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Drug utilization study on pediatric pneumonia patients in a tertiary care teaching hospital

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Abstract

Background: Pneumonia remains the prime infectious disease that increases the mortality rate among children under five claimed the lives of nearly 1.5 million children in 2015. Mortality due to childhood pneumonia is linked to the prevalence and relapse increases and usage of antibiotics is more. In such circumstances, the main. **Aim:** The Aim of the study was to assess the utilization of drugs and to spot the factors that contribute to the pediatric pneumonia patients at tertiary care teaching hospitals. **Material and methods:** A prospective, observational study was conducted from May 2021 to October 2021 Overall 310 prescriptions were collected, 204 patients were included in the study based on inclusion criteria and data was collected from a proforma and by using WHO prescribing indicators study is analyzed. **Results:** Age group with pneumonia of <5 years was 171 patients, followed by 33 patients between 6-8 years. The male children constituted the major portion i.e. 120 (58.82%) followed by female children were 84 (41.18%). Distribution of drugs per prescription, majority of prescriptions with <5 drugs i.e., 110 (56%) followed by 82 prescriptions with 5-10 drugs constituted (43%), this indicates the polypharmacy and 1 prescription with >10 drugs i.e., (1%). The distribution of antibiotics where majorly preferred drug in penicillin's were amoxiclav- 164 (59.20%), least preferred was piperacillin/tazobactam- 9 (3.28%), followed by cefotaxime-38 (13.71%), ceftriaxone -17 (6.13%), amikacin- 31 (11.19%), and azithromycin- 18 (6.49%). **Conclusion:** In our study, we observed an irrational use of antibiotics and polypharmacy of drugs in the treatment of pediatric pneumonia.

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Introduction

Pediatrics is the most susceptible group to infectious diseases due to their low immunity and nutritional status. The most prevalent infectious diseases in

pediatrics were pneumonia and diarrhea. Due to prevalence and increased mortality rate of pediatrics pneumonia is more common than adult's pneumonia [1]. Pneumonia is defined as an infection or inflammation of the lung parenchyma caused most often by microbial pathogens. Sometimes noninfectious pneumonia or pneumonitis results from exposure to drugs, fluids, or chemicals. Pneumonia mostly caused by gram positive, gram negative and anaerobic organisms. General signs and symptoms include: Fever > 38.5°C, Rapid breathing, Chest recession, Radiological

signs of consolidation, Leukocytosis, Wheeze and its treatment includes hemodynamic support and respiratory management, nutritional support. Pharmacological therapy includes amoxyclav as first line therapy and empirical therapy, vaccination [2]. Current scenario according to WHO there is an increased irrational use of drugs especially antibiotics resulting in resistance to antibiotic and increased mortality rate due to drug related problems. Thus, as to promote rational use of drugs, the DU research utilizes core drug use indicators. Main objectives of drug use indicators where categorized into describing current treatment practices, comparing the performance of individual facilities or prescribers, periodic monitoring and supervision of specific drug use behaviors and assessing the impact of an intervention. The WHO list of essential medicines contains the medicines that are effective and safe to fulfill the health needs [3]. According to WHO the drug use indicators are categorized into three types they are [4]:

1. Prescribing indicators such as

- a) Average number of drugs per encounter
- b) Percentage of drugs prescribed by generic name
- c) Percentage of encounters with an antibiotic prescribed
- d) Percentage of encounters with an injection prescribed
- e) Prescription of drugs prescribed from essential drugs list or formulary.

2) Patient care indicators such as

- a) Average consultation time
- b) Average dispensing time
- c) Percentage of drugs actually dispensed
- d) Percentage of drugs adequately labelled
- e) Patient's Knowledge of Correct Dosage And

3) Health facility indicators

- a) Availability of copy of essential drugs list or formulary
- b) Availability of key drugs.

Drug utilization (DU) studies describes the drug consumption, it was defined by WHO in 1997 as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. DU studies gives insights into an efficiency of drug use i.e., pattern of use, quality of use, determinants of use, outcomes of use. The aim of this study is to analyse the utilization of drugs in the paediatric pneumonia patients at a tertiary care teaching hospital.

Methodology

A prospective observational study was conducted for a period of 5 months from May to October 2021 in tertiary care teaching hospital, Ongole. The study was carried out by collecting 310 prescriptions among them 204 prescriptions are included based on inclusion criteria i.e., all the Children age less than 12 years (inpatients) with pneumonia and other co-morbidities were included in the study and 106 prescriptions were excluded based on exclusion criteria such as Paediatric outpatients, and those who are not willing to sign in informed consent form. The data was collected from the patient's case records in a proforma designed prior to the initiation of the study and other information obtained by patient care taker counseling. The data contains the following components: Patients demographics, Chief complaints, History of present illness, Past medication history, Prenatal history, Natal history, Post-natal history, Immunization history, Developmental history, Family history, General examinations, Respiratory System examinations, Lab investigations, Assessment of drug chart with WHO core indicator.

Results

Study population was 204, in our present study we observed the commonly affected age group with pneumonia was <5years i.e., 171 patients, followed by 33 patients between 6-8years. The male children constituted the major portion i.e. 120 (58.82%) followed by female children were 84(41.18%). Majority of patients i.e., 138 constituted (67.64%) are with pneumonia, followed by 63 patients constituted (30.88%) were suffered with severe pneumonia, 3 patients constituted (1.48%) with very severe pneumonia and 0% with no pneumonia respectively.

Table 1: WHO prescribing indicator

Indicator	Value
Total number of prescriptions	204
Total number of drugs prescribed	994
Average number of drugs per prescription	5.38
Percentage of drugs prescribed by generic name	80.58%
Percentage of prescriptions with an injection prescribed	100%
Percentage of prescriptions with an antibiotic prescribed	100%

Percentage of drugs prescribed from NLEM-2015	81.89%
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Table 1 shows the total number of drugs prescribed to the patients were 994. According to WHO prescribing indicator, the average number of drugs per encounter was found to be 5.38. The percentage of encounters with antibiotics were 100%, percentage of encounters with injections was 100% that indicates the unnecessary use of injectables and percentage of drugs prescribed by generic names was 80.58% which is more than the percentage of drugs prescribed by brand names was 80.58% which is more than the percentage of drugs prescribed by brand names and the drugs prescribed from EML were 81.89% of total drugs prescribed.

Table 2: Distribution of drugs per prescription

Drugs	No Of Drugs (N=204)	Percentage Of drugs per prescription
<5 drugs	110	53.93%
5-10drugs	84	41.17%
>10drugs	2	0.90%

Table 2 shows the distribution of drugs per prescription, majority of prescriptions with <5 drugs i.e., 110(56%) followed by 82 prescriptions with 5-10 drugs constituted (43%), this indicates the polypharmacy and 1 prescription with >10 drugs i.e., (1%).

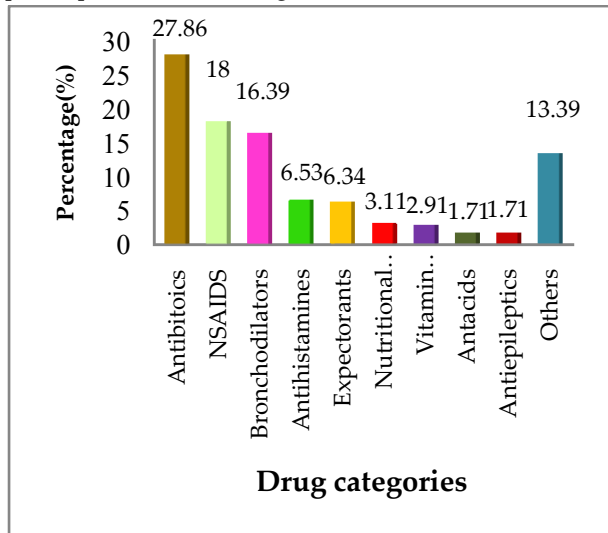


Figure 1: Distribution of prescribed drugs based on their category

Figure 1 shows the primary category preferred to treat pneumonia in children were antibiotics i.e., 277(27.86) indicates the antibiotics are the drug of choice, followed by the symptomatically therapy includes NSAIDS -

179(18%), bronchodilators-1163(16.39%), antihistamines-75(6.53%), expectorants -73(6.34%) and others were 133(13.39%).

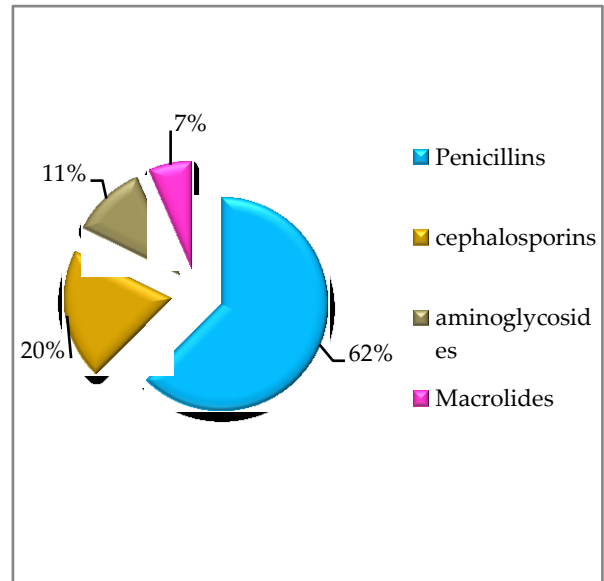


Figure 2: Distribution of class of antibiotics

Fig 2 indicates the mostly preferred class of antibiotics were penicillin's -173(62.45%), followed by cephalosporin's -55(20%), aminoglycosides -31(11%) and macrolides- 18(7%).

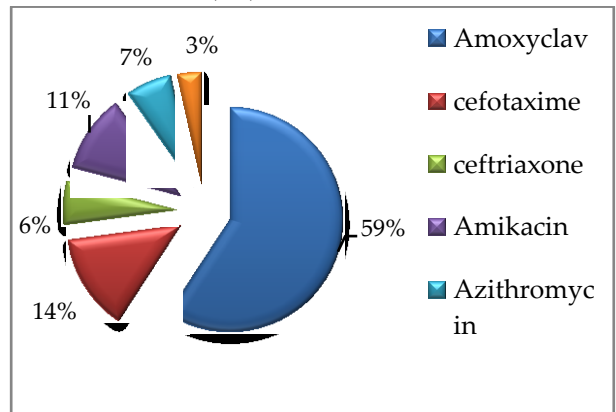


Figure 3: Distribution of antibiotics

Figure 3 indicates the distribution of antibiotics where majorly preferred drug in penicillin's were amoxyclav-164(59.20%), least preferred was piperacillin/tazobactam-9(3.28%), followed by cefotaxime-38(13.71%), ceftriaxone -17(6.13%), amikacin-31(11.19%), and azithromycin- 18(6.49%).

Table 3: Distribution based on number of antibiotics per prescription

Antibiotics	No. Of Prescriptions(N=204)	Percentage
Individual therapy	133	65.19%

Double therapy	57	27.94%
Triple therapy	14	6.87%

Table 3 indicates that all prescriptions are with antibiotics among them 133 prescriptions are prescribed with single antibiotics, 57 with two antibiotics and 14 with three antibiotics. All antibiotics given as individual, dual and triple therapy were detailed in discussion.

Discussion

Our study population was 204, in our present study we observed the commonly affected age group with pneumonia was <5 years i.e., 171 patients, followed by 33 patients between 6-8 years. This was because of the known fact that <5 years children were more vulnerable to infectious diseases [5]. Our study was conducted in tertiary care hospital, the patients admitted here belong to the surrounding villages, hence the prevalence of childhood pneumonia is strongly linked to factors such as under nutrition, lack of safe water and sanitation, indoor air pollution and inadequate access to health care. Demographic characteristics shown the percentage of males suffering from infection was more than females. Which is similar to the findings reported by Maximilianmuenchhoff et al., [6] This was due to stronger humoral and cellular immune responses in females makes them less susceptible to lower respiratory tract infections. In the present study, the total number of drugs prescribed for 204 patients were 994 drugs, the average number of drugs per prescription was 5.38, which is much higher than standard WHO prescribing indicators (1.6-1.8), it indicates polypharmacy. The percentage of prescriptions with an antibiotic prescribed was found to be 100% which was inflated than WHO standards (20.0%-26.8%). When compared to other studies of Shiva Leela et al. & Anandhasayanam Aravamuthan et al., we considered only a single disease of ARTI i.e., pneumonia where antibiotics are the drug of choice [WHO] thus the range 100% was acceptable [7,8]. In the total usage of antibiotics where majorly preferred drug in penicillin's were amoxycylav 164 (59.20%), least preferred was piperacillin/tazobactam 9 (3.28%), followed by cefotaxime 38 (13.71%), ceftriaxone 17 (6.13%), amikacin 31 (11.19%), and azithromycin 18 (6.49%). This is because penicillin was the first line antibiotic followed by cephalosporin's and macrolides other class of antibiotics were prescribed due to association risk factors in

patients. In our study principally antibiotics were administered through IV/IM route. In our study we found irrational use of antibiotics because according to WHO treatment guidelines, oral amoxicillin dispersible tablets, that is to be dissolved in breast milk or water for making children's for easy swallowing for five days is as effective as parenteral amoxicillin. If first line therapy fails or in severe pneumonia, parenteral formulation is to be preferred [WHO UNICEF]. Which may increase the hospital stay, exposure of other nosocomial infection and have chances to relapse the condition. According to PIDS and IDSA guidelines updated in 2015, cephalosporins should not be used as a first line agent and macrolides usage is uncommon. In our study we found 20% usage of cephalosporins, which is to be declined [9].

Conclusion

In the present scenario Pneumonia remains the prime infectious disease that increases the mortality rate among children under five, the prevalence of irrational drug use at tertiary care hospital was highly suggesting the need for rationalization. It was concluded that irrational use of antibiotics, poly pharmacy and the use of non-generic names were identified drug use problems in our study. These findings suggested that there is a need for continuous monitoring of rational prescribing of drugs and strengthening of factors that support the rational use of drugs.

References

1. Kelsey D J Jones and James A Berkley. Severe acute malnutrition and infection. *Pediatric Int Child Health*. 2014; 34(1): 1-29.
2. McCracken GH. Etiology and treatment of pneumonia. *Pediatric Infect Dis J* 2000; 19:373-377.
3. Richard Ofori-Asensio and Akosua Adam Agyeman. Irrational Use of Medicines—A Summary of Key Concepts. *Pharmacy (Basel)*. 2016 Dec; 4(4): 35.
4. Antenen Assefa Desalegn. Assessment of drug use pattern using WHO prescribing indicators at Hawassa University teaching and referral hospital, south Ethiopia: a cross-sectional study. *BMC Health Serv Res*. 2013; 13: 170.
5. M.N.G. Dukes, Drug utilization studies methods and uses, WHO regional publications European series no.45.
6. Maximilian Muenchhoff and Philip J.R. Goulder

- et al., sex differences in pediatric infectious diseases, 2014:2019
7. Dr. Shiva Leela, Dr. Jagadeesh, Dr. Srinivas. Revankar, Dr Vedavathi H, Dr.S. Nagaraja.Prasad, Dr Chidanand K N , Dr Jean L M et al., A Study of Prescription Pattern of Antibiotics in Pediatric In-Patients of Mc-Gann Teaching Hospital Shivamogga Institute of Medical Sciences (SIMS), Shivamogga, Karnataka, *Journal of Dental and Medical Sciences*, Dec, 2014, Vol-13(12).
 8. Anandhasayanam Aravamuthan, Mohan Valli Arputhavanan, Kannan Subramaniam and Sam Johnson Udaya Chander J. et al., Assessment of current prescribing practices using World Health Organization core drug use and complementary indicators in selected rural community pharmacies in Southern India, *Journal of Pharmaceutical Policy and Practice* (2017) 10:1.
 9. Rohit C Agrawal. Pneumonia. A Parthasarathy (ed). *IAP Textbook of Pediatrics*, 5th ed. IAP National Publication House, Gwalior: Jaypee Brothers Medical Publishers; 2013. pp. 489.