Research Article

Evaluation of antibiotic usage on lower respiratory tract infections in paediatric department- an observational study

Stimson Jose[1]*, Yogananda Rajashekarachar[1], Basavanthappa S.P.[2], Bharathi Raghunatha Naidu[1]

[1]Department of Pharmacy Practice, SJMCP, Chitradurga, Karnataka, India
[2]Department of Pediatrics, BMCH & RC, Chitradurga, Karnataka, India

*Correspondence:
Stimson Jose,
E-mail: Stimsonjo@gmail.com

ABSTRACT

Background: Lower respiratory tract infections are the leading cause of death among infectious diseases and responsible for large burden of avoidable morbidity and mortality in childhood. Inappropriate, economically inefficient use of antibiotics has been observed in health care system. The objective of the present study is to identify various lower respiratory tract disorders, antibiotic prescription patterns, average hospital duration and average direct cost of antibiotic prescriptions.
Methods: The present study was an observational study. A total of 110 inpatients fulfilling the inclusion criteria were included. Current diagnosis, treatment chart, length of hospital stay, MRP (INR) of antibiotics on admission to discharge were recorded and analyzed.
Results: Males are more as compared to females with similar severity of illness. Study states that Bronchopneumonia is highest in the incidence followed by WALRI. Average duration of patient stay in hospital was 5.71days whereas 62.73% were on monotherapy and mostly prescribed antibiotic was Cephalosporin's. Average cost of antibiotic prescription in bronchopneumonia is INR 1681.94 followed by Walri INR 579.64, bronchiolitis INR 355.68 others INR 1044.9. Majority of drugs were given by intravenous route and Prescriptions are mainly ordered in Brand names.
Conclusions: The present study provides an overall pattern of antibiotic usage in patients. Higher generation antibiotic usages and brand name prescription especially in bronchiolitis & WALRI where there is no requirement, adds to the cost of the therapy.

Keywords: Hospital duration, Prescription pattern, Antibiotics cost, LRTI

INTRODUCTION

According to the World Health Organizations' (WHO) estimates for 2002, LRTIs were the leading cause of death among all infectious diseases worldwide, accounting for 3.9 million deaths and 6.8% of all reported deaths that year. Since 1990, when the WHO began compiling and presenting statistics on the burden of lung infections, LRTIs have been found to consistently cause more burden than diseases such as diabetes mellitus, HIV/AIDS, cerebrovascular disease, neoplasms, diarrhoeal disease, ischaemic heart disease, malaria, tuberculosis, chronic obstructive pulmonary disease (COPD) and asthma.[1]

Lower respiratory tract infections (LRTIs) including bronchitis (viral and bacterial),pneumonia, bronchiolitis, and pertussis (whooping cough) are among the most

common paediatric diseases encountered in primary care, and are responsible for a large burden of avoidable morbidity and mortality in childhood.[2] The symptoms of this disease includes chronic cough, excessive sputum production, and expectoration with persistent presence of microorganisms in the patient's sputum, While mild cases can be self-limiting, more serious infections may be life threatening and/or cause ongoing respiratory morbidity with irreversible lung changes.[3]

Antibiotics are given as the key drugs for treatment of infections and are among the most commonly prescribed drugs in Paediatrics department. Worldwide population constitute of about 28% of children and infants who are most susceptible to diseases due to under development of immune system. Several studies reported that 50% to 85% of children receive antibiotics in developed and developing countries prescribed by physicians.[4] It has been estimated that up to one third of all patients receive at least one antibiotic during hospitalization and up to 40% of hospital's drug expenditure may be spent on antibiotics.[5] The inappropriate and economically inefficient use of medication in terms of poly pharmacy, use of drugs not related to the diagnosis, poor patient's compliance, overuse and misuse of antibiotics and use of unnecessary expensive drugs has been commonly observed in the health care system throughout the world, especially in the developing countries. Unnecessary antibiotic prescribing remains common not only in developing countries, but also in developed countries like USA and Britain.[6] For the above reasons, prescribing patterns need to be monitored, evaluated and if needed modified so as to make the treatment more rational and cost effective.

METHODS

The present study was an observational study conducted at Department of Paediatrics, Basaveshwara medical college and hospital, Chitradurga, Karnataka, India during the period of October 2014 to March 2015. A total of 110 paediatric in patients treated with LRTI aged less than 18 years fulfilling the inclusion criteria were included. Inclusion criteria were children with LRTIs admitted & prescribed with antibiotics in department of paediatrics, genders of both male and female and those who willing to give inform consent form. Patients where general practitioners would not consider offering antibiotics and who treated as outpatients and Patients with immunosupression were excluded from the study. A written informed consent was obtained from parents/guardians of all the children after fully explaining the study procedure. The Institutional ethical committee of our hospital approved the study. The patients who satisfy the above criteria's will be enrolled in the study. Using a well designed data collection form the data's are collected like demographics of the patient including Name, Age, Sex, Occupation, Socio-economic status and the data regarding diagnosis, indication for which antibiotic is prescribed, route of administration, other

drugs for the treatment. Patients are followed throughout the period of hospitalization and obtained information on changes in therapy/withdrawal of antibiotic or addition of other antibiotics (if any), in order to identifying the most susceptible disease, most prescribing antibiotics associated with LRTIs, calculating the average hospitalization for patients and average cost analysis of the antibiotic treatment (in terms of MRP-Indian Rupees). The data thus obtained was compiled and analyzed using Microsoft Excel 2010 for windows.

RESULTS

In our study out of 110 patients enrolled in the study, 70 (63.64%) are males and 40 (36.36) cases were females. The total population was categorized into four age groups and patient in each group were recorded. The data from our study represent that, patient from age group of >12 month 36 (32.73%), 12-14 months 19 (17.27%), 2-14 years 52 (42.27%), 14-18 years 3 (2.73%).

In our study sample, most of the patient 66 (60%) stayed in hospital for 3-5 days, 29 (26.37%) patents stayed for 6-8 days, 12 (10.90%) patients stayed for 9-12 days and only 3 (2.73%) patients stayed for more than 12 days. Average duration of patient staying in hospital ward was 5.71days (Table 1).

Among 110 paediatric patients 61 (55.46%) patients were diagnosed with bronchopneumonia being highest in the incidence followed by WALRI 34 (34.90%), bronchiolitics 5 (4.55%) and other lower respiratory tract diseases 10 (9.09%).

Study revealed that out of 110 patients mostly, 69 patients (62.73%) were on monotherapy, followed by 11 (10%) patient were on two drug combination therapy, 25 (22.73%) were on three drug combination therapy and 5 (4.54) patient were receiving more than 3 antibiotic drug (Table 2).

Mostly prescribed antibiotic in our study were Cephalosporins 91, followed by Aminoglycosides, Penicillin's, Macrolide, Flouroquinolones and Glycopeptide (Figure 1).
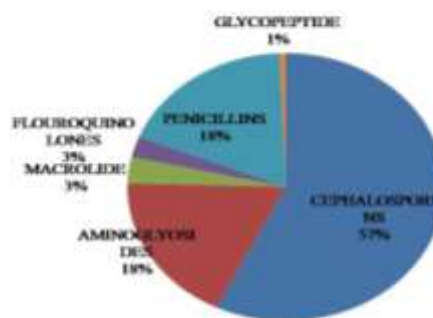

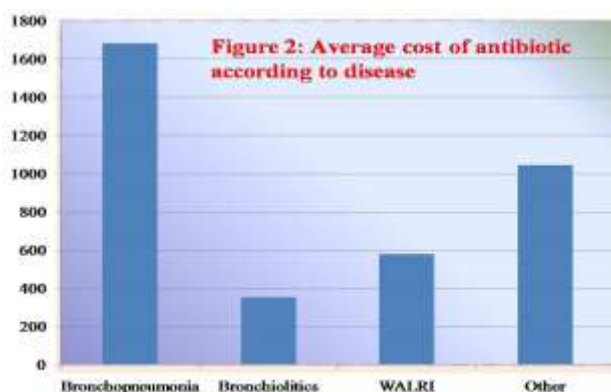**Figure 1: Pattern of antibiotic prescription**

Figure 2: Average cost of antibiotics according to disease.

In our study we were seen that the average cost of antibiotic in per prescription acceding to disease was found as follows, antibiotic prescription in bronchopneumonia cost INR 1681.94, followed by WALRI INR 579.64, bronchiolitics INR 355.68 others INR 1044.9 (Figure 2).

DISCUSSION

In general practice, the therapeutic approach for lower respiratory tract infection is primarily empirical and the main aim of the physicians is to treat as specifically as possible. The present study indicates the general trends of use of antibiotics in lower respiratory tract infection in pediatric inpatient department. Drug utilization studies have the potential to make objective evaluation and analysis of health professionals work and provide them with feedback to stimulate thinking about their practice and looking for ways to improve their performance. These studies should become a method of increasing job satisfaction and means of education for health professionals, rather than being perceived as threat or another bureaucratic burden. Antibiotic resistance is an emerging problem and has become a major threat to the medical field. Excessive and in appropriate use of antibiotic has been a major contributor to this ever growing problem.[7]

Out of 110 patients, 63.64% were males and 36.36% cases were females similar to observations made by Radji M et al, Kanish R et al, Pavani et al, and kaur S et al.[8-11]

The data from our study represent that, patients from age group of 2 -14 years 42.27%, followed by <12 month 32.73% are observed with LRTIs more predominantly which is similar to Kanish R et al.

The average duration of patient staying in hospital ward was 5.71days which is quite comparable with Banerji A, et al.[12]

55.46% patients were diagnosed with bronchopneumonia being highest in the incidence followed by WALRI and bronchiolitics. So in our study we concluded that in our area bronchopneumonia and WALRI are the highest incidences in LRTIs, while Milladi P et al, states that WALRI is the highest incident followed by bronchopneumonia , and Harish GN et al, states acute bronchitis is the highest incident and pneumonia is the second.[7,10]

In the antibiotic usage pattern we found that 62.73% were on monotherapy, followed by 10% patient were on two drug combination therapy, 22.73% were on three drug combination therapy and 4.54% patient were receiving more than 3 antibiotic drugs. Another study conducted by Harish GK et al states that 34.37% was monotherapy, 65.6225% were poly-antibiotic therapy were as Milladi P et al ,states that 51.74% prescribed as two drug therapy, 26.74% prescribed as monotherapy and 22.09% prescribed as three drug combination.[7,10]

Third generation cephalosporins were prescribed more frequently followed by Aminoglycosides, Penicillin's, Macrolide Flouroquinolones and Glycopeptide. Another study conducted by Kanish R et al and Kaur S et al, Sharma R et al, states the same.[9,11,13] Patients reach hospital (like ours) in advanced stage with prior appropriate/ inappropriate exposure to antibiotics and it becomes an absolute necessity to use higher generations of antibiotics. This leads to increased cost of therapy. The antibiotics are gradually de-escalated based upon the patient response and protocol of treatment.

We also observed that the average cost of antibiotic per prescription according to disease was found to be bronchopneumonia cost INR 1681.94 followed by WALRI INR 579.64 bronchiolitics INR 355.68 others INR 1044.9.In another study by Kaur S et al states that the total cost accounted approximately Rupees 6942 per patient and Kanish R et al states that cost for miscellaneous group is more followed by penicillin's and cephalosporins.

We also observed that majority of antibiotics are prescribed by IV route, similarly stated by Bezbaruath BK et al, Younias et al, Shamshy K et al, it's may be because IV route is necessary for rapid control of infections and to minimize morbidity as compared to oral route.[14-16]

Majority of the drugs are prescribed in brand names, which is similar to the studies of Kanish R et al. The possible reasons for nominal use of generic drugs could be prescriber's perception about the formulations and second possible reason could be that the branded drugs are easily available and names are easily to recall for the prescriber and dispenser and the third possible reason may be the vigorous promotional strategies by pharmaceutical companies.[9] Prescribing by generic name helps the hospital pharmacy to have better inventory control and also Generic drugs are often more economical than the branded ones.[7]

CONCLUSION

The present study provides an overall pattern of antibiotic usage in patients. Higher generation antibiotic usages and brand name prescription especially in bronchiolitis & WALRI where there is no requirement, adds to the cost of the therapy.

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