International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJAMSCR |Volume 3 | Issue 3 | July-Sep- 2015
www.ijamscr.com

Research article ***Medical research***

Prescription pattern for beta lactam antibiotics and their ADR in pediatrics

K.Sattanathan*, V.Sekar, Shyamily John, SK.Chandini, S. Jayaseelan, R.Sambathkumar
JKK Nattraja College of Pharmacy, Kumarapalayam, Namakkal, India.
***Corresponding author: K.Sattanathan.**
Email: ksknathan@rediffmail.com

ABSTRACT
β-lactam antibiotics are a broad class of antibiotics, consisting of all antibiotic agents that contain a β-lactam ring in their molecular structures. This includes penicillin derivatives (penams), cephalosporins (cephems), monobactams, and carbapenems[1-4]. Most β-lactam antibiotics work by inhibiting cell wall biosynthesis in the bacterial organism and are the most widely used group of antibiotics. This study Prescription pattern for beta lactam antibiotics and their ADR in pediatrics was carried out in tertiary care hospital Erode. The total number of the patients was 90. This work was carried out on some inclusion and exclusion criteria. We concluded that the Cephalosporin's class of antibiotics was highly prescribed followed by penicillins. The ADR were found Hypersensitivity and Gastrointestinal Diarrhea.

Keywords: Prescription pattern, ADR, Beta lactam antibiotics, Pencillin.

INTRODUCTION
Beta-lactam antibiotics, which are named for the beta-lactam ring in their chemical structure, include the penicillins, cephalosporins and related compounds. These agents are active against many gram-positive, gram-negative and anaerobic organisms. The beta-lactam antibiotics exert their effect by interfering with the structural crosslinking of peptidoglycans in bacterial cell walls[5-8]. This study was conducted to evaluate the pattern of antibiotics use in pediatric department of Tertiary care Hospital, Erode. And report their Adverse Drug Reaction.

METHODOLOGY
The use of antibiotics in 90 children was monitored in Pediatric ward of tertiary care hospital Erode, by questionnaires to parents and caregivers. This study was conducted for a period of six months from December 2014 to June 2015. This study will include hospital in-patients who were treated with β-lactam antibiotics for various diseases in Pediatric department. Patient who meets the following criteria will be enrolled.

INCLUSION CRITERIA
Patients who were treated with β-lactam antibiotics in pediatrics department. Patients of either sex aged below 10 years.

INCLUSION CRITERIA
Paediatric patients who are not on the β-lactam antibiotic therapy. Patients treated with β-lactam antibiotics on out- patient basis. All the patients admitted to pediatric department were reviewed daily to identify the patients prescribed with β-lactam antibiotics. Those patients who met the study criteria were included in the study. Patients were divided in

to different groups according to their age. The total of 90 prescriptions containing β-lactam antibiotics were assessed from patient medical records irrespective of the indications. Patient's demographic details such as name, age, sex, clinical data such as diagnosis, therapeutic data such as name of the β-lactam antibiotic, other concomitant medications, duration of therapy and other necessary details were collected from patient's medical records and medication charts. The collected information was documented in a suitably designed data collection form. All the patient information was collected from the day of admission to the day of discharge and was assessed for the clinical outcome. Patient's prescriptions were screened for any possible drug interactions and ADRs that had occurred with β-lactam antibiotics. A total of 90 inpatients prescribed with β-lactam antibiotics aged < 10 years admitted to Pediatric ward for the treatment of various diseases were reviewed over a period of six months from December 2014 to June 2015.

RESULTS

Table 1: Sex wise distribution

Gender	Number of Prescriptions	Percentage (%)
Male	42	46.67
Female	48	53.34

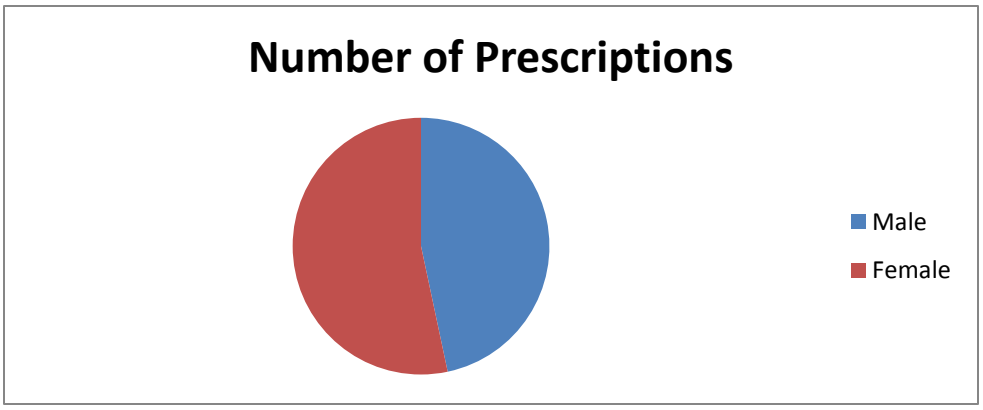

Figure 1: Sex wise distribution

Of the 90 patients treated with β-lactam antibiotics, male subjects were 46.67% less than female subjects 53.34%.

Table 2: Age wise distribution

Age Groups	Number of Prescriptions	Percentage (%)
1day-1 month (Neonate)	14	15.56
1 month-1 year (Infant)	19	21.11
1year-5 years (Child)	26	28.89
6 years-10 years(Child)	31	33.44

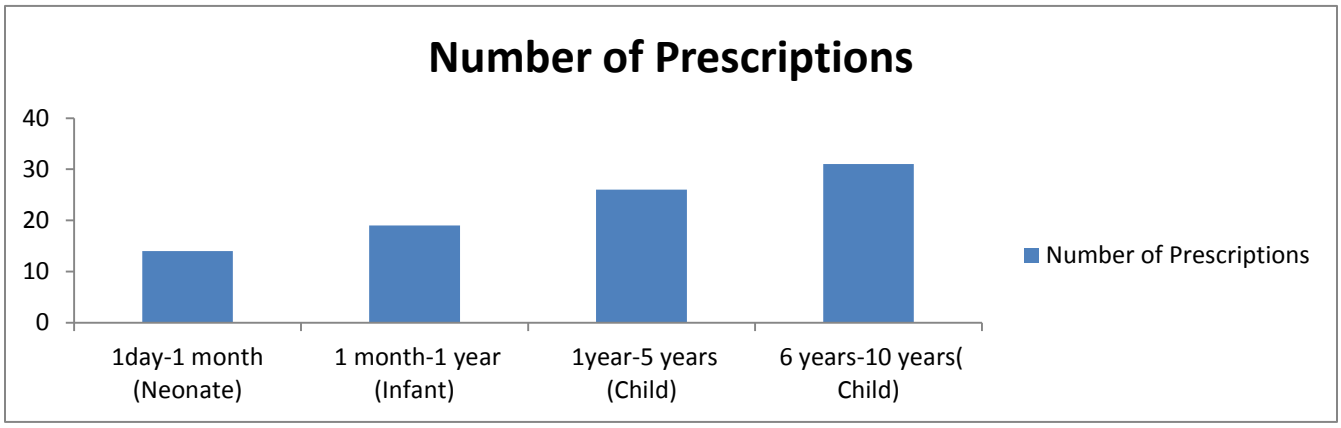

Figure 2: Age wise distribution

Among them the age group of 1 year-5 years (child) 29% patients and the age group 6 years – 10 years 33% were more than the other age groups, Neonates and Infants. The demographic data of study patients are presented in Table 2.

Table 3: Prescribing frequency of different class of β-lactam antibiotics

Class of β-lactam antibiotics	No. of prescriptions	Percentage (%)
Cephalosporins	32	35.56
Penicillins	26	28.89
Penicillins+β-lactamase inhibitors	18	20.00
Cephalosporins+β-lactamase inhibitors	12	13.33

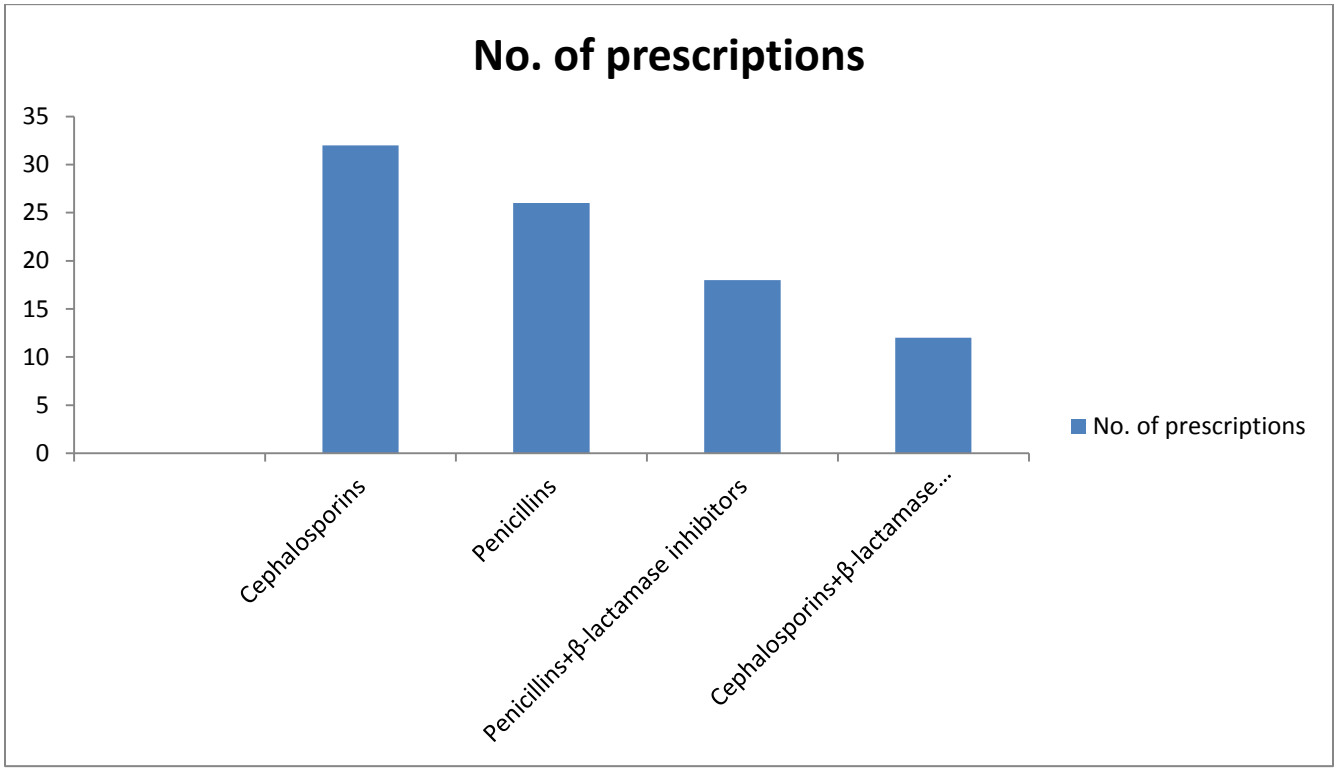

Figure 3: Prescribing frequency of different class of β-lactam antibiotics

Among the 90 β-lactam antibiotics, the highest number of Cephalosporins were prescribed as 35.56% followed by penicillin's28.86% and the least prescribed were Penicillins+β-lactamase inhibitors and Cephalosporins+β-lactamase inhibitors.

Table 4: Age distribution of patients prescribed with different class of β-lactam antibiotics

Drugs	1day-1 month	1 month-1 year	1year-5 years	6 year – 10 year
Cephalosporins	3	7	10	12
Penicillins	4	8	8	6
Penicillins+β-lactamase inhibitors	0	3	5	10
Cephalosporins+β-lactamase inhibitors	0	2	5	5

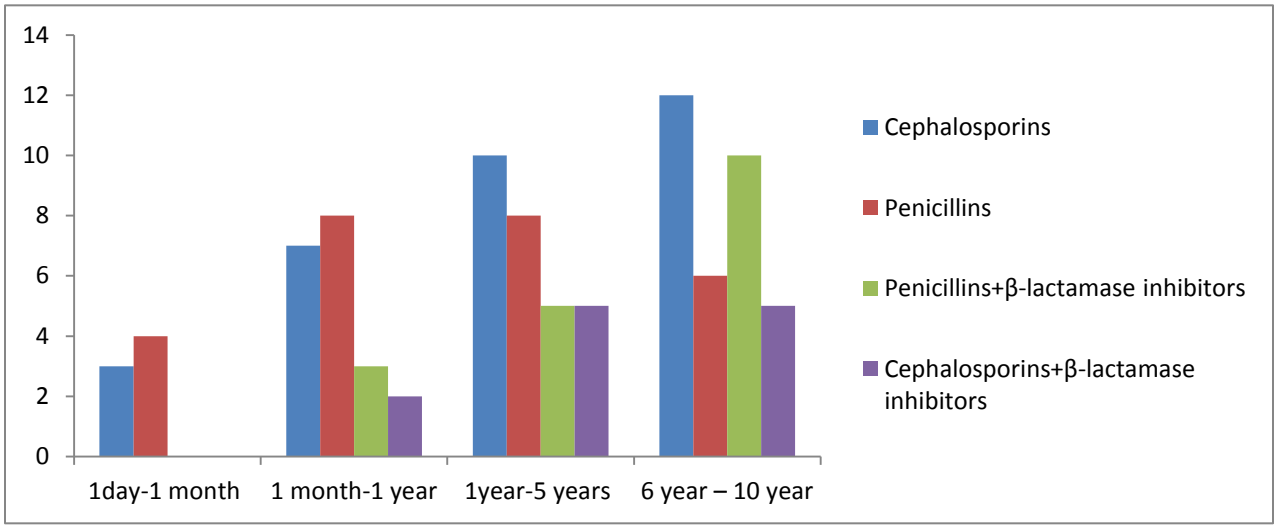

Figure 4: Age distribution of patients prescribed with different class of β-lactam antibiotics

Age distribution of patients prescribed with different class of β-lactam antibiotics Patients were categorized into four groups according to their age. Patients aged between 1 year–10 years were prescribed β-lactam antibiotics more often than patients of other age groups. In Neonates, penicillin's and cephalosporins were most commonly prescribed. The details of the different class of β-lactam antibiotics prescribed in different age groups were presented in the Table 4.

Table 5: Number of prescriptions Vs. Diagnosis

Drugs	No. of prescriptions	Percentage
Respiratory Tract Infections	**27**	**30.00**
GI Disorders	**20**	**22.22**
Hematological Disorders	**15**	**16.66**
UTI	**16**	**17.78**
Others	**12**	**13.33**

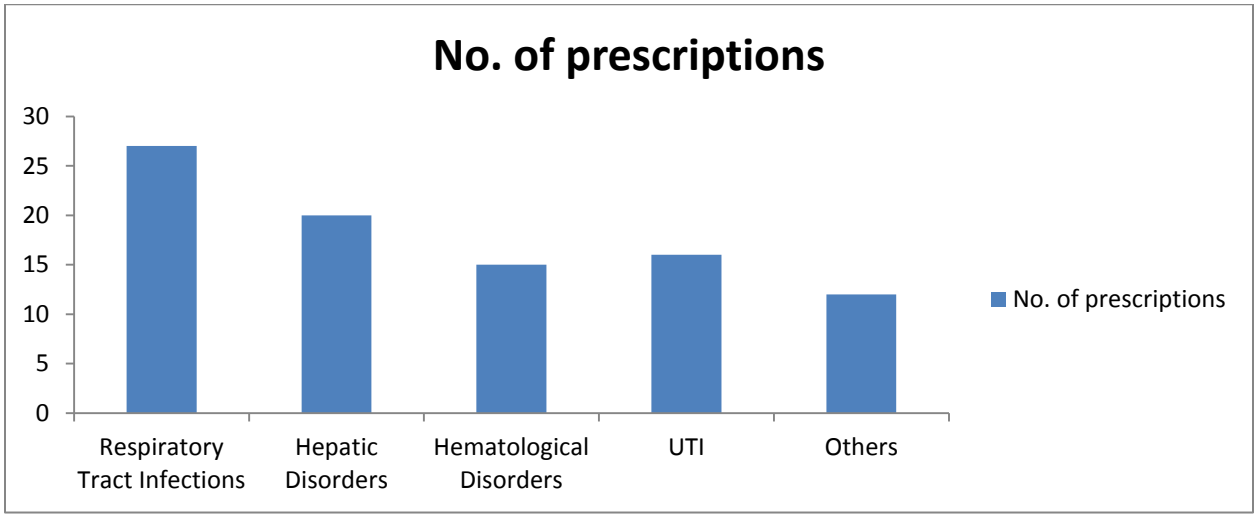

Figure 5: Number of prescriptions Vs. Diagnosis

During our study, among 90 prescriptions highest number of prescriptions were found to be diagnosed as respiratory tract infections 30.00%, followed by GI disorders 22.22%, UTI disorders 17.78%, co-morbid conditions (n=37) 9.25% and the least number of prescriptions were seen in UTI 17.78% and hematological disorders 16.66%. Number of prescriptions in various clinical conditions is presented in Table 5.

Table 6: Pattern of use of individual β–lactam antibiotics

Drugs	No. of prescriptions	Percentage (%)
Ceftriaxone	30	33.33
Ampicillin	14	15.55
Cefotaxime	13	14.44
Cefotaxime+Sulbactam	2	2.22
Ceftriaxone+Sulbactam	3	3.33
Cefixime	4	4.44
Amoxicillin+PotassiumClavulanate	4	4.44
Ceftriaxone+Tazobactam	3	3.33
Cefotaxime+Tazobactam	2	2.22
Penicillin-G	13	14.44
Cefpodoxime	2	2.22

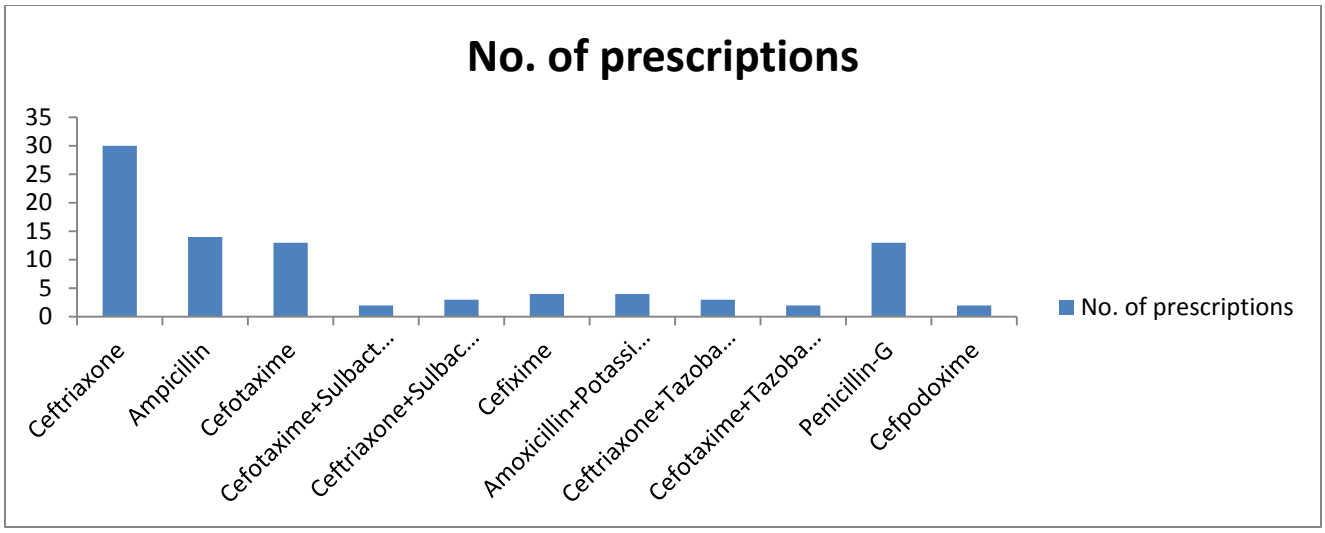

Figure 6: Pattern of use of individual β–lactam antibiotics

In our study, out of 90 prescriptions ceftriaxone 33.33% was most frequently prescribed followed by ampicillin 15.55% and cefotaxime14.44%. The pattern of usage of individual β-lactams is presented in table 6.

Table 7: ADR reported

Types of reaction	No.of Patients	Percentage (%)
Hypersensitivity	6	6.66
Seizures	2	2.22
Gastrointestinal Diarrhea	4	4.44
Disulfiram-like effect	3	3.33

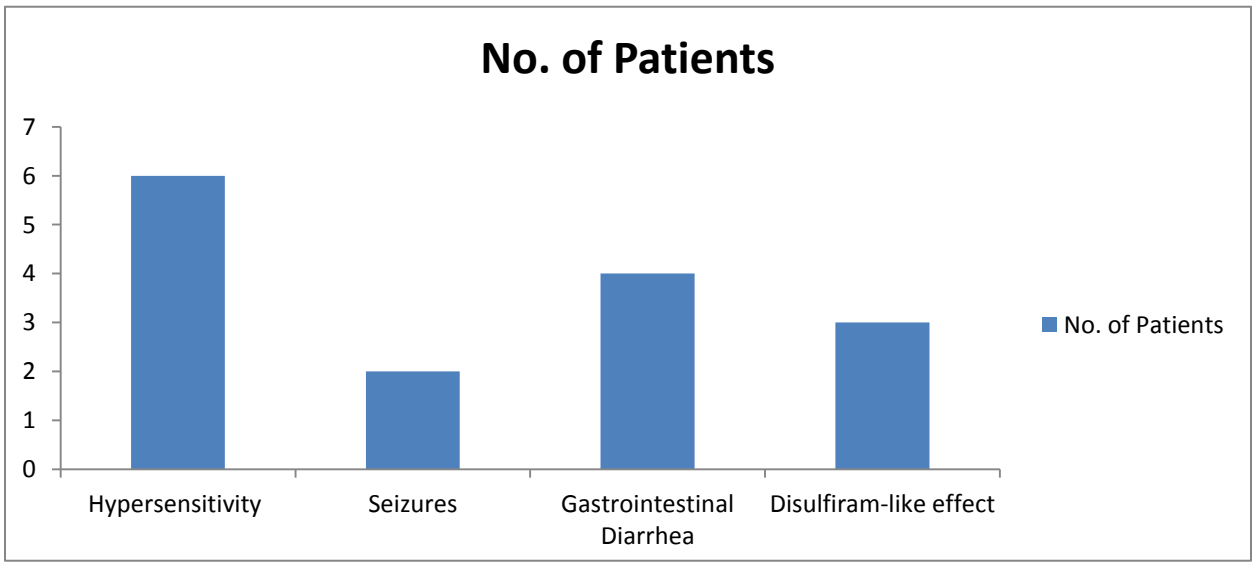

Figure 7: ADR reported

During our study, among 90 prescriptions highest number of ADR were found Hypersensitivity 6.66% and Gastrointestinal Diarrhea 4.44% followed by Disulfiram-like effect 3.33%. and Seizures 2.22%

were the reported ADR. Number of prescriptions in various clinical conditions is presented in Table 7. hematological disorders 16.66%. In our study, out of 90 prescriptions ceftriaxone 33.33% was most frequently prescribed followed by ampicillin 15.55% and cefotaxime 14.44%. During our study, among 90 prescriptions highest number of ADR were found Hypersensitivity 6.66% and Gastrointestinal Diarrhea 4.44% followed by Disulfiram-like effect 3.33%. And Seizures 2.22% were the reported ADR.

DISCUSSION

The pediatricians and other medical personnel who provide health care for infants and children in developing countries confront a number of challenges during the day to day practice of medicine due to the shortage of appropriate drugs and other facilities[9]. β-lactam antibiotics have long been important in the treatment of paediatric infections. The management of serious paediatric infections involves several particular treatment challenges. The purpose of this study is to assess the prescription pattern of β-lactam antibiotics. In our study the numbers of male patients were prescribed with β-lactam antibiotics was higher than female subjects[10]. This was due to the fact that more males were admitted than females for the treatment of various disease conditions. This result was similar to the study conducted by Omole 2012 in south west Nigeria which showed higher antibiotic prescriptions for males to be 71.7% whereas females were 28.3%. In both males and females the cephalosporins were most widely prescribed followed by penicillins. In our study of the 90 prescriptions reviewed, the usage of β-lactam antibiotics according to the age, it was found that patients between the age group of 1-10 years were highly prescribed than patients aged below 1year. In our study the more number of prescriptions were found to be diagnosed as respiratory tract infections 30.00%, followed by GI disorders 22.22%, UTI disorders 17.78%, co-morbid conditions (n=37) 9.25% and the least number of prescriptions were seen in UTI 17.78% and

CONCLUSION

Over a study period, 90 prescriptions were analyzed for prescription pattern of β-lactam antibiotics from the pediatric department of tertiary care Hospital, Erode. A majority of the patients in this study were between the age group of 1-10 years and a high percentage of the patients were Cephalosporin's class of antibiotics was highly prescribed followed by penicillins. Prescribing frequency of newer β-lactam antibiotics was low. Overall ceftriaxone was found to be the most frequently prescribed drug followed by ampicillin and cefotaxime due to its wider spectrum of activity. During our study, among 90 prescriptions highest number of ADR were found Hypersensitivity 6.66% and Gastrointestinal Diarrhea 4.44% followed by Disulfiram-like effect 3.33%. and Seizures 2.22% were the reported ADR. There is a need to carry out culture sensitivity test and assess prescription for drug-drug interactions which will help to rationalize the therapy, safety and to prevent the β-lactam antibiotic resistance.

BIBLIOGRAPHY

[1]. Queener SF. History and origins of beta-lactam antibiotics. In: Queener SF, Webber JA, Queener SW, editors. Beta-Lactam Antibiotics for Clinical Use. New York: Marcel Dekker, Inc, 1986. Page. 3–16.

[2]. Amos HE. Antigenic determinants of the penicillin molecule. In: Amos HE Eds. Allergic drugs reactions. Oxford: Edward Arnold, 1976; 64–74.

[3]. Levine BB, Price VH. Studies on the immunological mechanisms of penicillin allergy II. Antigenic specificities of allergic wheal-and-flare skin responses in patients with histories of penicillin allergy. Immunology 1964; 7:542.

[4]. Ahlstedt S, Kristofersson A. Experimental evidence of decreased incidence of Penicillin allergy through the use of pure penicillins. Infection 1979; 7:499–502.

[5]. Blanca M, Vega JM, Garcia J, Miranda A, Carmona MJ, Juarez C, et al. New aspects of allergic reactions to betalactams: cross reactions and unique specifities. Clin. Exp Allergy 1994; 24:407–41.

[6]. Romano A, Mayorga C, Torres MJ,Artesani MC, Suau R, Pe´rez E, et al. Immediate allergic reactions tocephalosporins: cross-reactivity and selective responses. J Allergy Clinical Immunology.2000; 106:1177–1183.

[7]. Prajapathi V, Bhatt JD. Study of prescribing patterns of antimicrobials in the paediatric wards at tertiary teaching care hospital, Gujarat. International journal of pharmaceutical sciences and research 2012; 3(7): 2348-2355.
[8]. Bharathiraja R, Sridharan S, Chelliah LR, Suresh S, Senguttuvan M. Factor's affecting antibiotic prescribing pattern in paediatric practice. Indian journal of Paediatrics2005; 72: 877-879.
[9]. Resi D, Milandri M, Moro L and Emilia R. Antibiotic prescriptions in children. Journal of Antimicrobial Chemotherapy 2003; 52: 282-286.
[10]. Adam, Dieter MD. Beta-lactam antibiotics: their role in the management of infections in children. Paediatric Infectious Disease Journal 1998; 17(3): S4-S7.

How to cite this article: K.Sattanathan, V.Sekar, Shyamily John, SK.Chandini, S. Jayaseelan, R.Sambathkumar, Prescription pattern for beta lactam antibiotics and their ADR in pediatrics. A case report Int J of Allied Med Sci and Clin Res 2015;3(3):321-328.