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Patterns of Prescription and Drug Use in Paediatric Department of a Lower Respiratory Tract Infection at a Teaching Hospital - A Preliminary Study.

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ABSTRACT

Drug utilization studies have become a useful tool to facilitate rational use of drugs in paediatric population. The present study was to establish prescription trends of lower respiratory tract infection at the teaching hospital. The study was conducted using WHO based prescription auditing proforma. Data were recorded from the inpatients attending the teaching care hospital through a chance random sampling method. Amikacin (37%) and Ceftriaxone (19%) was the most frequently prescribed drug among LRTI, followed by crystalline pencillicin (15%), Ampicillin (13%) and Ceprazone (5%) which were the least prescribed. Our study found that LRTI drugs were mostly given (56%) by the intravenous route followed by the inhalation (27%) and oral route (17%). It has been concluded that a study may be more meaningful to improve the prescribing and dispensing practices of clinical pharmacists through successful implementation of interventional programs in health care centers.

Keywords: Prescriptions; Pneumonia, Asthma, and Drugs

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INTRODUCTION

Drug utilization research was defined by WHO in 1977 as 'the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences ". Since then, a number other terms have come in use and it is important to understand the interrelationship different domains [1]. Drug utilization studies aim to evaluate factors related to the prescription, dispensing, administrating and taking at medication, and its associated events (either beneficial/adverse) [2]. Their scope is to evaluate the present state and future trends of drug usage, to estimate crudely disease prevalence, drugs expenditures, appropriateness of prescriptions and adherence to evidence-based recommendations [3]. The increasing importance of drugs utilization studies as a valuable investigation resource in pharmacoepidemiology has been bridging it with other health related areas, such as public health, pharmacovigilance, pharmacoeconomies eco-pharmacovigliance (or) pharmacogenetics [4]. Studies on the process of drug utilization focus on the factor related to the prescribing, dispensing, administrating and taking of medication and its associated events covering the medical and non medical determinants of drug utilization, the effects drug utilization relates to the effect of drug use, beneficial or adverse . The therapeutic practice is expected be based on evidence provided by pre-marketing clinical trial , but complementary date post marketing period are needed to provide an adequate bases for improving drug therapy [5].

Respiratory syncytial virus (RSV) is the major respiratory pathogen of young children and the fore most cause of severe lower respiratory disease in infants. [6-8] Infection with RSV is seen throughout the world in annual epidemics that occur in late fall, winter or spring re-infection is common. RSV accounts for 20-25% of hospital admissions of young infants and children for pneumonia and for up to 75% of cases of bronchiolitis in this age group.

Moreover, the economic burden, both from the medical and social prospective is impressive. Thus, preservations through immunizations is highly desirable. Consequently, existing vaccines have been improved to facilitate use in children, as in the case of IV, and new ones have been sought, as from RSV and PIV [9].

Releasing the enormous potential of drug utilization studies in the promotion of rational drug therapy international agency like WHO and international network of rational utilization of drug (INRUD) have applied them to evolve standard drug use indicator and data collection method. Auditing prescription also form part of drug utilization studies [10]. Essential drugs are among the most cost effective ways of saving lives and improving health. They constitute 20-40% of health budgets in developing countries such as India. Increase in the cost of drugs often results in public health problems resulting in inability to procure sufficient drugs to meet patients demand. This often results in drug mismanagement, insufficient and irrational use of drugs. Irrational use of drugs can also be due to inadequate training of health care staff, lack of continuing education and supervision, lack of updated drug information, reliable and unbiased drug information [11]. The present study was undertaken to investigate drug utilization patterns and current prescribing practice of LRTI in pediatrician of a tertiary care hospital.

METHODS

This is a prospective, descriptive study undertaken in pediatric patients admitted in a tertiary care hospital in Warangal for 4 months beginning July 2012 to Oct 2012 using a specially designed form to record the required information from the IPO during prescription card of each patient. All the drugs prescribed were recorded including drug dose route, dosage form, frequency of administration indicators for which prescribed and duration of therapy. This recorded form were used to consulted average number of drugs per prescription. Number of encounters with antibiotic, percentage of drug prescribed by generic name and whether the dosage form free of administration and duration of therapy were recorded where as, number of drugs prescribed by the parenteral route was calculated. Frequency of prescribing of drugs belonging to different groups was recorded. The drugs were classified according to the Anatomical Therapeutic Chemical (ATC) classifications system and drug utilizations were measured in DDD/100 bed day. In the ATC classifications system the drugs are divided into different groups according to the organ/system in which they act and their chemical, pharmacological and therapeutic properties [12]. The DDD/100 bed-days was calculated using the following formula

DDD/100 bed days = Drug consumption in study period X 100mg
  DDD (mg) X Period of study X Average occupancy X Bed strength

Our study was carried act for a time period of 120 day. There were 10 beds in the ICU and the average occupancy indeed was 0.8.

Prescribed Daily Dose (PDD)

Prescribed daily dose were calculated for patients who are treated for the disease. PDD was calculated using the formula

PDD =   Total quantity X strength
    Total days supplied

A comparison of a drugs PDD with DPP provides as insight into actual use of a drug where compared to the drugs most common use and recommended use [13].

Pharmacoeconomic analysis

The economic analysis was limited to three main health care costs, i.e. total antimicrobial costs (antimicrobial costs and hidden costs, including costs of consumable materials, staff times and waste disposal). Diagnostic test cost and hospital bed costs.   All costs were calculated for the total hospital stay.

RESULTS

Total number of prescriptions analyzed at the end of 4months was 294 from pediatric department. Of them one hundred and fifty (51.0%) were males and one hundred and forty-four (48.9%) were females. Regarding the clinical diagnosis of the RSV cases 270 patients were diagnosed as LRTI (92.0%) while 28 cases were diagnosed as pneumonia (10.2%) and 16 cases with bronchiolitis (5.10%). Table.1. Shows the frequency of prescribing of the 6 most commonly prescribed antibiotics. One hundred and eight patient antibiotics (61%) were prescribed parenterally.

Table 1: Antibiotics prescribed in the paediatric ward.

Antibiotics	Number of Prescriptions (n)	Percentage (%)
Amikacin	67	37
Ampicillin	24	13
Amoxicillin	19	11
Crystalline Penicillin	27	15
Ceftriaxone	34	19
Cefaprazone	09	05
Total	180	

Table 2: Baseline characteristics of study population

Parameters	Percentage (%)
Gender	
Male	51.0
Female	48.9
Age (in years)	
Below 1years	51.2
1-3 yrs	29.59
3-7yrs	16.3
7-10yrs	3.06
Type of disease	
LRTI	84.6
Bronchopneumonia	10.2
Bronchiolitis	5.10

Table 3: The percentage use of the various drug prescribed in this hospital are given as

Core indicators	Data
Average drug prescribed	5.72
Generics	45.22%
Antibiotics	96.8%
Injections	95.7%

Figure 1: Type of formulations used in LRTI patients
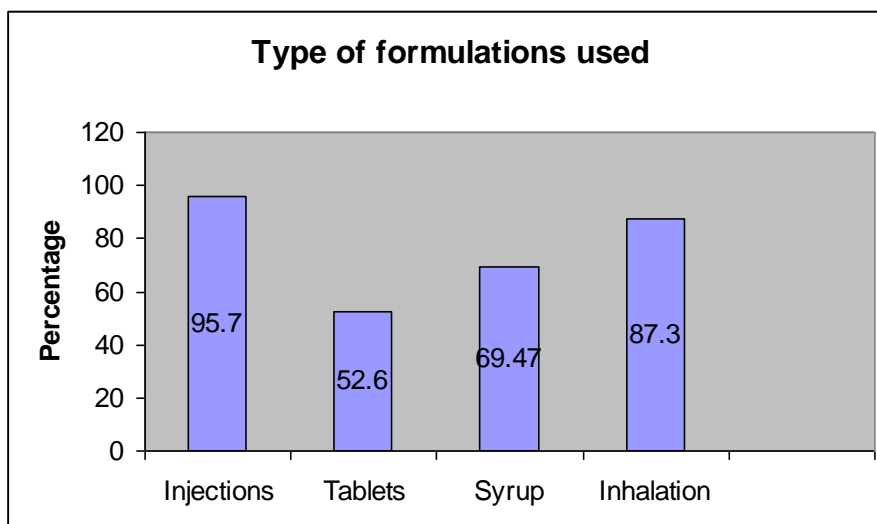
In this study, most of percentage i.e., 95.7% of the injections was administered parentrally. Eighty seven percentages of Inhalations was given to the children. The average number of drugs per patient was 5.726. More than 98% of the patients were exposed to at least two drugs. Average number of drugs prescribed per each prescription was 3. Drugs prescribed in generic name was 45.22% Amikacin was most frequently prescribed antibiotic followed by ampicillin.

DISCUSSION

Drug utilization studies important for obtaining a data about the patterns in quantity of use, the determinants of drug use and the outcomes of use. The main aim is to facilitate the rational use of medicines in pediatric patients. Rational drug prescribing is defined as the use of the least number of drugs to obtain the best possible effect in the shortest period and at reasonable cost [14]. Since WHO has recommended that average number of drug per prescription should be 2.0, [15]. The result of our study reflects polypharmacy.

The LRTI study research activity done in inpatient pediatric department from 1pm to 4 pm (Monday to Saturday) and 10 am to 12 pm on week end. LRTI were the most common indication for attending the pediatric ward followed by Bronchopneumonia. Bhardwaja *et al* reported that the mean number drugs per prescription were 3.2 in an urban area, but in our study, we have found that mean no drug per prescription were 5.726 in a rural area [16].Hall *et al* reported that onset of community LRTI epidemic generally precedes the appearance of the epidemic virus in hospital isolated by one to two weeks and that community LRTI epidemic generally continues one-two weeks beyond the last hospital isolated [17]. However, present study is contrast to the previous research literature. We found a predominance of male patients (51%) as compared to females (49%) and the ratio was more than expected from the sex ration of Warangal (India). It reflects a deep rooted gender bias in Indian culture where girls are treated as lesser over boys and are therefore less often parents often brought to the hospital for medical attention. With regard to age, maximum (30%) patients were in the age group of 1-3 years. This may be due to higher susceptibility of infections improper hygiene, diet, vaccination, and age. These needs a greater concern for infant's health relatively. Our findings is agreed to siva kumar et al 2011 [18].

In our study the percentage of generic and drug use from essential drug list are higher were compared to those from a specialty centre in Delhi. However, in other studies.

Prescribing by brand name may be an evidence of vigorous promotional strategies by pharmaceutical companies that may undermine some of the goal of essential drug list concept. On the other hand, prescribing by generic name may be reduce overall expenditure of government and private hospital on drugs especially on newer antibiotics etc. [19]

Palikhen 2004 [20] reported that high percentage of patients i.e., 93% were prescribed at least one antibiotic which was different than study done by Marlies et al, i.e., 36% and Josanhall i.e., 60.6%. Similarly study done by Bosu et al, again showed the variation in average percentage of patient receiving at least antibiotic which was 41%, 45%, 79% and 98% in different health centre. It is not possible to draw firm conclusion since the patients are not matched socioeconomically. This study was similar to our findings. The prescription of antibiotics was mainly based on clinical judgment with out investigation. Amikacin and ampicillin were found to be mostly used combination antibiotic in case of bronchitis. Bronchiolitis was generally treated with chloramphenicol and ampicillin. LRTI was most prevalent diagnosis among infants, which agrees with studies only 31% cases were demanded for culture of blood or urine. 86 cases shows positive result out of 294 cases. So only in few patients' therapy could be modified after culture results where available. Similar study was done by S.Hu et al., where specimens were taken from culture in 14% specimen were not obtained in most of he cases in our hospital or patients were not asked for culture report [21]. It is very necessary to monitor appropriate clinical specimens have been obtained. Examine the culture report before antibiotic is initiated.

The use of antibiotic is related to antibiotic resistance, side effects of drugs and health care cost. So measures should be taken care to avoid the in appropriate use of antibiotics. Physician must have a clear understanding of therapeutic use of antibiotics; they must be aware of the prevalence of various pathogens and resistance patterns in their hospital and exercise good judgment in selection of empirical antibiotic regimen.

Infant less than 1year received antibiotic more frequently was similar to the study done by Marlis et al [22].Our results shows infant received antibiotics 50.94%.The excessive use of injectables is common in many developing countries [23]. In this study 95.7% of antibiotic were given by injections. It seems necessary for the pediatric patients to be treated by parenteral route of administration but consideration should be taken care for the syringe use to administer different antibiotic.

Canroy et al, studied 2262 drug prescription that were prescribed to 624 children, 46% of all prescription were either unlicensed or half labeled medication. The above study was contrast to the present investigation of 1200 drug prescription that were prescribed to 294 children, 86% of all prescription were licensed or labeled medication [24]. However, in our study reveals that prescription of asthalin in combination with amikacin is of 37%.

CONCLUSION

Our article concludes that some irrational prescription pattern including very high utilization of antibiotics in paediatric department. The study highlights need to pay attention rational drug use and promote the patients antibiotic sensitivity test in a tertiary care hospital. Our study had many limitations. The study was carried out over a period of four months and seasonal variations in disease pattern prevalence and drug utilization were not considered. Further, the number of patients in our study was low and the study was restricted to only inpatients as well as single center studied. Drug-drug interaction studies are necessary to anticipate the scale of problem in pediatric population.

ACKNOWLEDGEMENT

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