International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

A Study on Prescribing Pattern of Cephalosporins in Paediatric Department of Tertiary Care Teaching Hospital

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Abstract: ***Worldwide, infants and children represent a higher proportion of the population. 28% of the world's total population is accounted by children younger than 15 years of age. Several studies focusing on prescribing practices of antibiotics among the hospitalized children indicate that approximately 35% of infants and children who are admitted to hospitals receive antibiotics. Surveys showed that 22–65% of antibiotic prescriptions are either inappropriate or incorrect based on clinical and economical criteria, resulting in an increased incidence of side effects, higher costs and higher rates of antimicrobial resistance in community pathogens. Cephalosporins are the most commonly used group of antibiotics in hospitals and health care facilities around the world. This study was conducted to evaluate the prescribing patterns of cephalosporins in a paediatric population of a tertiary care teaching hospital. This was a prospective observational study conducted for a period of 6 months (October-March 2019) in the paediatric population of CSI Holdsworth Memorial (Mission) Hospital after being approved by the Institutional Humans Ethics Committee of Farooqia College of Pharmacy, Mysore. A total of 120 paediatric patients received cephalosporins. Ceftriaxone was the widely prescribed cephalosporin (88.70%) for the most common indication being respiratory tract infections (21.16%) and for majority of the patients between the age group of 0-1 year (37.50%). The most commonly prescribed ceftriaxone dose, frequency of administration and mean duration of treatment was found to be 500 mg (17.59%), twice daily (65.74%) and 2.75 days (range 1-8 days) respectively. The drug-drug interactions were identified (29.83%), which included 13.51% major, 81.08% moderate and 5.40% contraindications. Marginal irrationality (10.48%) was found with dose and frequency. The drug-drug interactions were identified and the inappropriateness in terms of dose and frequency of administration was found in the prescribed cephalosporins. The study findings demonstrated clinical pharmacist intervention in the drug therapy to resolve and prevent drug-related problems in paediatric population.***

Keywords: Paediatrics, Cephalosporins, Prescribing

1. Introduction

Paediatrics is the field of medicine that is concerned with the health of neonates, infants, children and adolescents; their growth and development; and their opportunity to achieve full potential as adults.[1] Worldwide, infants and children represent a higher proportion of the population. 28% of the world's total population is accounted by children younger than 15 years of age.[2] Pediatrics is among the most vulnerable population group of infectious diseases. Drug therapy is considered to be a major component of paediatric management in health care setting like hospital, because the pharmacodynamics and pharmacokinetics are different in children, which often make them more susceptible to various drug related problems.[3], [4] Lower respiratory tract infections are the leading cause of death in children below five years of age. Acute respiratory infection, acute watery diarrhoea and viral fever are the common childhood illnesses accounting for the major proportion of pediatric visits.[5] Antibiotics are the key drugs for treatment of infections and are among the most commonly prescribed drugs in paediatrics department.[6] Maximum use of antibiotic prescriptions were found in age groups of 5-12 yrs. Several studies focusing on prescribing practices of antibiotics among the hospitalized children indicate that approximately 35% of infants and children who are admitted to hospitals receive antibiotics.[7], [8] According to the national ambulatory medical care survey (NAMCS), antibiotics are the second leading drug which is being prescribed or considered for treating infection in children.[9], [10], [11] Surveys showed that 22–65% of antibiotic prescriptions are either inappropriate or incorrect based on clinical and economical criteria, resulting in an increased incidence of side effects, higher costs and higher rates of antimicrobial resistance in community pathogens.[12], [13], [14] Because of the rising costs in health care, lack of uniformity in prescribing attitudes and the emergence of antibiotic resistance, monitoring and controlling antibiotic use is of growing concern.[15], [16] Antibiotics are the most frequently prescribed and misused drugs and there are reported concerns about the continuous indiscriminate and excessive use of antibiotics leading to emergence of antibiotic-resistant organisms called "super-bugs" which may further lead to usage of more combination of antibiotics and fear amongst the clinicians about the future availability of antibiotics, especially in the paediatric population and thus have prompted the need to use antibiotics judiciously in paediatric practice.[17], [18], [19], [20], [21], [22] Indiscriminate use of drugs is an important global threat.[23] Selecting the appropriate antibiotic for an infection and educating the patients about the importance of taking therapy exactly as prescribed are considered areas for improvement needed.[24] It was reported that the in-appropriate use of cetriaxone caused, worldwide, an annual cost of $4-$5 million pertaining to infection caused by antibiotic resistant bacteria.[25] The other study conducted in Spain regarding the use of third generation cephalosporins, wherein ceftriaxone was the most frequently prescribed agent, found out that the cost of in-appropriate use of antibiotics was twice as much for patients who were treated appropriately.[26] Cephalosporins are a commonly

used group of antibiotics in hospitals and health care facilities around the world.

This study was conducted to evaluate the prescribing pattern of cephalosporins in a paediatric department of a tertiary care teaching hospital.

2. Methodology

This was a prospective observational study conducted for a period of six months (October-March 2018) in the inpatient department of Paediatrics of CSI Holdsworth Memorial (Mission) Hospital, Mysore. This study was approved by the Institutional Human Ethics Committee of Farooqia College of Pharmacy. Patient data collected from case notes of patients admitted during the study period by using patient data collection form. The content of the data collection form was designed to record patient information (age, gender, weight, chief complaints, past medical/medication history, physical examination), disease condition, laboratory investigation, treatment details, admission and discharge details. Other necessary and relevant data was collected by personnel interview with the patients, nurses, doctors and patient caretakers. The collected data was evaluated for determining the rationality and drug interactions using standard references such as Stockley's Textbook of Drug Interactions, Textbook of Medical Pharmacology by K.D. Tripathi, Textbook of Rational Antimicrobial Practice in Pediatrics, Medscape, Micromedex and Drugs.com. The compiled data was expressed in terms of numbers and percentage.

3. Results

Among 120 patients in this study, 70 (58.33%) patients were male and 50 (41.67%) patients were female. Patients in between the age group of 0-1yr (n=45; 37.5%) were most predominantly prescribed with cephalosporins, followed by 2-3yrs (n=36; 30%), 4-5yrs (n=18; 15%), 8-9yrs (n=8; 6.67%), 6-7yrs (n=7; 5.83%) and 10-12yrs (n=6; 5%) respectively (Table 01).

Table 1: Demographic characteristics of patients included in the study (n=120)

Characteristics	Category	Number of Patients	Percentage (%)
Sex	Male	70	58.33
	Female	50	41.67
Age (years)	0-1	45	37.50
	2−3	36	30.00
	4−5	18	15.00
	6−7	07	05.83
	8−9	08	06.67
	10−12	06	05.00

In the study population, it was found that 90.83% of the patients received cephalosporins as first line therapy (primary) and 9.17% of the patients received cephalosporins as second line therapy (alternate) in accordance with the diseases and culture sensitivity report. However, cephalosporins were prescribed empirically for most of the patients (n=109; 90.83%). Among 124 cephalosporins prescribed, 122 (98.38%) contained intravenous therapy and 2 (1.61%) had oral therapy. Majority of the children were prescribed with 3rd generation cephalosporins (n=123;99.19%) followed by 1st generation cephalosporin (n=1; 0.80%). (Table 02)

Table 2: Details of Prescribing Patterns of Cephalosporins in the Study Participants (n=120)

Characteristics	Category	Number	Percentage (%)
Indication of Cephalosporin	Primary	109	90.83
	Alternate	11	9.17
Type of Treatment	Empiric	109	90.83
	Specific	12	10
Route of Administration	Oral	2	1.61
	Intravenous	122	98.38
Generation of Cephalosporin	1st Generation	1	0.8
	2nd Generation	0	0
	3rd Generation	123	99.19

Table 03 shows that, among the prescribed cephalosporins, 3rd generation cephalosporins were predominantly prescribed. Majority of the patients were found between the age group of 0-1 yr (29.68%) who received ceftriaxone, followed by 2-3yrs (26.56%), 4-5yrs (14.06%), 6-7yrs and 8-9yrs (5.46%) and lastly 10-12yrs (4.68%). Cefotaxime was commonly prescribed drug in patients between the age group of 0-1 yr (7.03%) followed by 4-5yrs (2.34%), 8-9yrs (1.56%), 2-3yrs and 6-7yrs (0.78%). Three patients between the age group of 2-3yrs, 4-5yrs and 8-9yrs received cefoperazone, cefixime and cephalexin respectively.

Table 3: Details of Cephaloporins Generation Use In Different Age Groups (n=120)

Generation	Cephalosporins	Age (years)					
		0-1	2−3	4−5	6−7	8−9	10−12
1st Generation	Cephalexin	0	0	0	0	1	0
2rd Generation	NIL	0	0	0	0	0	0
3rd Generation	Ceftriaxone	38	34	18	7	7	6
	Cefixime	0	0	1	0	0	0
	Cefotaxim	9	1	3	1	2	0
	Cefoperazone	0	1	0	0	0	0
TOTAL		47	36	22	8	9	6

Table 04 describes the antibiotics used for various indications/systemic infections. Out of 205 antibiotics prescribed, cephalosporins were found to be 149 (72.68%), aminoglycosides were 32 (15%), penicillins were 8 (3.90%), tetracyclines were 7 (3.41%), macrolides were 6 (2.92%) and fluoroquinolones were 3 (1.46%).

Table 4: Details of Antibiotics Used For Various Indications

Systemic Infections	Penicillins	AG	Cephalosporins	FQ	TC	Macrolides
Penile hypospadias	-	1	3	-	-	-
Viral meningitis	-	3	4	1	1	-
Enteric fever	-	-	13	1	1	-
Lower Respiratory Tract Infection	2	-	7	-	-	-
Upper Respiratory Tract Infection	-	-	6	-	-	-
Diarrhoea	1	2	6	-	-	-
Urinary Tract Infection	-	3	9	-	-	-
Bronchopneumonia	-	-	7	-	-	3
Sepsis	-	2	3	-	-	-

Dysentry	-	-	2	-	-	-
Broncholitis	-	-	1	-	-	1
Viral fever	-	1	11	1	1	-
Cystitis	-	1	1	-	-	-
Pneumonia	1	1	3	-	-	1
Rectovestibular fistula	-	2	2	-	-	-
Acute Respiratory Tract Infection	-	1	4	-	-	-
Follicular tonsillitis	-	-	1	-	-	-
Acute Gastroenteritis	-	3	9	-	1	-
Mesenteric adenitis	-	-	1	-	-	-
Rickettsial fever	-	-	1	-	1	-
Acute Respiratory Distress	-	2	2	-	-	-
Chronic Appendicitis	-	1	1	-	-	-
Pertussis	1	-	1	-	-	-
Atopic dermatitis	-	-	1	-	1	-
Pyeloplasty	-	1	1	-	-	-
Laryngotracheobron chitis	-	-	1	-	-	-
Oral candidiasis	1	-	2	-	-	-
Anorectal malformation	-	1	1	-	-	-
Inguinal hernia	-	-	1	-	-	-
Hypernatremia	-	1	-	-	-	-
Ludwig's Angina	1	-	1	-	-	-
Hypocalcemic seizures	-	-	1	-	-	-
Acute streptococcal pharyngitis	1	1	1	-	-	-
Acute febrile Illness	-	2	18	-	1	-
Febrile seizures	-	2	14	-	-	-
Anaemia	-	1	5	-	-	-
Arthralgia	-	-	1	-	-	-
Thrombocytopenia	-	-	2	-	-	-
Shigella encephalitis	-	-	1	-	-	-

AG- aminoglycosides, TC- tetracyclines, FQ- fluoroquinolones

Table 05 shows the distribution of diseases among 120 patients which was analysed and it was found that majority of the children between the age group of 0-1yr (n=29; 21.16%) were diagnosed with respiratory tract infections which included lower respiratory tract infections, upper respiratory tract infections, bronchopneumonia, tonsillitis, pharyngitis and pertussis. Acute febrile illness being prominent diagnosis in children between the age group of 2-3 yrs (n=17; 12.40%), followed by febrile seizures and viral fever in 4-5 yrs (n=13; 9.48%), enteric fever in 6-7 yrs (n=10; 7.29%) and urinary tract infection in 8-9 yrs (n=8; 5.83%) respectively.

Table 5: Details of Distribution Of Diseases In The Population (n=120)

Systemic Infections	Penicillins	AG	Cephalosporins	FQ	TC	Macrolides
Penile hypospadias	-	1	3	-	-	-
Viral meningitis	-	3	4	1	1	-
Enteric fever	-	-	13	1	1	-
Lower Respiratory Tract Infection	2	-	7	-	-	-
Upper Respiratory Tract Infection	-	-	6	-	-	-
Diarrhoea	1	2	6	-	-	-
Urinary Tract Infection	-	3	9	-	-	-
Bronchopneumonia	-	-	7	-	-	3
Sepsis	-	2	3	-	-	-
Dysentry	-	-	2	-	-	-
Broncholitis	-	-	1	-	-	1
Viral fever	-	1	11	1	1	-
Cystitis	-	1	1	-	-	-
Pneumonia	1	1	3	-	-	1
Rectovestibular fistula	-	2	2	-	-	-
Acute Respiratory Tract Infection	-	1	4	-	-	-
Follicular tonsillitis	-	-	1	-	-	-
Acute Gastroenteritis	-	3	9	-	1	-
Mesenteric adenitis	-	-	1	-	-	-
Rickettsial fever	-	-	1	-	1	-
Acute Respiratory Distress	-	2	2	-	-	-
Chronic Appendicitis	-	1	1	-	-	-
Pertussis	1	-	1	-	-	-
Atopic dermatitis	-	-	1	-	1	-
Pyeloplasty	-	1	1	-	-	-
Laryngotracheobron chitis	-	-	1	-	-	-
Oral candidiasis	1	-	2	-	-	-
Anorectal malformation	-	1	1	-	-	-
Inguinal hernia	-	-	1	-	-	-
Hypernatremia	-	1	-	-	-	-
Ludwig's Angina	1	-	1	-	-	-
Hypocalcemic seizures	-	-	1	-	-	-
Acute streptococcal pharyngitis	1	1	1	-	-	-
Acute febrile Illness	-	2	18	-	1	-
Febrile seizures	-	2	14	-	-	-
Anaemia	-	1	5	-	-	-
Arthralgia	-	-	1	-	-	-
Thrombocytopenia	-	-	2	-	-	-
Shigella encephalitis	-	-	1	-	-	-

Table 06 shows that, among 37 drug interactions identified with cephalosporins, 5 (13.51%) DDI's were major, which involved ceftriaxone with doxycycline, 30 (81.08%) DDI's were moderate, involving ceftriaxone with amikacin and gentamycin and 2 (5.40%) DDI's were contraindicated, involving ceftriaxone with calcium gluconate.

Table 6: Details of Drug-Drug Interactions with Cephalosporins

DDI	Frequency	Mechanism	Severity	Clinical Effect
Ceftriaxone + Amikacin	18	Pharmacokinetic	Moderate	Nephrotoxicity
Ceftriaxone + Gentamicin	1	Pharmacokinetic	Moderate	Nephrotoxicity
Ceftriaxone + Doxycycline	5	Pharmacodynamic	Major	Decreases plasma concentration of ceftriaxone
Ceftriaxone + Calcium Gluconate	2	Pharmacokinetic	Contraindicated	Precipitation in the lungs and kidneys
Cefotaxime + Amikacin	11	Pharmacokinetic	Moderate	Nephrotoxicity

DDI- drug-drug interaction

Among 120 patients prescribed with cephalosporins, the most concomitantly administered pharmacological class of drug was NSAID's (n=103; 85.83%), followed by electrolytes, vitamins and minerals (n=71; 59.16%), other antibiotics (n=48; 40%), probiotics (n=36; 30%), anti-tussives (n=35; 29.16%), 5-HT receptor antagonist (n=31; 25.83%), anticonvulsants (n=22; 18.33%), antivirals (n=11; 9.16%), corticosteroids (n=7; 5.83%), benzodiazepines and antiamoebics (n=6; 5%), sympathomimetics (n=4; 3.33%) and proton pump inhibitors (n=1; 0.83%).(Table 07).

Table 7: Details of Other Pharmacological Class of Drugs Used With Cephalosporins (n=120)

Pharmacological Class	No. of Patients	Percentage (%)
NSAID's	103	85.83
H2- Receptor Antagonist	017	14.16
Proton Pump Inhibitors	001	00.83
Electrolytes, Vitamins and Minerals	071	59.16
Probiotics	036	30.00
Antiamoebics	006	05.00
Other Antibiotics	048	40.00
Anti-tussives	035	29.16
Beta-2 receptor agonists	019	15.83
Antivirals	011	09.16
Corticosteroids	007	05.83
Anticonvulsants	022	18.33
5-HT_3 receptor antagonists	031	25.83
Nasal Drops	017	14.16
Benzodiazepines	006	05.00
Sympathomimetics	004	03.33

Table 08 describes the changeover of cephalosporins in accordance with the culture and sensitivity report. Ceftriaxone which was initially prescribed in 8 patients was eventually changed over to cefotaxime in 6 (5%) patients, to cefixime in 1 (0.83%) patient and to cefoperazone in 1 (0.83%) patient.

Table 8: Details of Change Over of Cephalosporins Use after Obtaining Culture Sensitivity Report (n=120)

Started with	Changed to	No. of Patients	Percentage (%)
Ceftriaxone	Cefixime	1	0.83
Ceftriaxone	Cefotaxime	6	5.00
Ceftriaxone	Cefoperazone	1	0.83

The most commonly prescribed dose of ceftriaxone was 500 mg (17.59%) and the most used frequency of administration being twice daily dosing (65.74%). The mean duration of treatment, dose and the number of patients with ceftriaxone was found to be 2.75 days (range 1-8 days), 745.49 mg and 1.77 patients respectively. Whereas, the commonly prescribed dose of cefotaxime was 150 mg (17.64%) and the most used frequency of administration being thrice daily dosing (70.58%), followed by sixth hourly dosing (23.52%). The mean duration of treatment, dose and number of patients with cefotaxime was found to be 3.18 days (range 1-7 days), 440.93 mg and 1.06 patients respectively. Three patients received cefixime, cefoperazone and cephalexin in the dose of 70 mg, 400 mg and 500 mg respectively with the frequency of administration being twice daily dosing.

Table 9: Details of Dose, Frequency & Duration of Cephalosporin Use (n=120)

Name of the Cephalosporin	Dose (mg)	Frequency	Duration (days)	No. of Patients (n=120)	Total Dose per Day (mg)	Total Dose per duration (mg)
	750	OD	4	1	750	3000
	1000	BD	2	4	2000	4000
	250	BD	3	3	500	1500
	500 - 250	BD	4	2	750	3000
	400	BD	2	1	800	1600
	650	BD	1	1	1300	1300
	1000 - 500	BD	2	6	1500	3000
	500	BD	3	8	1000	3000
	500	BD	7	1	1000	7000
	500	BD	5	1	1000	5000
	700 -500	BD	4	1	1200	4800
	500-50	BD	3	1	550	1650
	500	OD	8	1	500	4000
	1250	BD	3	2	2500	7500
	1000	OD	4	2	1000	4000
	700	BD	3	1	1400	4200
	1500	OD	4	1	1500	6000
	1500	OD	2	1	1500	3000
	750 - 500	BD	2	1	1250	2500
	750 - 500	BD	6	1	1250	7500
	1500	OD	1	1	3000	3000

	1200	OD	3	1	1200	3600
	750 - 250	BD	1	1	1000	1000
	800	OD	2	1	800	1600
	1500-1000	BD	1	1	2500	2500
	380	BD	2	1	760	1520
	1500-1000	BD	4	1	2500	10000
	1000 - 500	BD	3	1	1500	4500
	650	OD	1	1	650	650
	1500	BD	2	1	3000	6000
	1200	BD	2	1	2400	4800
	470	TID	2	1	1410	2820
	750	OD	5	2	750	3750
	450	BD	1	1	900	900
	450	BD	2	2	900	1800
	900	BD	1	1	1800	1800
	800	BD	1	1	1600	1600
	300	BD	3	1	600	1800
	600	OD	2	1	600	1200
	500	BD	4	1	1000	4000
	500 - 250	BD	6	1	750	4500
	1000 - 500	BD	1	1	1500	1500
	500 - 250	BD	2	5	750	1500
	500 - 250	BD	3	1	750	2250
	500	OD	3	1	500	1500
	1000	BD	3	2	2000	6000
	1000	OD	3	2	1000	3000
	750	OD	2	6	750	1500
	500	BD	5	1	1000	5000
	750	OD	3	3	750	2250
	250	BD	2	2	500	1000
	500	OD	2	1	500	1000
	400	Stat	2	1	400	800
	1250	BD	4	1	2500	10000
	1000	OD	2	5	1000	2000
	500	BD	2	4	1000	2000
	1500	BD	2	2	3000	6000
	1500	OD	1	1	1500	1500
	750	BD	3	1	1500	4500
	250	BD	1	2	500	500
	750	OD	1	3	750	750
Mean	745.49	-	2.75	1.77	1229.83	-
Cefotaxime	650	TID	3	1	1950	5850
	200	TID	1	1	600	600
	220	TID	5	1	660	3300
	75	TID	3	1	225	675
	250	BD	2	1	500	1000
	900	TID	2	1	2700	5400
	1500	TID	1	1	4500	4500
	1000	QID	3	1	4000	12000
	275	QID	4	1	1100	4400
	750	TID	1	1	2250	2250
	150	TID	2	1	450	900
	150	TID	6	2	450	2700
	500	QID	3	1	2000	6000
	200	QID	3	1	600	1800
	135	TID	5	1	405	2025
	100	TID	7	1	300	2100
Mean	440.93	-	3.18	1.06	1418.12	-
Cefixime	70	BD	2	1	140	280
Cefoperazone	400	BD	10	1	800	8000
Cephalexin	500	BD	2	1	1000	2000

OD- once daily, BD- twice daily, TID- thrice daily, QID- four times a day, Stat- at once Out of 124 cephalosporins prescribed, 111 (89.51%) cephalosporins were found to be appropriate in dose and 13 (10.48%) cephalosporins were found to be inappropriate in frequency as compared to standard text.

4. Discussion

This study was conducted to evaluate the prescribing pattern of cephalosporins in paediatric department of tertiary care teaching hospital. The current study showed, number of males were more predominant than the number females, which was similar to a study, where they observed majority of the patients were males when compared to females.[27] Considering the age, majority number of patients belonged to the age group of 0-1 year. The main reason for infants to be more prone to infections is because of lesser immunity. This is similar with the results obtained by other study.[28] The study showed wider usage of third generation cephalosporins in hospitalized paediatric patients as their penetration is adequate to effectively treat systemic infections. The finding was in line with other study.[29] It was found that majority of cephalosporins were prescribed for parenteral administration when compared to oral route which was proved in a study.[30] This is because the age at which children can swallow conventional tablets is of great importance for their safety and moreover, 3rd generation cephalosporins like ceftriaxone and cefotaxime are available only as injection dosage form. It was found that most cases received cephalosporins as first-line therapy for the diseases and majority of the patients were prescribed cephalosporins empirically, while only a few patients received cephalosporins after obtaining the culture sensitivity report. These findings are in line with a study conducted by Alemayehu Sileshi et al.[31] Significant use of cephalosporins was observed in respiratory tract infections which was in line with a study,[32] followed by febrile illness. These findings are similar to a study conducted.[28] More respiratory tract infections were reported in this study as it was conducted during the winter season. It was observed that ceftriaxone and cefotaxime were the most commonly prescribed cephalosporins. These findings were in line with a study.[33] Out of 205 antibiotics prescribed, the antibiotics of choice were cephalosporins, followed by aminoglycosides, penicillins and tetracyclines which was similar to a study.[34] Among the prescribed cephalosporins, aminoglycosides, penicillins and tetracyclines the choice of drug was ceftriaxone, amikacin, amoxicillin and doxycycline respectively. The other antibiotics prescribed included macrolides and fluoroquinolones. Majority of the drug-drug interactions with the prescribed cephalosporins namely, ceftriaxone and cefotaxime was found with aminoglycosides namely, amikacin and gentamycin, followed by tetracyclines namely doxycycline and few contraindications were found with calcium gluconate. Among the various pharmacological class of drugs prescribed along with cephalosporins, most concomitantly used were found to be NSAID's. This finding was similar to a study conducted.[35] Less frequently used were electrolytes, vitamins and minerals, other antibiotics, probiotics, anti-tussives, 5-HT_3 receptor antagonist, anticonvulsants, antivirals, corticosteroids, benzodiazepines, antiamoebics, sympathomimetics and lastly proton pump inhibitors. The most commonly prescribed dose of ceftriaxone was found to be 500 mg with the most used frequency of administration being twice daily dosing which was in line with a study,[31] followed by once daily dosing. The mean duration of treatment, dose and the number of patients with ceftriaxone was found to be 2.75 days (range 1-8 days), 745.49 mg and 1.77 patients respectively. Whereas, the commonly prescribed dose of cefotaxime was 150 mg and the most used frequency of administration being thrice daily dosing, followed by sixth hourly dosing. The mean duration of treatment, dose and number of patients with cefotaxime was found to be 3.18 days (range 1-7 days), 440.93 mg and 1.06 patients respectively. More number of the patients initially prescribed with ceftriaxone were changed over to cefotaxime and a lesser number were changed over to cefixime and cefoperazone. Cephalosporin which was initially prescribed to the patient was eventually changed over to another cephalosporin in accordance with the culture and sensitivity report.

Rational use of cephalosporins in accordance with appropriate dose and frequency was found to be high which was analysed by comparing with a standard text. [36] Similar results were obtained in the study conducted by Hyuck Lee et al.[37]

5. Conclusion

A small number of inappropriate use of cephalosporins was found in frequency and dose. Also, the drug-drug interactions with the prescribed cephalosporins were identified. This necessitates clinical pharmacist intervention in the drug therapy to identify, resolve and prevent drug related problems in paediatric population.

6. Acknowledgement

The authors thank, Dr. Md. Salahuddin, Principal, Farooqia College of Pharmacy, Dr. Suguna Shanti, Director of CSI Holdsworth Memorial (Mission) Hospital and Dr. Ravish, Head of Paediatric department for their support and encouragement. We also extend thanks to Mr. Sheikh Mohammed Afzal for his timely support.

7. Conflict of Interest

The authors declare no conflict of interest.

This research was carried out without funding.

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