduce the spread of infections through the vaccination, hand washing and food hygiene. The pattern of prescribing deals with the monitoring, evaluating and suggesting modifications and so as to make patient care with safe, effective and cost effective.<sup>4</sup> Antibiotic resistance in a community has been increased because of inappropriate use of antibiotics and it can be optimized by implementing appropriate use of antibiotics.<sup>5</sup> In pediatric population, some are mostly prone to suffer from the recurrent infections which lead to cause respiratory tract and gastrointestinal system and lower respiratory tract infections. These are the leading cause of death in children who are below 5 years of age. Several studies focusing on antibiotic prescribing attitudes reported misuse of antibiotics in hospitalized children.<sup>6</sup> Higher incidence of infections are seen mostly in infants and children when compared to adults which further leads to higher use of antimicrobials and overall increase in healthcare costs as well as potentially severe adverse drug reactions.<sup>7</sup>

**Aim:** To evaluate and assess the prescribing pattern of antibiotics in pediatrics hospital.

**Methodology:**

This study was conducted in the vijayakrishna multi speciality hospital, a 250 bedded speciality hospital with Pediatric inpatient department, the present study conducted during the period of April to September 2017, associated with Pratishta institute of pharmaceutical sciences, Suryapet, Telanagana, India. Pediatric ward have 2 units i.e., PICU & NICU with general ward of pediatrics.

**Study design:** This is a Prospective observational study.

**Study population:** This study consists of 105 patients who were admitted in Pediatric inpatient department of vijaya

krishna hospital, a 300 bedded speciality hospital. The data was collected from the patients who were admitted in Pediatric ward.

**Sampling method:** The patients were included in this study with age group of 1 month-13 years, patients who were diagnosed as acute gastroenteritis, LRTI, URTI and who were on antibiotic prescription. 105 patients were selected based on these criteria.

**Study criteria:**

**Inclusion criteria:** Patients with age group of 1 month-13 years, Patients admitted in pediatric inpatient department, Patients with infectious diseases

**Exclusion criteria:**

- Patients without infectious disease
- All out patients and PICU/NICU

**Sample size:** 105

**Study procedure:** Prescriptions of inpatients were reviewed based on the study criteria.

**Patient data collection form:** The data was collected from the case sheets which consist of details like patient demographic details, laboratory data, drug therapy and other relevant information.

**Statistical software:**

The statistical software namely SPSS 11.0 and systat 8.0 were used for the analysis of the data and Microsoft word and excel had been used to generate graphs, etc.

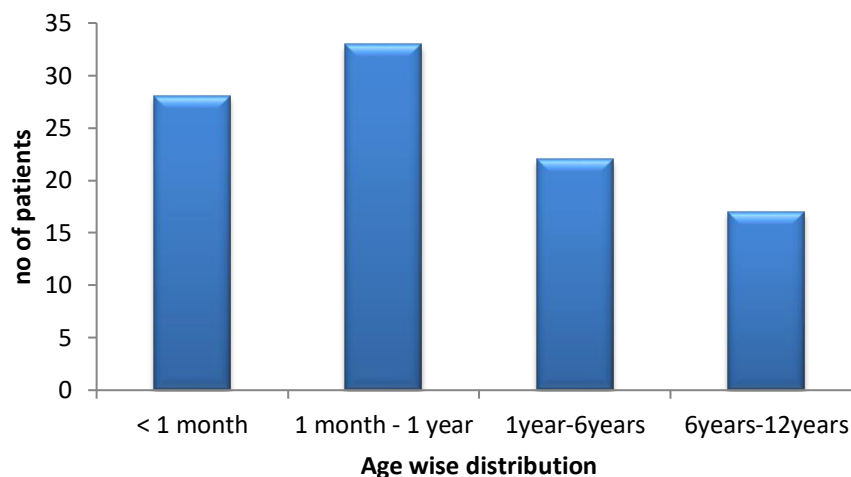
**DISCUSSION:**

In the present study 105 patients belong to the age group of 1 month-13 years, out of that 58.09% were male and 41.90% were female. This study population shows that the majority of the people were males when compared to females and the antibiotics were widely used. This reveals that the main reason is it may be because this group of people has less immunity power and more prone to infections. Out of 105 patients enrolled in this study, it was observed that nearly 32.38% patients are having acute gastroenteritis, 27.61% are having URTI and 40% are having LRTI.<sup>8</sup>

**Table 1: Age distribution of Pediatric patients**

Age	No. of patients (n)	Percentage
< 1month (Neonates)	28	28
1 month – 1 year (Infants)	33	33
1 year – 6 years (Children)	22	22
6 years – 12 years ( children)	17	17
<b>Total</b>	100	100
<b>Mean±SD</b>	25±6.97	

**Figure no. 1: Age wise distribution of Pediatric patients**



**2. Gender wise distribution:** Males is higher when compared to females as shown in the table 2.

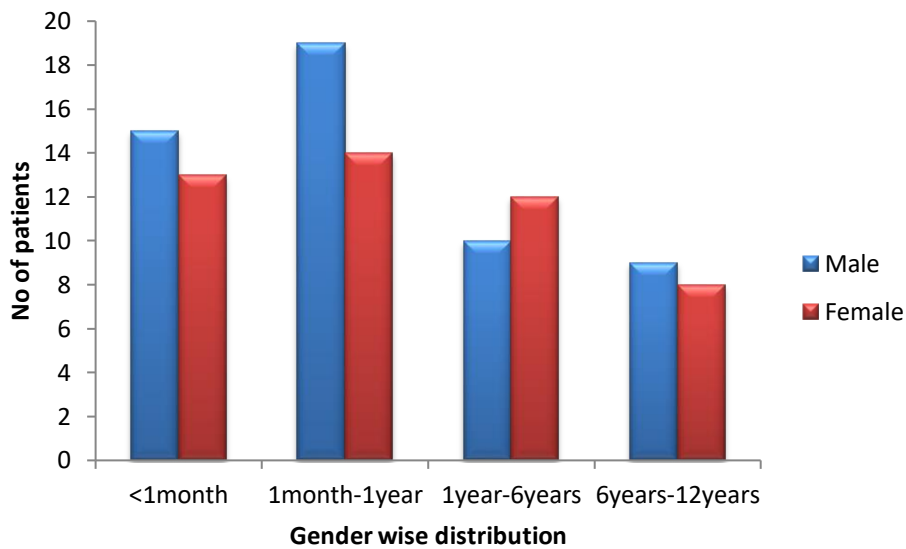
**Table No. 2 Gender wise distribution in Pediatric patients**

Age	Male	Female	Total
< 1month	15	13	28
1 month-1year	19	14	33
1year-6years	10	12	22
6years-12years	9	8	17
Total	53	47	100
Mean±SD	13.25±4.64	11.75±2.62	

**Table No.3 Body weight of Pediatric patients**

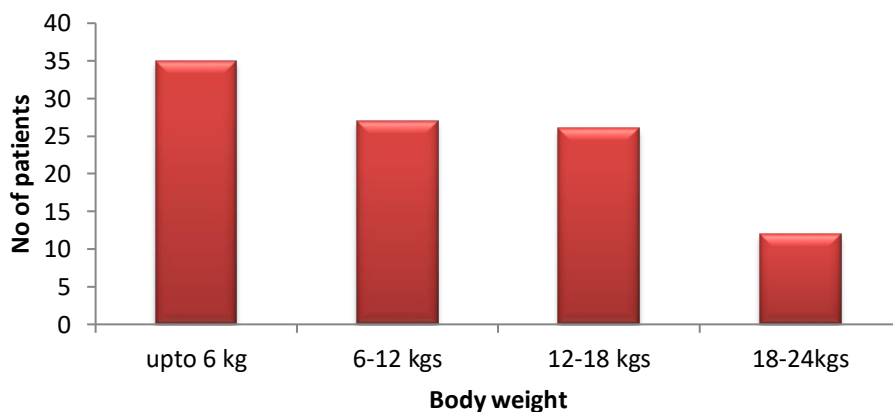
Body weight	No. of patients	Percentage
Upto 6 kg	35	35
6-12 kg	27	27
12- 18 kg	26	26
18-24	12	12
Total	100	100
Mean±SD	25±9.55	

**Figure No. 2 Gender wise distribution in Pediatric patients**



**3. Based on Body weight of Pediatric patients:** Out of 105, 35 with 6kg weight, 27 were between 6 to 12kg, 26 were with 12 to 18kg and only 12 were 18 to 24kg respectively.

**Figure No.3 Body weight of Pediatric patients**

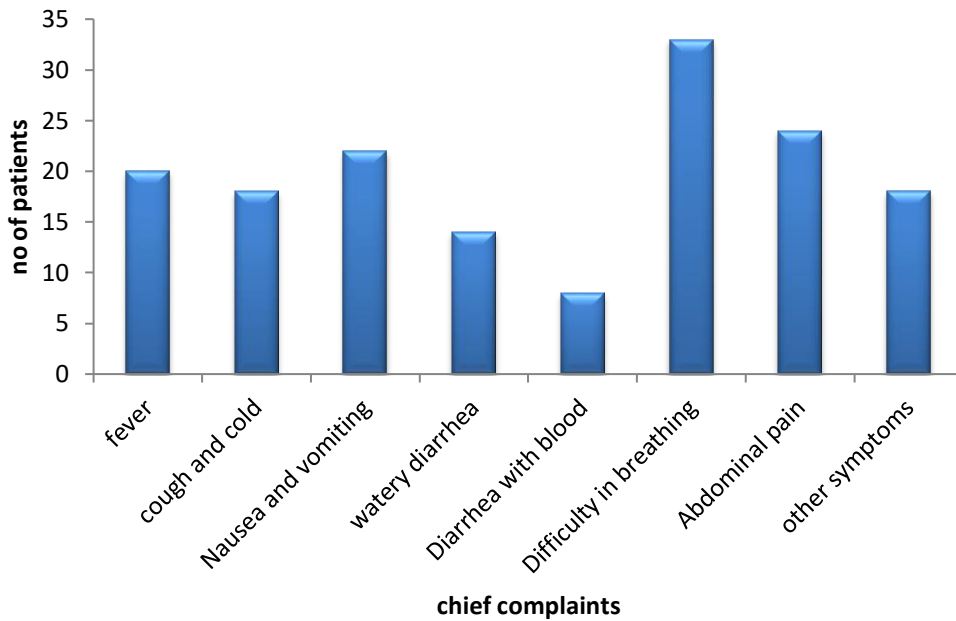


**4. Based on Chief complaints of Pediatric patients:** Majority of children were suffering from respiratory complication Difficulty in breathing 33, abdominal pain 24, Nausea and diarrhoea 22, fever 20 et.,

**Table No.4 Chief complaints of Pediatric patients**

Chief complaints	No. of patients
Fever	20
Cough and cold	18
Nausea and diarrhoea	22
Watery diarrhoea	14
Diarrhoea with blood	8
Difficulty in breathing	33
Abdominal pain	24
Other symptoms	18

**Figure No.4 - Chief complaints of Pediatric patients**

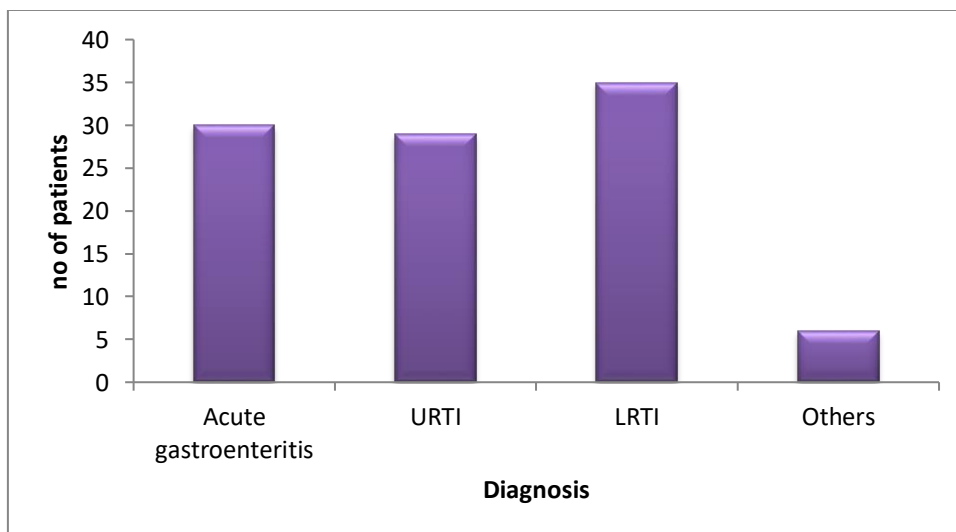


**5. Based on Diagnosis of Pediatric patients:** Out of 105, 41 were LRTI, 30 were diagnosed as acute gastroenteritis, 29 with URTI and other conditions in 6 patients.

**TableNo.5 - Diagnosis of Pediatric patients**

DIAGNOSIS	NO. OF PATIENTS (n)	PERCENTAGE
Acute gastroenteritis	30	30
URTI	29	29
LRTI	41	41
Others	6	6

**Figure No.5 Diagnosis of Pediatric patients**

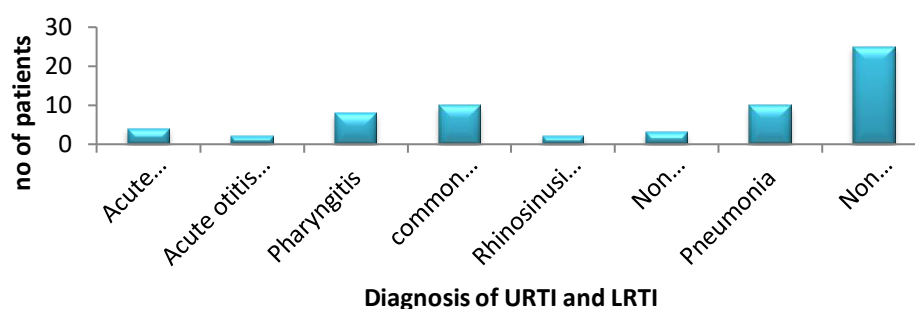


**6. Based on Diagnosis pattern of URTI and LRTI in Pediatric patients:** Out of 105 majority were suffering from nonspecific LRTI 25, Pneumonia and common cold were in 10 & 10, remaining are not significant.

**Table No.6 Diagnosis pattern of URTI and LRTI in Pediatric patients**

Diagnosis	No. of patients
Acute tonsillitis	4
Acute otitis media	2
Pharyngitis	8
Common cold	10
Rhino sinusitis	2
Nonspecific URTI	3
Pneumonia	10
Nonspecific LRTI	25

**Figure No.6 Diagnosis pattern of URTI and LRTI in Pediatric patients**



**7. Based on the Distribution of individual antibiotics among Pediatric patients:** Ceftriaxone is most commonly prescribed drug in 28, Cefotaxime & Amoxicillin each in 15 and others.

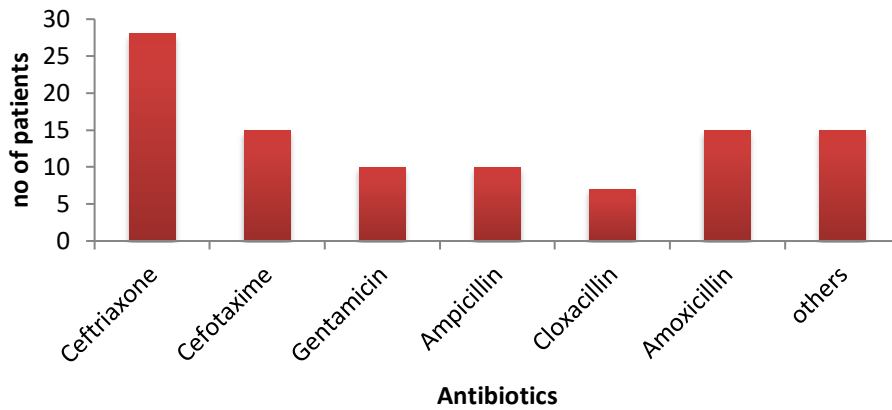
**Table No.7 Distribution of individual antibiotics among Pediatric patients**

Antibiotics Given	No. of Patients (n)	Percentage
Ceftriaxone	28	28
Cefotaxime	15	15
Gentamicin	10	10
Ampicillin	10	10
Cloxacillin	7	7
Amoxicillin	15	15
others	15	15

**Table No.8 Combination of antibiotic drugs in Pediatric patients**

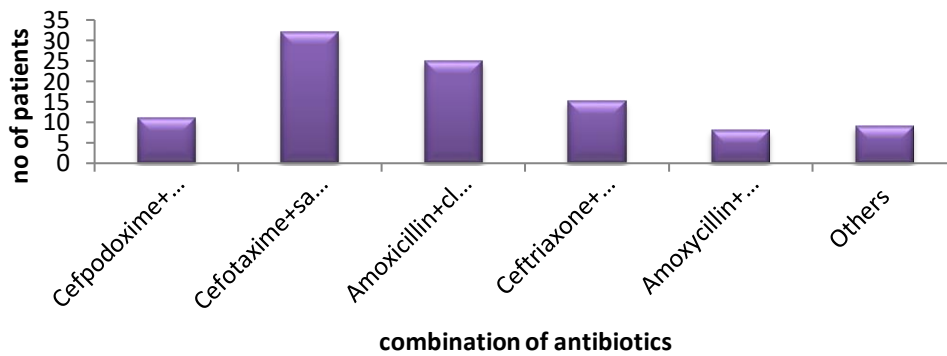
Combination	No. of patients	Percentage
Cefpodoxime+Amikacin	11	11
Cefotaxime+salbactam	32	32
Amoxicillin+clavulanic acid	25	25
Ceftriaxone+ vancomycin	15	15
Amoxycillin+ cloxacillin	8	8
Others	9	9

**Figure No. 7 Distribution of individual antibiotics among Pediatric patients**



**8. Combination of antibiotic drugs in Pediatric patients:** Cefotaxime+salbactam is the common combination prescribed in 32, Amoxicillin+clavulanic acid in 25, Ceftriaxone+vancomycin in 15 et.,

**Figure No.8 combination of antibiotic drugs in Pediatric patients**

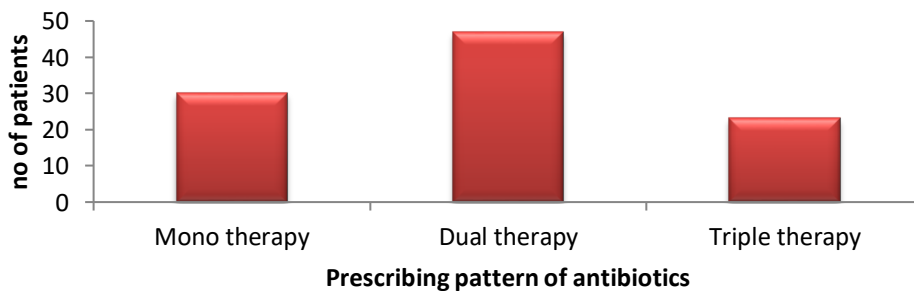


**9. Pattern of use of antibiotic in pediatric population:** 2 combinations (47) were common than single (30) and triple (23) therapy.

**Table No.9 Pattern of use of antibiotic in pediatric population**

Prescribing pattern of antibiotics	No. of Prescriptions	Percentage
Mono therapy	30	30
Dual therapy	47	47
Triple therapy	23	23

**Figure No. 9 Pattern of use of antibiotic in pediatric population**



Medications that are used in the treatment of infections were studied during the study period. From this study and analysis it was observed that various antibiotics were given to the patients i.e. ceftriaxone drug (26.66%), cefotaxime (23.80%), Gentamicin (9.52%), Ampicillin (14.28%), Cloxacillin (6.66%), Amoxicillin (19.04%).<sup>9</sup> The most commonly prescribed antibiotics were ceftriaxone 26.66%, cefotaxime 23.80% and amoxicillin 19.04% to treat the infections in the pediatric patients based on the choice and course of antibiotics for the therapy.<sup>10</sup>

#### **FUTURE DIRECTIONS:**

A study of irrational prescribing and medication errors at different points in drug use system such as prescribing, dispensing and administration is necessary and documentation of errors will help the patient for better cure in a short period. A similar study could be conducted for longer period of time to assess the patient disease and infections which are mainly caused and treated with proper medications. A long term study can be designed to determine the long term effect of patient illness of the disease, adherence and quality of life and importance in avoiding the trigger factors.

#### **LIMITATIONS:**

- The study period was short for the interventions. The sample size of the study was small for the intervention study. Antibiotics in pediatrics are prescribed based on the patient illness with minimum dose
- This is a hospital based study conducted in one hospital. The results of the study may be different, relevant and significant, if it was conducted in several hospitals of the different districts.

**CONCLUSION:** It was found that patients are mostly suffering from respiratory tract infections and acute gastroenteritis. Ceftriaxone 26.66% were

prescribed mostly and cefotaxime 23.80% and amoxicillin with potassium clavinate 19.04% was also used to treat the infections in the pediatric patients. This also concludes that antibiotics were given as BD (twice daily). This study significance is to reduce the irrational prescription pattern which includes overdose, wrong time, wrong frequency, wrong administration and multiple prescribing. Standard treatment guidelines for Antibiotics prescribing in pediatrics were supplied to all the doctors of Pediatric division. A suggestion was given to the health care professional on drug use pattern and to minimize the adverse drug reactions, drug interactions and promote rational uses of drugs.

Assuring the safe medications to the patients, this study has created awareness among the medical practitioners on the necessity of the clinical pharmacist in the institutional healthcare setup to prevent irrational prescribing and to promote rational use of drugs. Physicians and pharmacists should also adopt interventions that are designed to help patients remember to keep their clinic appointments and to take their antibiotic medications as prescribed by the doctor.

#### **REFERENCES:**

1. Arulmoli SK, Sivachandiran S, Perera BJC. Prescribing Patterns of Antibiotics for Children before Admission to a Paediatric Ward in Jaffna Teaching Hospital, Sri Lanka. *J Child Health.* 2009; 38:121-123.
2. <http://www.newhealthadvisor.com/Classification-of-Antibiotics.html>
3. <http://www.medicinenet.com/script/main/art.asp?articlekey=8121>
4. Cantas L, Shah SQA, Cavaco LM, Manaia C, Walsh F, Popowska M, et al. A brief multi-disciplinary review on antimicrobial resistance in medicine and its linkage to the



- global environmental microbiota. Front Microbiol. 2013; 4:96. 2.
5. The world medicine situation 2011. at [http://www.who.int/medicines/areas/policy/world\\_medicines\\_situation/WS\\_ch14\\_wRational.pdf](http://www.who.int/medicines/areas/policy/world_medicines_situation/WS_ch14_wRational.pdf). Accessed on 12 July 2016. <http://www.emedexpert.com/classes/antibiotics.shtml>. <http://www.internationaljournalofrecentresearch.com/media-centre/factsheets/antibiotic-resistance/en/>
  6. Divya Kancherla et al., A Study On Prescribing Pattern Of Antibiotics In Respiratory Tract Infections In A Tertiary Care Center. International Journal of Recent Scientific Research Vol. 6, Issue, 6, pp.4558-4563, June, 2015
  7. Shamsy et al /Int.J. PharmTech Res.2011,3(3) Drug Utilization of Antimicrobial drug in Pediatrics Population in a tertiary care hospital in Erode, Tamilnadu,India.
  8. Deshmukh Swapnil Narayan and MahajanManaliMangesh. A Study of Prescription Pattern of Antibiotics in Paediatric InPatients at a tertiary care hospital in central India. IJPR Volume 6 Issue 08 (2016).