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ANTIBIOTIC UTILIZATION IN PEDIATRIC IN-PATIENTS AT A TERTIARY CARE UNIT.

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ABSTRACT… Antibiotics are key drugs which are used for the treatment of infectious disease and are among the drug that are most frequently prescribe in pediatric patients. This study was designed to assess antibiotics utilization patterns in pediatric ward of a tertiary care teaching unit, Peshawar. **Study Design:** A retrospective cross sectional study. **Setting:** Pediatric ward by evaluating antibiotics utilization patterns in pediatric ward of a tertiary care teaching unite, Peshawar. **Period:** January, 2017 up to March, 2017. **Materials and Methods:** There were 219 patients included in the study. In this study, the major medical conditions for which antibiotics were prescribed include pneumonia (23.28%). **Results:** The most commonly used antibiotics were ceftriaxone, 46.21%, while the most commonly prescribed multiple antibiotics were ceftriaxone plus ampicillin (21.9%) followed by Ceftriaxone & Metronidazole. The average number of antibiotics per prescription was 1.75. At least 114 (52%) patients were prescribed with single antibiotic and patients prescribed with two antibiotics were 72 (32%). There was a high rate of parental administration which account for about 92.26% of the total antibiotic prescribed. It is assessed that 26.89% of total drugs were prescribed by generic name which were extremely lesser than the medication prescribed with brand names 73.10%. **Conclusion:** From the result we concluded that third generation cephalosporin especially ceftriaxone was most frequently prescribed antibiotic in hospitalized children.

Key words: Adverse, Antibiotics, Pediatric, Prescription Pattern, Resistance

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INTRODUCTION

Antibiotics are key drugs which are used for eradication and treatment of infectious diseases and are among the drug that are most frequently prescribe in pediatric patients.[1,5] Infants and children's constitute about 28% population of the world and due to under development of immune system they are most susceptible to infectious disease.[2,6] A number of studies reported that in developed and developing countries 50 to 85% of children receive antibiotics prescribed by Pediatrician[3] Antibiotics have save billions of lives since their first arrival about fifty years ago.[4] However, nowadays large number of people are dying from infectious disease that were treatable but for which no longer we have correct treatment. This is because due to the development of resistance by bacteria that transforming their shape.[4] Number of research studies have showed the connection between antibiotic use and the rate of resistance. This globally widespread resistance to antibiotic is a thread to this golden stag of antibiotic therapy.[5] Its not only reduces the rate of effective treatment but also increase the risk of morbidity, mortality and cost of healthcare.[6] The rate of morbidity and mortality is high with the infection cause by antibiotic resistance bacteria as compare to antibiotic susceptible bacteria.[7,8,9] It is estimated worldwide that the inappropriate prescribing, dispensing and sale of drug is more than 50%.[8] It has been found in various parts of the world that the inappropriate use of antibiotics is common but in developing countries few studies are found in this regard.[9] Of all the drug the use

and miss use of antibiotic are more common.[4]

During inpatient stay majority of the admitted patients receive antibiotics either for therapy or prophylaxis purpose. The estimated percentage of antibiotic that is use without clear indication is at least about 50%.[10] Excessive prescribing of antibiotic not only increase the chances of super infection due to antibiotic resistant bacteria, but may also increase the cost of expenses on health care and may increase the possibility of adverse drug reaction. The over use of antibiotic is considering to be the key reason for high occurrence of antibiotic resistance in hospital observed.[10,11] Irrational antibiotic use lead to occurrence and spread of bacterial resistance, increase cost of treatment, adverse reaction which need more resources to be manage and patient misconception of these drugs in comparison to other.

MATERIALS AND METHODS

The study was conducted at LRH which is a tertiary care teaching hospital at Peshawar, Pakistan. The study was conducted in the pediatric wards from January to March 2017 for two consecutive months.

A retrospective cross sectional study was carried out in a pediatric ward at LRH, Peshawar Pakistan from January, 2017 up to March, 2017.

All patients attending the pediatrics wards of LRH during the study period were considered as the source of population. On the other hand, the study populations were all infected patients who had been admitted to the pediatric wards of LRH during the study period.

All patients attending the pediatric wards of LRH during the study period and who have been prescribed antibiotic were included. The study was conducted from January 2017 to March 2017. Accordingly, prescriptions of all patients that were seen at LRH during this period and met the eligibility criteria were successively enrolled into the study and during this period totally 219 prescriptions were collected. For this study, prescriptions of pediatric patients of that met the eligibility criteria were included in the study. The following inclusion criteria were applied.

Inclusion Criteria

All pediatric population <14 years of age admitted to in-patient pediatric ward, were included in the study.

Exclusion Criteria

Patient >14 years of age and who did not receive antibiotics were excluded from the study.

For the collection of desire data from the prescriptions a data extraction form was developed. For the developing of the data extraction form the following process was followed. Considering the objective of the study the data extraction form comprised of three section. Section first consist of the patient demographic data such as age and gender. The next one comprise of the disease for which the patient was admitted and the third one include the drug prescribed, dose of the antibiotic, frequency, quantity dispensed and duration of treatment

Using data extraction pro-forma data was extracted from patient chart. The collected data was cleared and checked for completeness and then analyzed in term of percentage frequency appropriate graphic presentation for the describing data.

RESULTS

Socio Demographic Data of the Patients

The total number of the patients involved in the study was 219. One hundred and twenty-six (57.53%) were male and 91(41.55%) females. One hundred fourteen (52.05) of the admitted patents were at the age of one month to one year followed by pre-school age child 51 (23.29%) as shown in the Table-I.

Common Pediatric Disease

The most common diagnosis was pneumonia (23.28%), Lower respiratory tract infection (19.17%) and meningitis (13.7%), pleural effusion was the disease which were found in least number (1.82). (Table-II)

Classes of Antibiotics Prescribed

During our study period the highly prescribed antibiotic was Ceftriaxone 177 (46.21%) followed by Ampicillin 39 (10.18%) and Cefotaxim 27 (7.05%) (Table-III).

Multiple Antibiotics Prescriptions

As shown in Table-IV, in case of combination the most commonly use antibiotics was ceftriaxone and Ampicillin 31 (29.81%), followed by ceftriaxone and metronidazole 24 (23.08%) & Vancomycin and Ceftriaxone 14 (13.46%).

Antibiotic Prescription by Generic Name Verses Brand Name

As the Table-V indicates that most of the drug were prescribed by brand name 280 (73.10%). While the drug prescribe by generic name are about 103 (26.89%).

Frequency of Prescribing Patterns of Antibiotics in Accordance with Diagnosis

As shown in Figure-2 highest number of antibiotics were prescribed for pneumonia, followed by Lower Respiratory Tract Infection (LRTI), Measles and Meningitis. Among the total number of antibiotics prescribed for pneumonia Ceftriaxone was use in high proportion followed by Ampicillin. Similarly, in case of LRTI, Ceftriaxone were also use in high number and followed by Ampicillin and Cefotaxim. For the treatment of Measles Ceftriaxone and Tobramycin eye drops were mostly prescribed. In all condition Ceftriaxone was the mostly prescribe antibiotic. Vancomycin was used frequently for Meningitis, pleural effusion and pneumonia. (Figure-1)

Number of Antibiotics Per Prescription

Majority of the patient were prescribed with single antibiotics 114 (52%), patient prescribed with two antibiotics were 72 (32%), with three antibiotics were 30 (14%) and only 3 (1.37%) patient was prescribed with four antibiotics. (Figure-2)

Parameter	Frequency	Percentage
Sex		
Male	126	57.53%
Females	91	41.55%
Total	219	100%
Age		
0-28 day	9	4.1%
29 days-12 months	114	52.05%
1 year-5 year	51	23.29%
5 year-12 year	45	20.54%
Total patients	219	100%

Table-I. Patient demographic data

DISCUSSION

In our study126 (57.53%) of the patients were male compare to 91 (41.5%) were females. which is similar to the study conducted in Guwahati (India).[12] The average length of hospital stay was 6.7 days which is less than one of the study done in which average length of hospital stay is 8.9 days.[12]

Diagnosis	0 Days-28 Days	29 Days-12 Months	1 Year-5 Year	5 Year-12 Year	Total No,%
Pneumonia	3 (1.4%)	39 (17.8%)	6 (2.73%)	3 (1.4%)	51 (23.28%)
Meningitis	0 (0%)	13 (5.93%)	8 (3.7%)	9 (2.41%)	30 (13.7%)
Measles	0 (0%)	18 (8.21%)	6 (2.73%)	0 (0%)	24 (10.95%)
AGE	0 (0%)	6 (2.74%)	6 (2.74%)	0 (0%)	12 (5.5%)
LRTI	3 (1.4%)	27(12.32%)	9 (4.1%)	3 (1.4%)	42 (19.17)
Enteric fever	0 (0%)	0 (0%)	6 (2.43%)	2 (.81%)	9 (3.65%)
Pleural effusion	0 (0%)	0 (0%)	1 (.30%)	3 (.90%)	6 (1.82%)
Sepsis	3 (1.4%)	6 (2.73%)	0 (0%)	0 (0%)	9 (4.1%)
Others	0 (0%)	9 (4.1%)	12 (5.5%)	18 (8.21%)	39 (17.80%)
Total					219 (100%)

Table-II. Common diseases of children

Type of Antibiotic	Frequency Use	Percentage
Benzyl Penicillin	3	0.78%
Ampicillin	39	10.18%
Cloxacillin	10	2.61%
Cefotaxim	27	7.05%
Ceftazidime	11	2.87%
Cefoperazon	5	1.30%
Ceftriaxone	177	46.21%
Amoxicillin	18	4.69%
Cepefime	4	1.04%
Ceftazidime	6	1.56%
Vancomycin	22	5.74%
Metronidazole	26	6.78%
Amikacin	7	1.82%
Tobramycin Ointment	22	5.74%
Anti-TB	6	1.56%
Total	383	100%

Table-III. Classes of antibiotics prescribed.

Antibiotic Combination	Frequency	Percentage
Ceftriaxone + Amoxicillin	2	1.9%
Ceftriaxone + Ampicillin	31	29.81%
Cefepime + Vancomycin +Ampicillin +Cloxacillin	3	2.88%
Ceftriaxone +Metronidazole	24	23.08%
Ceftriaxone + Vancomycin	14	13.46%
Ceftriaxone + Tobramycin eye drops	17	16.45%
Co-Amoxiclave + Vancomycin	5	4.81%
Amikacin + Cefepime	1	0.96%
Ampicillin + Cloxacillin + Ceftriaxone	7	6.73%
Co-Amoxiclave + Ceftriaxone	3	2.88%
Ceftriaxone +Amikacin +Metronidazole +Tobramycin eye drops	1	0.96%
Ceftriaxone+ Cefoperazon + Metronidazole + Tobramycin eye drops	1	0.96%
Streptomycin + Ceftriaxone	4	3.85%
Ceftriaxone + Vancomycin +Rifampicin	2	1.92%
Total	104	100%

Table-IV. The antibiotic combinations prescribed.

Type of Antibiotic	Frequency	Percentage
Brand Name	280	73.10%
Generic Name	103	26.89%

Table-V. Antibiotic prescriptions by generic names Vs brand names.

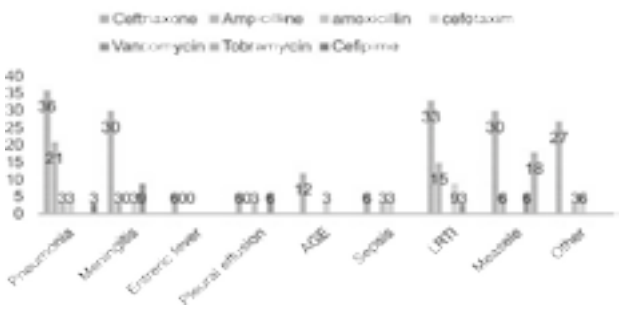

Figure-1. Frequency of prescribing pattern of antibiotic an accordance with diagnosis in pediatric ward of LRH from January - March, 2017.

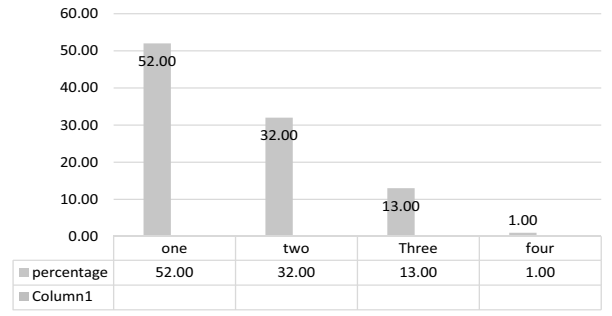

Figure-2. Number of antibiotics per prescription in pediatric ward of LRH from January-March, 2017.

The average number of antibiotic per prescription was 1.75. this result was low as compare to the study done in south west Ethiopia which show that average number of antibiotic prescribe per patient was 2.17% 15.but was comparable to the study done in Tamilnadu, India in 2011 which showed the average number of antibiotic per prescriptions was 1.64%.[13] In our study we have observed that pediatric patients having age group 29 days-12 months had received more number of antibiotics as compare to infants and school age children's. In contrast Guwahati.[12] has found that the children at the age of 5-12 years and in teaching hospital in Ethiopia those which were from 1-5 year received antibiotics more commonly. Pneumonia was the most common disease for which high proportion of antibiotic was prescribed which was in similarity with the finding of the study conducted in Guwahati medical college and hospital Guwahati.[12] North East, Ethiopia.[15] And JUSH pediatric ward, Ethiopia.[14] In our study most of the patients have received at least two antibiotics, which is in consistent with the study done in Ethiopia.[15] which showed that two antibiotics were most frequently prescribed in pediatric patients. In contrast study in the Guwahati medical college and hospital Guwahati shows large number of singly us antibiotics.[12] The maximum number of antibiotic per prescription were four which is consistent with the study done in Hawassa University Referral Hospital which shown that the maximum number of antibiotic prescribed per-prescription was four.[16] Among the most commonly prescribe single antibiotic was Ceftriaxone (46.21 %), Ampicillin (10.18%), Cefutaxime (7.05%), Vancomycin (5.74%) study of Tsegaye et al., 2015 shown (21.69%) of Gentamycin and (18.30%) of Penicillin-G prescription.[15]

CONCLUSION

In this study Ceftriaxone was the most commonly prescribed antibiotic in pediatric patients while Ceftriaxone + Ampicillin combination was the most frequently prescribed combined antibiotic. This high use of ceftriaxone may be due to its availability in injectable form because most of the patients were admitted which require quick therapy with parental rout which is not possible with oral one. And secondly the reason for the large use of this extended spectrum antibiotic was the treatment of all infection without microbial sensitivity test to cover wide range of microbes as well as its safety profile. Prescription by brand name was a continuous practice which is deemed irrational.

RECOMMENDATIONS

To prevent resistance and improve rational use of medication all health workers are encourage to use standard treatment guidelines, as well as antibiotic control system should be implemented. Hospital should have drug therapeutic committee that can evaluate incorrect prescription.

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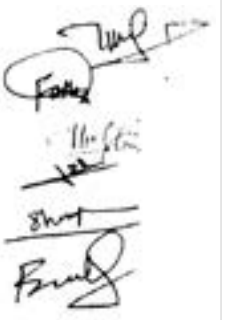
1	Abid Ullah	Supervision.	
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