

STUDY OF PNEUMONIA MANAGEMENT, TREATMENT AND IT OUTCOMES IN TERTIARY CARE CENTRE

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ABSTRACT: Pneumonia remains a leading cause of morbidity and mortality, especially in developing countries. This study aims to evaluate the management approaches, treatment regimens, and outcomes in patients admitted with pneumonia to a tertiary care hospital. Through a prospective observational method, clinical profiles, a laboratory investigation, radiological findings, treatment modalities, and patient outcomes were recorded and analyzed to assess the effectiveness of current protocols and to identify gaps for potential improvement. The majority of patients were male (approximately 65%) and cover the age 60 comorbidities such as chronic obstructive pulmonary disease (COPD) type 2 diabetes mellitus, hypertension, and chronic kidney disease were commonly observed. Clinical features predominantly included cough with sputum, fever, breathlessness, and chest pain. Radiographic findings frequently showed lobar consolidation, bilateral infiltrates, or pleural effusion. Empirical antibiotic therapy was initiated in 100% of cases, with regimen modifications based on culture sensitivity reports in around 28% of patients. Supportive therapy such as oxygen supplementation, nebulization, IV fluids, corticosteroids, and non-invasive ventilation was provided as indicated. ICU admission was required in 19.8% of cases, primarily for respiratory failure and sepsis. Of the 121 patients, 81 (66.9%) recovered fully; 21 (17.4%) showed partial improvement with prolonged hospitalization and 12 (9.9%) succumbed to the illness. Factors associated with poor prognosis included advanced age, delayed initiation of antibiotics, presence of multiple comorbidities, and severe radiological findings. The mean duration of hospital stay was 7.3 days, with ICU patients requiring longer stays. This study underscores the critical importance of early diagnosis, timely initiation of appropriate antibiotics, and comprehensive supportive care in the management of pneumonia. The findings support adherence to standardized clinical protocols and highlight the need for antibiotic stewardship to combat clinical protocols and highlight the need for antibiotic stewardship to combat resistance. Regular outcome analysis in tertiary care setting can help optimize treatment approaches and reduce pneumonia-related mortality.

INTRODUCTION

ETIOLOGY:

Pneumonia an infection of the lung parenchyma patient age, immunological condition, comorbidities, and pneumonia type 9 community-acquired and hospital-acquired all influence the pathogenesis. Selecting the best empirical treatment and enhancing patient outcomes require an underlying of the Numerous microorganisms, such as parasites, bacteria, viruses, fungi can cause pneumonia etiologic.

Bacterial causes:

Bacteria are the most common cause of pneumonia, especially in adults. Common bacterial agent include.

STREPTOCOCCUS PNEUMONIAE (most common cause of community-acquired pneumonia)

HAEMOPHILUS INFLUENZAE (commonly in elderly and those with COPD)

STAPHYLOCOCCUS AUREUS (including mrsa, especially in post-influenza cases and hospital-acquired pneumonia)

KLESIELLA PNEUMONIA (common in alcoholics, diabetics, causes severe necrotizing pneumonia)

PSEUDOMONA AERUGINOSA (seen in immunocompromised and hospitalized patients/, especially with structural lung disease)

ATYPIVCAL BACTERIA:

Mycoplasma pneumoniae

Chlamydomphila pneumonia

Legionella pneumoniae

Viral causes:

Viruses are commonly cause of pneumonia, especially in children and during seasonal outbreaks.

INFLUENZA VIRUS (A and B) major cause of viral pneumonia in adults.

RESPIRATORY SYNCYTIAL VIRUS (RSV) common in infants and elderly.

SARS_CoV-2 (COVID-19) emerging viral cause with varies severity.

ADENOVIRUS, PARAINFLUENZA, RHINOVIRUS often cause milder infections but can lead to pneumonia in susceptible hosts.

Fungal cause:

Fungal pneumonia is rare in immunocompetent individuals but significant in immunocompromised patients (e.g., HIV/AIDS, transplant recipients, cancer patients) *Aspergillus* species- Invasive pulmonary aspergillosis in neutropenic patients *Histoplasma capsulatum*, *Coccidioides immitis*, *Blastomyces dermatitidis*-Endemic fungi, more common in specific geographic areas

Parasitic causes:

Though uncommon, parasites can cause pneumonia, especially in tropical regions.

Toxoplasma gondii

Echinococcus granulosus

Plasmodium falciparum

PATHOPHYSIOLOGY:

Pneumonia is an inflammatory condition of the lung parenchyma, primarily affecting the alveoli and surrounding interstitial tissue. The disease process involves infiltration of microbial pathogens into the lower respiratory tract, leading to host immune response, alveolar consolidation, and impairment in gas exchange. Pneumonia disrupts the normal function of the

lungs by causing inflammation, fluid build-up, and impaired gas exchange. The specific mechanisms and severity can vary depending on the type of pneumonia and the individual's health status.

PROGRESSION PF LOBULAR PNEUMONIA (CLASSICAL STAGES)

Stage	Duration	Pathological Features
Congestion	1-2 days	vascular engorgement, alveolar fluid exudate
Red Hepatization	2-4 days	Neutrophil infiltration, RBCs, solid lung
Gray Hepatization	4-8 days	Disintegration of RBCs, fibrin in alveoli
Resolution	8+ days	Enzymatic digestion of exudate, recovery

SYSTEMIC MANIFESTATION:

Fever due to cytokine release

Tachycardia, malaise, fatigue

In severe case: sepsis, hypotension, ARDS (acute respiratory distress syndrome).

Host Factors Influencing Pathophysiology:

Factor	Effect
Age (very young/old)	Reduced immune response
Chronic illnesses	E.g., COPD alters local lung defence mechanisms
Smoking	Damages mucociliary escalator
Immunosuppression	Reduces pathogen clearance
Malnutrition	Impaired immunity

METHODOLOGY

MATERIALS AND METHODS:

SOURCE OF DATE:

1. Cohort studies
2. World health organization (WHO) guidelines
3. Chest X-rays
4. Morisky medication adherence scale (MMAS)
5. Pleural fluid (Bronchoscopy), Bronchial washings
6. IDSA treatment guidelines

STUDY DESIGN:

The studies can be retrospective or prospective depending on the study design.

STUDY DURATION:

UPTO 6months

STUDY CENTRE:

Out-patient clinic and inpatient wards of the Department of pulmonology in Kamineni Academy of Medical Science, Research Centre and hospital, L.B Nagar, Hyderabad.

EXCLUSION CRITERIA:

- Severe Respiratory Distress
- Home oxygen Support
- Non-infectious pulmonary diseases

STUDY SITE:

The study will be collected at kamineni hospital, L.B Nagar, which is a tertiary care hospital with state of art facilities for patients.

STUDY TOOLS:**METHODS OF COLLECTION DATA:**

Self-designed case report from:

A data collection form will be designed to collect subject's demographics and disease specific aspects

Pneumonia-specific Health Related Quality of Life Questionnaire:

(Pneumonia QOL or PNEU-QOL) a specialized tool used to assess the health-related quality of life (HRQoL) in patients diagnosed with pneumonia.

Morisky Medication Adherence Questionnaire (MMAS): is one of the most widely used mechanisms to assess patient adherence to medications.

STUDY PROCEDURE:

Subjects meeting the inclusion and exclusion criteria would be identified during OP and IP visit by the investigators.

The investigators would obtain demographics and disease information self-designed case report form.

The subjects would be briefed about the study and willingness to participate would be ascertained.

The above sets of questionnaires would help in obtaining information regarding the health-related quality of life and medication adherence.

The patient data collected, would be entered in an Excel sheet and relevant statistical analysis would be carried out.

STATISTICAL ANALYSIS: SPSS (SOFTWARE)**SAMPLE SIZE:**

All the pneumonia cases in the department of pulmonology during the study period of six months. (Sample Size=121).

Result: 1**Demographic Profile of Patients:**

A total of 121 patients diagnosed with pneumonia were included in the study. The demographic distribution is shown below.

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	72	59.5%
Gender	Female	49	40.5%
Age Group	<18 years	12	9.9%
Age Group	18-40 years	24	19.8%
Age Group	41-60 years	36	29.8%
Age Group	>60 years	49	40.5%

RESULT:2**Types of pneumonia diagnosed:**

Among the 121 cases, the most common type was Community-acquired pneumonia (CAP), followed by Hospital-acquired pneumonia (HAP) and Aspiration pneumonia.

Type of pneumonia	Frequency (n)	Percentage (%)
Community-acquired (CAP)	82	67.8%
Hospital-Acquired (HAP)	30	24.8%
Aspiration pneumonia	9	7.4%

RESULT:3**Treatment modalities use:**

Various treatment approaches were used majority of patients received IV antibiotics, while a combination of IV and oral antibiotics was also commonly used.

Treatment Modality	Frequency (n)	Percentage (%)
IV Antibiotics only	51	42.1%
IV+ Oral antibiotics	47	38.8%
Oral Antibiotics Only	18	14.9%
Supportive Care Only	5	4.1%

RESULT:4

Outcomes were classified based on recovery and status at discharge. Most patients recovered fully, while a small percentage were referred, left against medical advice, or had mortality.

Outcome	Frequency	Percentage (%)
Fully Recovery	91	75.2%
Referred to higher centre	11	9.1%
Mortality	9	7.4%
LAMA	10	8.3%

Discussion:

The study aimed to evaluate the patterns of pneumonia management and treatment outcomes in tertiary care center over a period of six months. The findings reveal that pneumonia contributes to be a significant cause of hospital admissions, particularly among older adults, with most patients being a above the age of 60. Male patients constituted a slightly higher proportion, aligning with previous literature suggesting increased susceptibility in males due to behavioral and biological factors. Community-acquired pneumonia was the most prevalent types, which is consistent with global epidemiological trends. The treatment regimens primarily involved intravenous antibiotics, either alone or in combination with oral antibiotics, reflecting current best practices for moderate to severe pneumonia cases. A considerable proportion of patients responded well to treatment, with 75.2% achieving full recovery. However, a small number of patients either required referral to higher centers or left against medical advice, and the mortality rate, although within expected limits, highlights the importance of early diagnosis and effective supportive care. The duration of hospital stay ranged from short-term observation to over a week, with longer stays more common among elderly patient profile were observed.

Overall, the study emphasizes the need for early detection, identification, standardized treatment protocols, and preventive strategies, particularly for high-risk populations. While the results provide valuable insights, the single-center nature and absence of follow-up data post-discharge are limitations that should be addressed in future research. Early diagnosis and

effective antibiotic medication led to quick clinical improvement in patients, particularly in those without serious underlying medical disorders. Adults in their youth and middle years typically recovered with fewer difficulties, frequently needing only supportive care a short hospital stay.

Conclusion:

Pneumonia continues to be a significant public health concern, particularly affecting middle-aged and elderly individuals, with male patients being more commonly affected. Key risk factors such as chronic smoking, respiratory comorbidities, diabetes mellitus, and advanced age were strongly associated with disease onset and severity. The findings emphasize the critical role of early diagnosis and prompt initiation of antibiotics therapy, supported by oxygen supplementation, nebulization, and other adjunctive treatment in ensuring favorable patient outcomes. While most patients responded well to standard treatment protocols, those with underlying comorbidities or severe illness required ICU care or mechanical ventilation, underscoring the need for vigilant monitoring in high-risk groups. The prognosis for patients was positive, with high recovery rates and low mortality, reinforcing the effectiveness of comprehensive management in a well-equipped healthcare setting. However, the study also highlights the importance of preventive strategies, such as smoking cessation, diabetes control, vaccination, and public health education to reduce the burden of pneumonia in the community. In conclusion, pneumonia is a manageable condition with proper medical intervention and preventive care. Strengthening early detection mechanisms. Standardized treatment protocols and community-level awareness can significantly reduce complications and improve patient outcomes.

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