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PRESCRIBING PRACTICES OF ANTIBIOTICS AND MEDICATION ADHERENCE IN ACUTE LOWER RESPIRATORY TRACT INFECTIONS IN PAEDIATRIC OUTPATIENTS OF A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

The work was a prospective observational study carried out to identify the prescribing pattern and compliance of antibiotics in acute lower respiratory tract infection in paediatrics out patients. The patients enrolled in the study were within the age 1-12 years. Out of 244 patients enrolled in the study, the mean age was found to be 5.30 years with SD of 3.48. Amoxicillin is the most commonly prescribed antibiotic. The next commonly prescribed antibiotic was Azithromycin followed by Amoxicillin + Clavulanic acid. Cephalexin was the least prescribed antibiotic for LRTI. Syrups were the widely prescribed dosage form. There is significant relationship between age group and dosage forms. Tablet and capsule were mostly prescribed in school children. Syrup prescribed mostly in toddlers, followed by preschool and school children. In this study most of the patients were prescribed TID regimen and 5 days of antibiotic duration. Majority of Antibiotics prescribed in Brand name. Polypharmacy prescriptions indicated wide use of Antibiotics + Bronchodilators + Antipyretics. Antihistamines were prescribed in 19.3% patients Adherence study of 244 patients was carried out. From the study it was revealed that 133 (54.5%) patients belongs to High adherence followed by Medium adherence in 98 patients (40.16%) and 13 (5.32%) belongs to Low adherence. In this study high adherence was significantly associated with the antibiotic duration. When the duration of days of antibiotic therapy increases, the percentage of high adherence in the population decreases. Adherence was worse with TID schedule and better with OD regimen. High adherence and low adherence was significantly associated with the number of daily doses of antibiotic. This indicated that when the frequency of doses increased compliance was decreased. Adherence was also significant with the educational qualification of primary care

giver. High adherence increases and low adherence decreases with increase in educational qualification of primary care giver.

KEYWORDS: antibiotics, paediatric, LRTI, medication adherence.

INTRODUCTION

Worldwide, infants and children represent a higher proportion of the population. Across the globe this category has higher than average risk of developing infectious disease. Lower respiratory tract infections (LRI) are an important problem to society. They occur frequently and are associated with significant morbidity and mortality. LRI impose a considerable cost to the nation. Initially LRIs are usually managed by general practitioners (GPs). Use of Antibiotic prescription in LRI remains controversial. On the one hand, it is usually of bacterial origin, is associated with a high morbidity and mortality, and needs to be rapidly treated with an antibiotic.[1] Prescribing the appropriate antibiotic is important to obtain the optimal patient response.

The problem of getting children to follow a treatment regimen is widespread and is frustrating for physicians Antibiotic adherence is an important issue in the management of any paediatric infection. Poor adherence to antibiotic regimens has resulted in one of the major causes of treatment failure. Non-adherence to antibiotic treatment has been widely demonstrated to have a profound negative impact on patient health resulting in the reduction of clinical success, additional physician visits, extra drug prescriptions and hospital admissions with an increase in additional costs to manage non-adherent patients.[10]

Prescribing practices are a reflection of health professional's abilities to determinate among the various choices of drugs and determine the ones that will most benefit the patients. The study of prescribing pattern is a part of the medical audit and seeks to monitor, evaluate and if necessary, suggest modification in prescribing practices to make medical care rational and cost effective.[4]

Hence the main aim of my study is to pictuarise antimicrobial prescribing patterns and compliance with antibiotic therapy in paediatric populations with lower respiratory tract infections.

METHODOLOGY

Prospective observational study in outpatient Paediatric department of IMCH, Govt. Medical College, Calicut for 6 months. patients were enrolled and included in the study as per inclusion and exclusion criteria.

INCLUSION CRITERIA

Randomly selected patients attending paediatric outpatient department in Calicut Medical College who are diagnosed to have acute lower respiratory tract infections.

Both male and female in the age group 1-12 years.

EXCLUSION CRITERIA

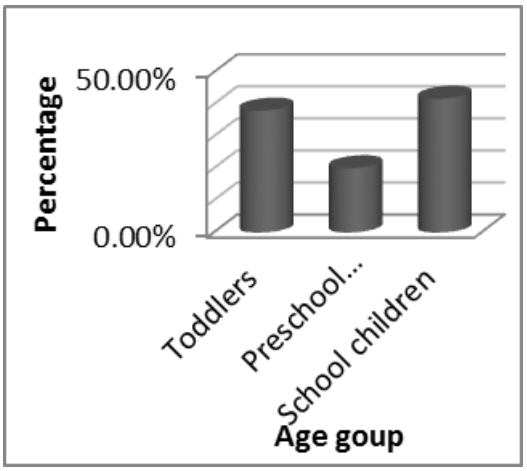
In patients Age <one year Age >12yr Children, with other infections like gastrointestinal infections will be excluded.

SOURCE OF DATA**:** Prescriptions of outpatients Direct interview of parents/care takers.

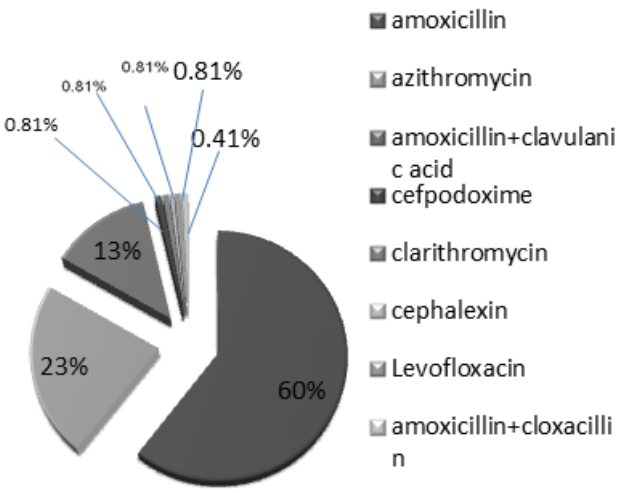
Patient compliance was evaluated using Morisky medication adherence scale 4 (MMAS 4) by follow up on next visit. Data analysis was done by descriptive analysis.

RESULTS

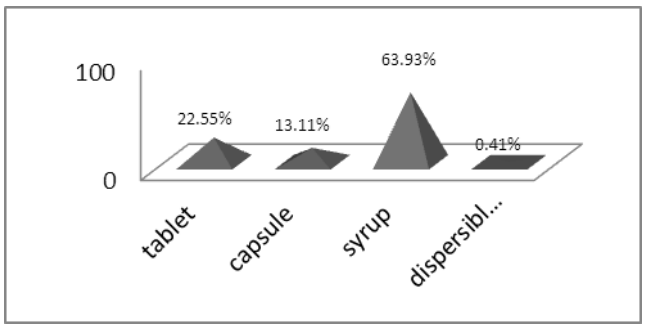
During the study period, a total of 251 patients were enrolled, 7 patients were excluded due to insufficient data. The remaining 244 patients were analysed, who are receiving antibiotics for LRTIs at paediatric outpatient department in IMCH, Govt. Medical College, Calicut. The collected data was evaluated to understand the drug prescribing pattern and patient compliance of antibiotics towards LRTI.



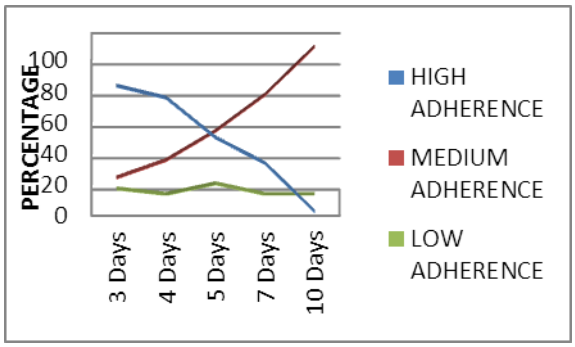
52.9% patients were males and 47.1% were females (The patient data showed only a slight dominance of males over females in the study population. In the present study, 102 (41.80%) were school children (age in between 6 and 12), followed by Toddlers (age in between 1 and 3) 93(38.1%) and preschool children 49 (20.08%). Primary care giver of 74.6% patients having the educational qualification school level followed by graduation (24.2%), illiterate (0.8%), and post graduation (0.4%). The number of children in the same house hold. 133 having number of children in the same house hold 2, followed by one child in 64, three children in 40, four children in 6 and five children in 1 cases. Out of 244 prescriptions 82 patients have the history of use of antibiotics in past 6 months. Amoxicillin received in 36 (36.37%) occasions, followed by Azithromycin in 24 (24.24%), Amoxicillin+Clavulanic acid in 11 (11.11%), Cefixime in 5 (5.05%), Cephalexin in 5 (5.05%), Cefadroxyl in 3 (3.03%), Ciprofloxacin in 3 (3.03%), Cefotaxime in 3 (3.03%), Cefpodoxime in 2 (2.02%), Amikacin in 2 (2.02%), A mpicillin in 2 (2.02%), clarithromycin in1 (1.01%), Ampicillin +Cloxacillin in 1 (1.01%) and Piperacillin+Tazobactam in 1 (1.01%)., in this study the most commonly used antibiotic in the past 6 months belongs to Penicillin derivatives (50.5%), followed by Macrolides 25.25%, cephalosporins 18.2%, Fluoroquinolones 3.03% and Aminoglycosides 2.02%. out of 244 prescriptions non specific LRTI, WALRTI (wheeze associated LRTI), Acutebronchitis, Asthma, Bronchopneumonia, Bronchiectasis, Bronchiolitis, Epiglottitis, tuberculosis, whooping cough and pneumonia were the diagnosis made. In this study out of 244 patients 64 children were associated with co morbidity. The most common co morbid condition is seizure, in 12 (4.86%), followed by cardio vascular diseases in 9 (3.64%),Renal disorders in 7 (2.83%), Anaemia in 5 (2.02%), congenital hernia in 3 (1.21%),Global developmental disorder in 3 (1.21%), Dermatitis in 3 (1.21%), Appendicitis in 2 (0.81%), Cerebral palsy in 2(0.81%), and type 1 DM in 1(0.4%). Other 7.29% of co morbidities are Down syndrome, Conjuctival congestion, oral ulcer, Hereditary elliptocytosis, etc. in this study No. of medications per prescriptions was One in 2 prescription (0.81%), Two in 38 (15.57%), Three in 118 (48.36%), Four in 68 (27.86%), Five in 17 (7.0%), and Six in 1 (0.4%). Amoxicillin is the most commonly prescribed antibiotic. Out of 244 patients Amoxicillin is prescribed in 149 (60.57%) followed by Azithromycin in 56 (22.78%), Amoxicillin+ Clavulanic acid in 32 (13.0%), Cefpodoxime in 2 (0.81%), Clarithromycin in 2 (0.81%), Levofloxacin in 2 (0.81%), Amoxicillin+cloxacillin in 2 (0.81%), Cephalexin in 1 (0.41%). Only 2 patients were prescribed with 2 antibiotics; Azithromycin and Levofloxacin



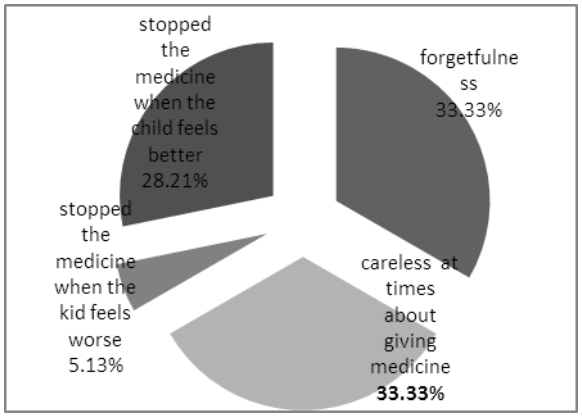
Major classes of antibiotic prescribed were Penicillin derivatives 74.39%, followed by Macrolides 23.58%, Cephalosporins 1.22% and Fluoroquinolones in 0.81%. The most commonly prescribed dosage form is Syrup in 156 patients (63.93%), followed by Tablet in 55 (22.55%), Capsule in 32 (13.11%) and Dispersible tablet in 1 (0.4%). significant relationship between age group and dosage form. In this study most of the patients prescribed the thrice in daily (TID) regimen 63%, followed by once daily 21%, BID 15% and QID 1%. it shows that out of 244 patients 161 patients given 5 days of antibiotic therapy, followed by 3 days in 56,7 days in 13, 4 days in 11, and 10 days in 3.



Out of 244 prescriptions antibiotics were prescribed in brand names in 155 prescriptions (63.52%) and by generic names in 89 prescriptions (36.48%). 231 patients (94.7%) received antibiotics from Govt. supply and 13(5.3%) from community pharmacy. Bronchodilators were prescribed 59.8%, Antihistamines 19.3%, Antipyretics 70.9% and Nasal drops 26.2%. The least prescribed class of drug was Antihistamines. it shows that when the duration of days increases the percentage of high adherence in the Paediatric population decreases. Adherence was significantly associated with the duration ofantibiotic therapy.



It shows that low adherence was more in TID regimen, the least percentage of high adherence is also with the TID, in OD regimen low adherence is least. i.e, Adherence was worse with TID schedule and better with OD regimen. Adherence was significantly associated with the number of daily doses of antibiotic



DISCUSSION

Demographic characteristics showed that percentage of males suffering from LRTIs and prescribed with antibiotics was more than females. The above observation was similar to the study conducted by P Thennarasu et al, but in contrast to the study conducted by Harish Govind Naik et al in which female patients were comparatively more than the male patients.

The patients enrolled for this study were within the age 1 – 12 years. Majority of patients belong to the age group school children followed by toddlers and preschool children(age in between 3 and 6), on an average age of 5.3years SD 3.527. In this study it is observed that the primary care giver of 182 patients having the educational qualification school level followed by graduation, illiterate, and post graduation. No. of children in the same house hold was higher with 2 and followed by one child, three children, four children and five children.

Out of 244 prescriptions 82 patients have the history of use of antibiotics within past 6 months. The most commonly used antibiotic in the past 6 months belongs to Penicillin derivatives 50.5%, followed by Macrolides 25.25%, cephalosporins 18.2%, Fluoroquinolones 3.03% and Aminoglycosides 2.02%.

In this study out of 244 patients 64 children associated with co morbidity. The most common co morbid condition is seizure, in 12, followed by cardio vascular diseases in 9, Renal disorders in 7, Anaemia in 5 congenital hernia in 3 Global developmental disorder in 3 Dermatitis in 3 Appendicitis in 2 Cerebral palsy in 2 and type 1 DM in 1. Other 7.37% of co morbidities are Down syndrome, Conjunctival congestion, oral ulcer, Hereditary elliptocytosis, etc.

Total No. of medications per prescription was One in 2 (0.81%), Two in 38 (15.57%), Three in 118 (48.36%), Four in 68 (27.86%), Five in 17 (7%), and Six in 1 (0.4%) prescriptions. Study shows that Bronchodilators were prescribed for 59.8% patients, Antihistamines 19.3%, Antipyretics 70.9% and Nasal drops 26.2%. The above observation was similar to the study conducted by Khalid K et al. Polypharmacy prescriptions indicated wide use of Antibiotics + Bronchodilators + Antipyretics (22.54%) followed by Antibiotics + Antipyretics (17.62%), Antibiotic+ Bronchodilator; 11.9%; Antibiotics+ Bronchodilator + +Antipyretics+Nasal rops; 9.84% and Antibiotics+Antipyretics+Nasal drops; 6.96%.

The results show that penicillins are the most prescribed class of antibiotics, that according to the National Guideline-based Medicine, the major antibiotic guidelines recommended by the World Health Organization and American Academy of Paediatrics, are the recommended first line antibiotics of choice in the treatment of bacterial respiratory tract infections. In this study out of 244 patients, 184 (74.39%) prescribed with penicillin derivatives, followed by Macrolides, Cephalosporins, and Fluoroquinolones in 58 (23.58%), 3 (1.22%), and 2 (0.81%) respectively. The above observation was similar to the study conducted by P. Thennarasu et al and Nema pallavi et al. Beta-lactam antibiotics were most commonly prescribed (75.6%). Similar findings were observed in study conducted by N. Venkateswaramurthi et al. The use of fluoroquinolones by 0.81 percent of total patients reminds that quinolones were very rarely prescribed for paediatric patients owing to their toxic effects in children below the age of 14 years.

Of the 184 patients prescribed with penicillins, majority of them were prescribed with amoxicillin, followed by amoxicillin + clavulanic acid and amoxicillin + cloxacillin. Azithromycin, a macrolide antibiotic was prescribed in 22.78% patients and clarithromycin in 0.81%. The cephalosporins prescribed included cephalexin in 1 patient and cefpodoxime in 2 patients. Of the fluroquinolone antibiotics, Levofloxacin was prescribed in 2 patients. 2 patients were prescribed with 2 antibiotics; Azithromycin and Levofloxacin. Single antibiotic per prescription was preferred than two or more antibiotics per prescription. Similar findings were observed in a study conducted by Murali et al , but in contrast to the study conducted by Pavani et al in which two drug combination of antimicrobials were mostly prescribed than mono therapy.

Various dosage forms were prescribed for children. The study showed that 63.93% of antibiotics were prescribed as syrups, 22.55% was prescribed as tablet, 13.11% as capsules and 0.41% was prescribed as Dispersible tablet. Similar findings were observed in study conducted by Thennarasu et al. Tablet and capsule were mostly prescribed in school children. Syrup prescribed mostly in toddlers, followed by preschool and school children. The age at which children can swallow conventional tablets is of great importance for their safety. Liquid medicines are usually recommended for infants and younger children so the ability to mask unpleasant taste with sweeteners and flavours is crucial.

In this study most of the patients were prescribed TID regimen (63%), followed by OD (21%), BID (15%) and QID (1%). It shows that out of 244 patients, 161 patients(65.98%) given 5 day course of antibiotic therapy, followed by 3 day course in 22.95%, 7 days course in 5.33%, 4 days course in 4.51%, and 10 days in 1.23%.

In the present study 133 patients belongs to High adherence followed by Medium adherence in 98 patients and 13 belongs to Low adherence. 16.8% of parents were sometimes missed a dose of antibiotics due to forgetfulness. 21.72% were reported that they were careless at times about giving medicines to their child. 11.8% parents were stopped medicines due to worsening of disease whereas 17.21% were stopped the medicines as the child feels better.

In this study, 2.05% reported bad taste of medicine, 15.57% of parents reported that the child refused to take medicine and spat it out, 2.86% were reported there was too much medicine to give, 2.45% reported other difficulties such as busy with the second child, travelling, could not administer medicine on time in case of school children etc.

In this study it shows that when the duration of days of antibiotic therapy increases the percentage of high adherence in the population decreases. High adherence was significantly associated with the antibiotic duration. Adherence was worse with TID schedule and better with OD regimen. High adherence and low adherence was significantly associated with the number of daily doses of antibiotic. This indicated that when the frequency of doses increased, compliance was decreased. The above observation was similar to the study conducted by Carl Llor et al. In the present study it shows that high adherence increases and low adherence decreases with increase in educational qualification of primary care giver. Adherence was significantly associated with the educational qualification of primary care giver. There is no significant correlation observed between dosage form and compliance.

CONCLUSION

To conclude, it is evident from the present study that amoxicillin is the major antibiotic prescribed for the patients treating with lower respiratory tract infection, followed by Azithromycin and Amoxicillin +clavulanic acid combination. These were supplied free of cost from OP pharmacy, Govt. medical college, Calicut. Penicillin derivatives was the major class of antibiotic prescribed followed by macrolides, cephalosporins, and Fluoroquinolones. Syrups were the most widely prescribed dosage form. There is a significant relationship between age group and dosage forms. However, there is irrationally prescribed tablets in toddlers(2 patients), for the antibiotics Amoxicillin and Azithromycin, even though syrup dosage form was available.

The results of the study conclude that the antibiotic treatment prescribed in most of the cases is without doing much culture sensitivity test which may lead to irrational prescription. Efforts to improve the rational antibiotic prescribing practices are needed for all paediatricians and parents who care for their children.

Most of the drugs were prescribed by brand name. Prescribing by generic name helps the hospital pharmacy to have better inventory control and reduce confusion among the pharmacist while dispensing. While prescribing, it is easier for Physicians to memorise a drug by generic name than a number of drugs which are marketed in brand names. Prescribing by brand name may be an evidence of vigorous promotional strategies by pharmaceutical companies. Prescribing by generic names has to be encouraged.

In this study, it is concluded that adherence was significantly associated with the number of daily doses and duration of antibiotic therapy, and educational qualification of the primary care giver. This study shows the high rate of compliance among the study populations towards antibiotic therapy.

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