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Acomparative Study on Antibiotic Utilization Pattern and Its Complications in adults V/S Paediatricpneumonia Patients

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A B S T R A C T

The respiratory system is the network of organs and tissues that help you breathe. It includes the airway, lungs, and blood vessels. it is divided into upper respiratory tract (URT) and lower respiratory tract (LRT). lower respiratory tract infections tend to last longer and can be more serious when compared to URTIs. Pneumonia is the most common LRTI that affects the alveoli and distal airway, this is the fourth leading cause of death. Pneumonia occurs more commonly in susceptible individuals, including children of < 5 years of age and older adults with >60 years of age. A large variety of microorganisms can cause pneumonia including bacteria, viruses, and fungi. Laboratory tests are used to assess and treat. antibiotics are the primary treatment for pneumonia. Antibiotics like Azithromycin and amoxicillin are frequently utilized. As a result of long-term antibiotic use, adults frequently develop resistance. In this study, we analyzed the patient data and identified antibiotic therapy and its differential complications among adults and children are also included. We educate the patients about antibiotics and antibiotic-related complications in adult vs paediatric pneumonia patients.

Keywords: Bacterial pneumonia, lower respiratory tract infection, antibiotics, staphylococcus pneumonia, curb-65, procalcitonin, antibiotic resistance.

A R T I C L E I N F O

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Contents

1. Introduction

Pneumonia is a bacterial, viral, or fungal infection that mostly affects the lung's alveoli or air sacs. It is an inflammatory illness. Infection that inflames air sacs in one or both lungs. The air sacs may fill with fluid or pus. Symptoms that include fever, coughing, chest pain, and breathing difficulties are evident.

Acute pneumonia:

- "Acute pneumonia" refers to an infectious agent-induced inflammation of the lungs' alveoli and interstitial tissues, which causes acute respiratory symptoms and signs.
- Some people feel better and can return to their normal routines within a week. For other people, it can take a month or more. Most people continue to feel tired for about a month.
- Common symptoms include fever, chills, muscle aches, headache and cough.

Chronic pneumonia:

- Chronic pneumonia is an illness that lasts at least 6 weeks and is caused by a microorganism.
- Symptoms may vary in certain populations. Newborns and infants may not show any signs of

the infection. Or, they may vomit, have a fever and cough, or appear restless, sick, or tired and without energy.

- Older adults and people who have serious illnesses or weak immune systems may have fewer and milder symptoms.
- Difficulty breathing, developing a bluish color in your lips and fingertips chest pain, a high fever, or a cough with mucus that is severe or is getting worse.

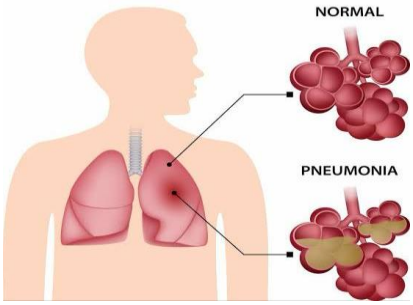

Fig: 01 Pneumonia

Pneumonia pathogenesis involves the invasion of the lower respiratory tract by infectious agents, often bacteria, viruses, or fungi. Inhaled pathogens reach the alveoli, triggering an inflammatory response. This leads to increased permeability of capillaries, allowing immune cells to enter the lungs. The immune response causes fluid accumulation, impairing gas exchange and leading to symptoms like cough, fever, and difficulty breathing. Severe cases can result in tissue damage and respiratory failure. Treatment typically involves antibiotics or antiviral medications, depending on the causative agent.

- Pneumonia is an inflammatory state of the lung influencing the air sacs, called alveoli. It commonly happens because of contamination, frequently by microorganisms, infections, or parasites.
- Microorganisms are breathed into the respiratory framework, arriving at the alveoli. Microbes attack the alveoli, causing irritation and triggering the immune system.
- Safe cells, like neutrophils, are enrolled in the tainted region, prompting an inflammatory response. This reaction leads to the side effects of pneumonia, including fever and hack.
- Inflammation prompts solidification, where the impacted lung tissue becomes loaded up with inflamed cells and accumulation of liquid. Alveolar edema happens as veins become leaky, making liquid collect in the alveoli.

2. Methodology

- **Study Design:** This is a prospective observational study conducted in the pulmonology department, ASCR government tertiary teaching care hospital, Nellore.
- **Study Site:** This study was done in a 1750-beded ASCR government tertiary care teaching hospital, Nellore.
- **Duration OD Study:** The study was conducted for six months in the pulmonology department.
- Source of Data: In-patient case sheets (Adult and pediatric patients).
- **Study Population:** This study involved a total subject of 160 (80 paediatric, 80 adults) according to inclusion and exclusion criteria.
- **Patient Selection Criteria:** The patient enrolled in the study was selected based on inclusion and exclusion criteria. Moringa Oleifera

Inclusion criteria:

- Both male and female patients were diagnosed with pneumonia.
- Patients of age between1 to 19 years and between 20 to 80 years.
- Patients with regular follow-up for six months.
- Patients who are willing to give consent.

Exclusion criteria:

- Non pneumonic patients.
- Outpatients and emergency paediatric patients.
- Patients who are not willing to consent.
- Unconscious patients.
- Pregnant women.

3. Results and Discussion

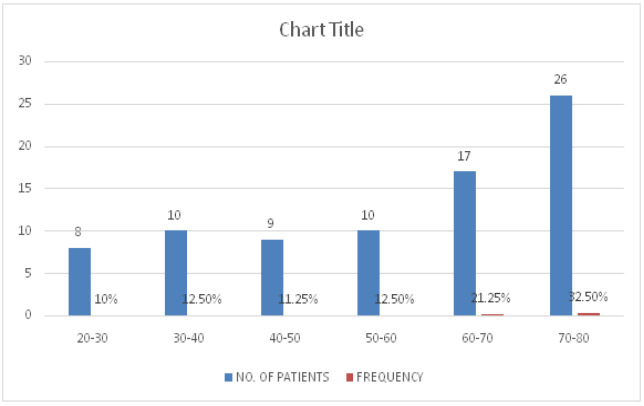

Fig: 2 Age-wise distribution of data in adults

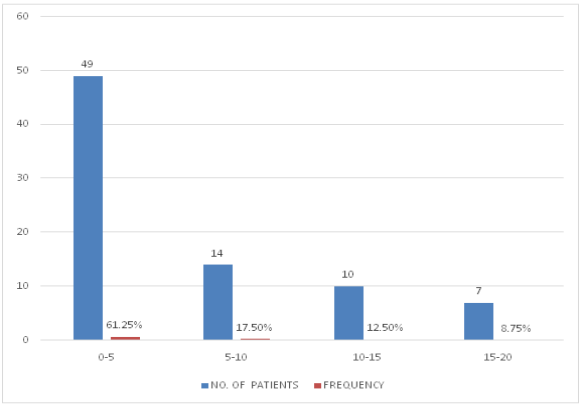

Fig: 3 Age-wise distribution of data in paediatric

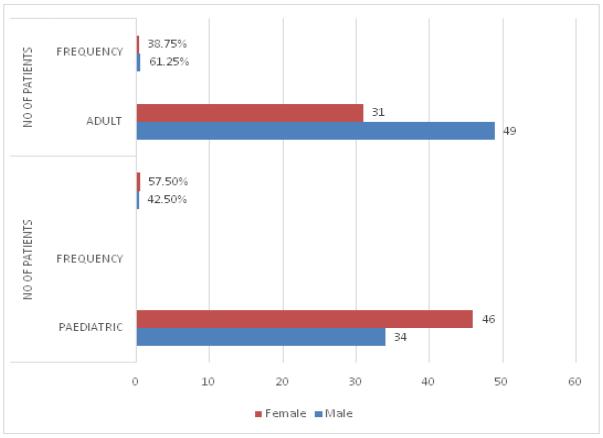

Fig: 4 Comparision of data based on gender wise

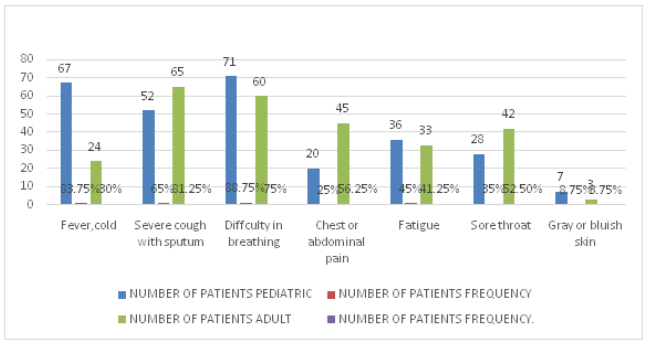

Fig: 5 Comparison of data based on reasons for hospitalization

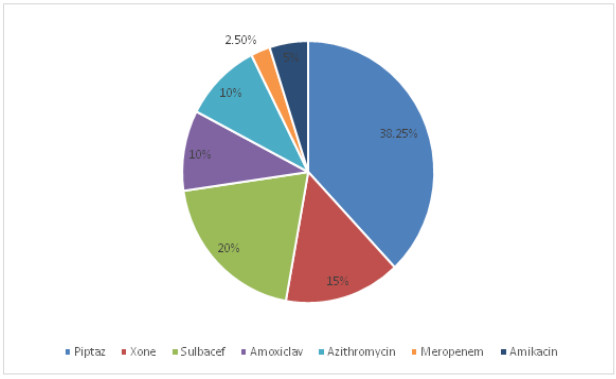

Fig: 6 Distribution of data based on drug utilization in adults

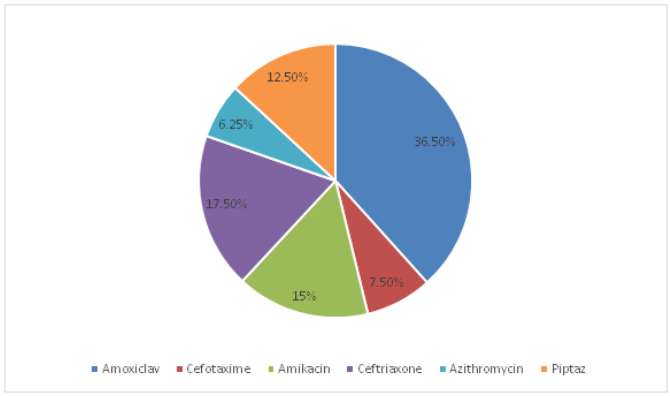

Fig: 7 Distribution of data based on drug utilization in pediatrics

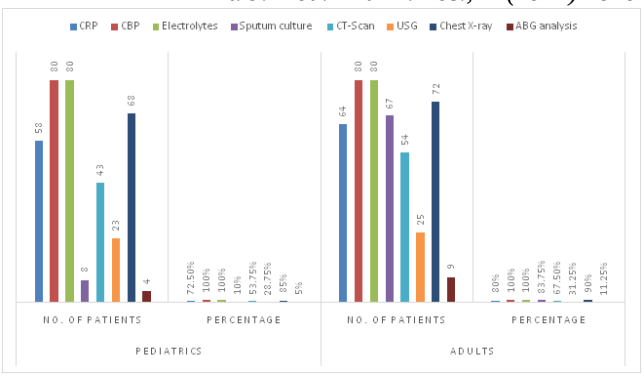

Fig: 8 Comparison of data based on diagnostic parameters

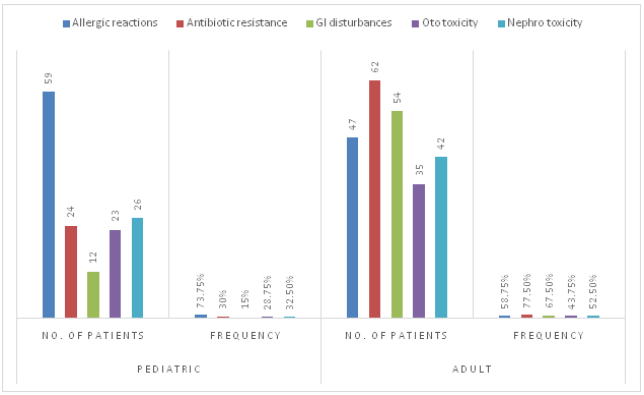

Fig: 9 Comparison of data based on complications of the antibiotic utilization

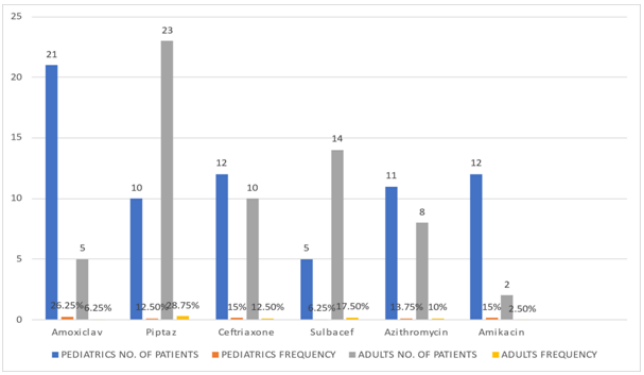

Fig: 10 Comparison of data based on drug related complications

Discussion:

- In the study "A comparative study on Antibiotic utilization pattern and its complications in adult v/s pediatrics patients" 160 patients are enrolled. Among these 80 patients are adults and 80 patientsin pediatrics are diagnosed with pneumonia.
- Among pediatric cases, 34 patients (42.5%) are male and 46 patients (57.5%) are female.
- Among adult cases, 49 patients (61.25%) are male and 31 patients (38.75%) are female.
- Among these 80 pediatric patients, based on age highest number of patients with an aged of 0-5yrs 49 (61.25%) and lowest number of patients with an age of 15-20yrs 07 (8.75%).

- Among these 80 adult patients, based on age highest number of patients with aged70-80 years.
- 26 (32.5%) and the lowest number of patients with an age of 20-30yrs 08 (10%).
- Among these 80 pediatric patients based on reasons for hospitalization, the highest number of patients 71 (88.75%) were admitted with shortness of breath, and the lowest number of patients 20 (25%) were admitted with chest or abdominal pain.
- Among these 80 adult patients based on reasons for hospitalization, the highest number of patients 65 (8.25%) were admitted with severe cough with sputum, and the lowest number of patients 24(30%) were admitted with fever, and cold.
- Among these 80 paediatric patients based on drug utilization, the highest number
- of patients 29 (36.5%) used with antibiotic Amoxiclav, and the lowest number of patients 05 (6.25%) used with antibiotic Azithromycin.
- Among these 80 adult patients based on drug utilization, the highest number of patients 31(38.25%) used with antibiotic Piptaz, and the lowest number of patients 02 (2.5%) used with antibiotic Meropenem.
- Among these 80 paediatric patients, based on diagnostic tests highest number of patients was 80 (100%) CBP, 80 (100%) Electrolytes, and the lowest number of patients was 04 (5%) ABG analysis.
- Among these 80 adult patients, based on diagnostic tests, the highest number of patients was 80 (100%) CBP, 80 (100%) Electrolytes, and the lowest number of patients was 09 (11.25%).
- Among these 80 pediatric patients, based on drugs used for underlying comorbidities the highest number of patients 63 (78.5%) are on the medication Paracetamol, and the lowest number of patients 19 (23.75%) are on the medication Ondansetron.
- Among these 80 adult patients, based on drugs used for underlying comorbidities the highest number of patients 80 (100%) are on medication Pantop and the lowest number of patients 02(2.5%) are on medication MVT.
- Among these 80 pediatric patients, based on complications of antibiotic utilization the highest number of patients 59 (73.75%) are of allergic reactions and the lowest number of patients 12 (15%) are of GI disturbances.
- Among these 80 adult patients, based on complications of antibiotic utilization the highest number of patients 62 (77.5%) are of antibiotic resistance, and the lowest number of patients 35 (43.75%) are of Ototoxicity.
- Among these 80 paediatric patients, based on drug-related complications the highest number of patients 21 (26.25%) Allergic reactions caused by amoxiclav, and the lowest number of patients 05 (6.25%) had GI disturbances caused by Sulbacef.
- Among these 80 adult patients, based on drug-related complications the highest number of patients was 23 (28.75%) direct nephrotoxicity caused by Piptaz, and the lowest number of patients was 02 (2.5%) Ototoxicity caused by Amikacin.

4. Conclusion

Our comparative study concluded that we have collected the data from hospitalized patients. The comparative study on antibiotic utilization patterns in adults versus paediatric pneumonia patients underscores several vital insights crucial for optimizing treatment strategies across different age groups. The most widely used antibiotic in paediatric is Amoxyclav and in adults is Piptaz. Our study also demonstrates the drug utilization and its complications according to the doses administered. The clinical pharmacist has to educate the patients, their family members, and society regarding the utilization complications of antibiotics among paediatric and adult pneumonia patients. Our team also mentioned the first-line and second-line drugs given in the treatment regimen according to different age groups and their possible complications. We have also depicted the antibiotic resistance and alternative prescription patterns of various antibiotics among paediatric and adult patients. Clinical pharmacist has to promote social awareness and knowledge about pneumonia and educate the patients on the advanced precautions, as well as give better advice on complications of pneumonia.

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