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Prescribing Pattern of Antibiotics in Respiratory Tract Infections in the Pediatric Indoor Patients at Manipal Teaching Hospital

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ABSTRACT

Introduction: Respiratory tract infections are the most frequently occurring illness in childhood and antibiotics are the key drugs for its treatment which account for three-quarters of all antibiotics prescriptions. Injudicious use of antibiotics leads to the development of resistance, patients are at high risk for opportunistic infections or prolonged hospitalization. This study aimed to assess the prescribing pattern of antibiotics for respiratory tract infections in the pediatric indoor patients of Manipal Teaching Hospital.

Methods: This study is a prospective cross-sectional study done in the paediatrics ward of Manipal Teaching Hospital Pokhara, conducted for six months. Patients aged range from 1 day to 14 years who meet the inclusion criteria were taken in this study. Data were collected from the inpatient ward and analysed using various statistical tools.

Results: Among 170 patients, a maximum(43.3%) were in the age group of 1 day to 11 months with male predominance(74.1%). Bronchopneumonia was the most common respiratory tract infection (51.8%) followed by bronchiolitis (13%). Chest x-ray was done in all patients however blood culture was done only in 60.6% and an antibiotic sensitivity test (27.6%) before prescribing antibiotics. Cefotaxime was prescribed in maximum patients (62.4%) followed by ceftriaxone (17.1%). All the patients received at least one antibiotic by i.v route during the hospital stay.

Conclusion: Since culture and sensitivity tests were not carried out on most of the patients before prescribing antibiotics in this study, which might lead to an increased chance of bacterial resistance and treatment failure in the future.

Keywords: *Pediatrics; Prescriptions; Respiratory Tract Infections*

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INTRODUCTION

A written prescription is the prescriber's order to prepare or dispense a specific treatment-usually medication-for to a specific patient.[1] It is an important transaction between the physician and the patient. It brings into focus the diagnostic acumen and the therapeutic proficiency of the physician with instruction for restoration of the patient's health. Prescription of drugs is an important skill, which needs to be continuously assessed and refined accordingly. It not only reflects the physician's knowledge of pharmacology and pathophysiology of diseases but also his/her skill in diagnosing and attitude towards selecting the most appropriate cost-effective treatment.[2]

Respiratory tract infections are the predominant cause most of health care consultations.[3] Paediatric groups are among the most vulnerable population groups to contact illnesses.[4] Respiratory tract infections are the most frequently occurring illness in childhood. It can be classified as upper respiratory tract infections (URTI) and lower respiratory tract infections (LRTI). The types of URTIs are common cold, pharyngitis, otitis media and sinusitis.[5] LRTI include acute bronchitis, bronchiolitis, and pneumonia.

Antibiotics are the key drugs for the treatment of infections and are among the most commonly prescribed drugs in Pediatric departments.[6] Several studies reported that 50% to 85% of children receive antibiotics in developed and developing countries prescribed by physicians.[7]

Respiratory tract infections account for three-quarters of all antibiotics prescriptions.[8] Respiratory tracts are of various aetiology: bacterial, viral and fungal. Irrespective of their aetiology, antibiotics are used indiscriminately and this is contributing to the development of resistance to antimicrobial agents which is currently one of the most important growing public health issues worldwide.[9,10,11,12] Injudicious use of antibiotics not only leads to the development of resistance but also these patients are at high risk for opportunistic or nosocomial infections or prolonged hospitalization and immunosuppressed condition.[13] Thus judicious use of antibiotics is, therefore, an important way to reduce the problem of antimicrobial resistance and other health-related problem.[14] This rise in antibiotic prescribing has led to an urgency to reexamine physician prescribing habits and to the dissemination of new evidence-based guidelines for antibiotics in respiratory tract infections.

In this study, I'll be assessing the prescribing pattern of antibiotics in respiratory tract infections in paediatric indoor patients in MTH.

METHODS

This study is a prospective cross-sectional study conducted in the paediatrics ward of Manipal Teaching Hospital Pokhara Nepal from November 2020 to May 2021. In this study pediatric patients who were in the age group of one day to 13 years were taken. Patients admitted to the ward with the diagnosis of respiratory tract infections, either upper or lower respiratory tract infections and those who were under at least one antibiotic therapy were included.

Patients with RTI but not taking a single antibiotic were not included in this study and whose parents did not give consent to take data were also excluded from the study. A total of 170 pediatric patients who fulfilled the above criteria were taken in the study. The period of this study was six months.

The ethical clearance was taken from the institutional review committee (IRC) at Manipal Teaching Hospital (MTH) to conduct the study. All the prescriptions written by a paediatrician for an indoor patient with RTI were checked and those having at least one antibiotic were taken in the study.

The demographic profile like age, sex, body weight, and lab investigation (TC/DC, Chest table x-ray, blood culture and

antibiotic sensitivity test) were recorded from the patient's case record sheet. Type of respiratory tract infections (URTI or LRTI) were also noted from diagnosis. A total number of antibiotics prescribed per patient, types of antibiotics, route of administration of the antibiotics, duration of treatment with antibiotics and total duration of hospital stay were recorded from record sheets. Also, the number of antibiotics prescribed at the time of discharge, their route and total duration of treatment after discharge were recorded.

Data collected were subjected to enter into a Microsoft excel sheet and analyzed by SPSS version 25 using descriptive statistics and the result was expressed as a percentage and mean.

RESULTS

Out of 170 pediatric patients enrolled in the study, the highest number i.e. 74 (43.3%) were in the age group one day to 11 months, and the lowest number i.e. only 11(6.5%) were in the age group 9-13 years as shown in Table 1. The mean age was 2.07±0.093. Male patients were higher in number (74.1%) than females (25.9%).

Table 1: Age Group Analysis

Age group	Frequency	Percentage (%)
1d-11m	74	43.5
1y-3y	45	26.5
3y-6y	27	15.9
6y-9y	13	7.6
9y-13y	11	6.5
Total	170	100.0

All the admitted patients in the ward were undergone one or other type of investigation. Chest x-ray was done in 100% of the admitted patients, in 99.4% blood count was done, and blood culture and antibiotic sensitivity test were done in 39.4% and 27.6% respectively as shown in Table 2.

Table 2: Lab Investigations of Indoor Patients

Lab investigations	Frequency	Percentages (%)
Chest X-ray	170	100
TC/DC	169	99.4
Blood culture	67	39.4
Antibiotic sensitivity test	47	27.6

The most common respiratory tract infection found in our study was bronchopneumonia which was 51.8% followed by bronchiolitis (13%) and other respiratory tract infections as shown in table 3. Duration of hospital stay ranges from one day to 28 days with a mean duration of 6.13±0.283 days of which a maximum of them (29.4%) stayed in the hospital for five days which is followed by three days (17.6 %).

Table 3: Types of infection

Diagnosis	No.of prescription	Percentage (%)
Acute gingivitis	2	1.2
Acute tonsilitis	9	5.3
Allergic rhinitis	5	3
Aspiration pneumonia	1	.6
Bronchiectasis	1	.6
Bronchiolitis	22	13
Bronchopneumonia	88	51.8
Laryngitis	3	1.8
Lower Respiratory Tract Infections	10	5.9
Otitis media	1	.6
Parotitis	1	.6
Pharyngitis	5	2.9
Reactive airways diseases	6	3.5
Upper Respiratory Tract Infections	12	7.1
Viral pneumonia	4	2.4
Total	170	100.0

The number of antibiotics taken by pediatric patients during hospital stays was one to five. Two antibiotics were prescribed to a

maximum patient of 82(48.2%), 40% receive only one antibiotic and very few patients 0.6% received 5 antibiotics. All the admitted patients were given at least one antibiotic by the I.V route.

Cefotaxime i.v, TDS was the most commonly prescribed antibiotic during hospital stay account 62.4% of patients followed by Ceftriaxone i.v, BD(17.1%). Clavam (amoxicillin+clavulanic acid) was the commonly prescribed fixed-dose combination antibiotic which accounts for 12.4% of total patients. (Table 5). Other combinations were cefotaxime with gentamycin, cefotaxime with vancomycin, and vancomycin with meropenem prescribed in a few cases.

Table 4: Total Number of Antibiotics Prescribed During a Hospital Stay

No. of antibiotics	Total Number(%)
1	68(40%)
2	82(48.2%)
3	12(7.1%)
4	7(4.1%)
5	1(0.6%)
Total	170

Table 5: Antibiotics Exposure to Paediatric Patients

Antibiotics	No. of prescription	Percentage (%)
Ciprofloxacin	1	0.6
Clavam	21	12.4
Meropenam	2	1.2
Piperacillin	1	.6
Cefotaxime	106	62.4
Gentamycin	8	4.7
Tazobactam	1	.6
Vancomyc	1	.6
Ceftrixone	29	17.1
Total	170	100.0

The total duration of antibiotics prescribed ranges from one to 14 days with which a maximum of patients(31.8%) receive antibiotics for 5 days followed by 3 days (20%). longest duration(14 days) antibiotics were prescribed in case of recurrent bronchopneumonia. In the current study antibiotics prescribed to the patients at the time of discharge were also noted from the prescriptions. No antibiotic was prescribed in 64(37.6%) patients, one antibiotic was prescribed in 101(59.4%) and only 5(3%) patients receive 2 antibiotics at the time of discharge from the ward. Among the varieties of antibiotics prescribed at the time of discharge most commonly prescribed was Monoral (cefpodoxime) twice a day in 18.8% and then clavam three times a day in (14.1%) of the patient. All the antibiotics were prescribed by oral route at the time of discharge.

DISCUSSION

Respiratory tract infections are the most frequently occurring illness in childhood and account for three-quarters of all antibiotics prescriptions.[8] The present study was done to evaluate antibiotic prescribing patterns among respiratory tract infected 170 pediatric inpatients. Most of the pediatric patients were in the age group 1 day to 11 months which is similar to the study done by Palikhe and Al-Ghazali MAA.[15,16] The mean age of the patients was 2.07. There was a preponderance of male patients. The percentage of male and female patients was 74 % and 36% respectively. Similar findings were seen in other studies as well mentioning that sex has a major impact on the outcome of infectious diseases starting from the beginning of life. [16,17]

In the current study, 100% of the admitted patients were undergone chest x-ray to rule out the diagnosis related to the respiratory tract. A blood test was done in 99.4% and blood culture and antibiotic sensitivity tests were done in 39.4% and 27.6% respectively. The most common diagnosis found in our study was bronchopneumonia (51.8%) followed by bronchiolitis (10.6%) which is similar to the studies were done by Shruthi et al., Badar et al., and Palikhe.[15,18,19] In contrast, in the study done by Al-Ghazali et al., bronchiolitis was the most common diagnosis and bronchopneumonia was the second most

common diagnosis among pediatric patients.[16] A pediatric patient diagnosed with RTI was admitted to the ward for a minimum of 1 day to a maximum of 28 days with the average duration of hospital stay being 6.13 days. Most of them 50 (29.4%) stayed for 5 days and 30(17.6%) stayed for 3 days.

The WHO recommends that the average number of drugs per prescription should be less than 2. The average number of drugs per prescription value should be as low as possible to prevent the unfavourable outcomes of polypharmacy such as the increased risk of drug interactions, increased cost of therapy, noncompliance and emergence of resistance in case of use of antimicrobials.[20] In the current study, the average number of antibiotics per prescription was 1.77 which was similar to findings seen in other studies.[17] Most of the patients receive 2 antibiotics in our study which is in contrast with the other studies(Mohapatra et al., Arute et al., and Badar et al. where a single antibiotic was prescribed in most of the prescriptions.[19,21,22] 100% of the admitted patients receive at least one antibiotic by the parenteral route which is near to the study done by Al-Ghazali et al.[16] Several studies have shown the varying percentages of antibiotics which were prescribed by the parenteral route.[15,23,24,25]

CONCLUSION

Bronchopneumonia was the most common lower respiratory tract infection diagnosed in this study. Cephalosporins (Cefotaxime and Ceftriaxone) were the frequently prescribed i.v antibiotics and clavam was the common combination antibiotics used in paediatric indoor patients in this study. Most of the antibiotics were given by the parenteral route. From this current study, it is concluded that management protocols did not fully abide by the current guidelines since culture and sensitivity tests were not carried out in all cases of RTI before prescribing antibiotics. Most of the paediatric patients received antibiotics without culture and sensitivity tests. Irrespective of its aetiology, antibiotics were prescribed in very few cases case such as viral infections and all these factors contribute to the development of resistance to antimicrobial agents. So from the result of the current study, it is recommended that the concerned authority or the professional organization should take a step to increase the awareness of antibiotic use among practising physicians and there is a need for a standard treatment guideline for every hospital taking into account the local sensitivity pattern of organisms to confirm the appropriateness of antimicrobial agents which help to control the emerging problem of antibiotics resistance.

CONFLICT OF INTEREST

None

SOURCE OF FUNDING

None

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