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STUDY OF CLINICAL, RADIOLOGICAL, MICROBIOLOGICAL PROFILE OF COMMUNITY ACQUIRED PNEUMONIA AND CORRELATION WITH PNEUMONIA SEVERITY INDEX

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ABSTRACT

Background

Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality, particularly in developing countries. Accurate assessment of severity is essential for effective management and prognosis. The Pneumonia Severity Index (PSI) is a validated clinical tool that helps stratify patients based on risk and guide treatment decisions. This study aimed to evaluate the clinical, radiological, and microbiological profile of CAP and to correlate disease severity using the PSI.

Methods

A prospective study was conducted on 90 hospitalized CAP patients. Clinical features, comorbidities, laboratory parameters, radiological findings, and sputum culture results were analyzed. Patients were categorized into PSI classes, and associations with clinical and biochemical variables were evaluated statistically.

Results

The mean age was 54.2 ± 18.3 years with male predominance (57.8%). Cough (77.8%), expectoration (85.6%), and fever (71.1%) were the common symptoms. Diabetes (34.4%) and hypertension (25.6%) were the leading comorbidities. Bilateral pneumonia (36.7%) and right-lower-lobe consolidation (39.1%) were frequent radiological patterns. The mean PSI score was 86.9 ± 25.7, with most patients in Classes III–IV. PSI correlated significantly with age ($p < 0.001$), socioeconomic status ($p = 0.031$), hyponatremia ($p = 0.006$), and altered mental status ($p = 0.004$). *Klebsiella pneumoniae* (27.7%) was the predominant pathogen. Clinical improvement occurred in 85.6% of cases, while mortality (4.4%) was confined to PSI Class V.

Conclusion

The PSI effectively predicts disease severity and outcomes in CAP. Gram-negative infections, hyponatremia, and multilobar involvement are strong indicators of severe disease. Early PSI assessment with appropriate empirical therapy can reduce complications and mortality.

Keywords: Community-Acquired Pneumonia; Pneumonia Severity Index; Klebsiella Pneumoniae; Hyponatremia; Gram-Negative Infection; Risk Stratification; Empirical Therapy

INTRODUCTION

Community-acquired pneumonia (CAP) remains one of the most common and potentially life-threatening infectious diseases worldwide, representing a major cause of morbidity and mortality among adults. It is defined as an acute infection of the pulmonary parenchyma acquired outside the hospital or within 48 hours of hospital admission in previously non-hospitalized individuals.[1] Globally, CAP accounts for nearly 4 million deaths annually, and in India, it contributes to approximately 23% of lower respiratory tract infection-related mortality, highlighting its significant public-health impact.[2,3]

The spectrum of CAP is highly heterogeneous, ranging from mild self-limiting illness to severe pneumonia requiring intensive care. Its etiology varies by geography, age, comorbidity, and antimicrobial exposure, with Streptococcus pneumoniae remaining the most common bacterial pathogen, while atypical and viral agents contribute substantially to mixed infections.[4] Early etiological identification and disease stratification are crucial for initiating appropriate antimicrobial therapy and reducing complications.

Clinical presentation alone often fails to accurately predict disease severity; hence, several prognostic scoring systems have been developed to guide clinical decision-making. Among these, the Pneumonia Severity Index (PSI) is one of the most validated and widely used tools, incorporating demographic, comorbid, laboratory, and radiological parameters to predict 30-day mortality and the need for hospitalization.[5,6] The PSI score stratifies patients into five risk classes, helping clinicians determine the level of care—from outpatient management to intensive care unit admission.

Despite advances in diagnostic modalities, microbiological confirmation rates in CAP remain low (30–60%), partly due to prior antibiotic use and limitations of conventional culture techniques.[7] Additionally, the emergence of multidrug-resistant organisms and changing local pathogen profiles necessitate region-specific epidemiological data to tailor empirical therapy. Radiological findings also play a pivotal role in differentiating typical from atypical infections and assessing disease extent.

Given this background, the present study was undertaken to evaluate the clinical, radiological, and microbiological profile of community-acquired pneumonia in adults and to correlate these findings with the Pneumonia Severity Index (PSI) to better predict disease outcome and assist in evidence-based management.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective cross-sectional observational study conducted in the Department of General Medicine, General Hospital, Jayangar, Bengaluru, from April 2023 to December 2024. The study included 90 adult patients admitted with a diagnosis of community-acquired pneumonia (CAP). Ethical clearance was obtained from the Institutional Ethics Committee, and written informed consent was obtained from all participants prior to enrollment. The study adhered to the principles of the Declaration of Helsinki.

Inclusion Criteria

- Adult patients aged ≥18 years.
- New-onset fever, cough with or without expectoration, dyspnea, and radiographic evidence of new infiltrate consistent with pneumonia, acquired outside the hospital or within 48 hours of admission.

Exclusion Criteria

- Hospital-acquired pneumonia (onset >48 hours after admission).
- Pulmonary tuberculosis, lung abscess, bronchiectasis, or malignancy.
- Immunocompromised states (HIV infection, corticosteroid or cytotoxic drug use).

- Recent hospitalization (within past 14 days).
- Patients unwilling to provide consent.

Data Collection and Clinical Evaluation

A detailed history was recorded, including demographics, comorbidities (COPD, diabetes, hypertension, CKD), smoking and alcohol habits, and symptom duration. Physical examination included assessment of vital signs, respiratory findings, and complications such as pleural effusion or encephalopathy.

Baseline investigations performed at admission included:

- Hematological parameters: hemoglobin, total and differential leukocyte counts.
- Biochemical parameters: blood urea, serum creatinine, electrolytes, and liver function tests.
- Microbiological investigations: sputum Gram stain and culture, sputum for acid-fast bacilli (AFB), and blood cultures prior to initiation of antibiotics.
- Radiological assessment: chest X-ray (posteroanterior view) to identify lobar involvement, multilobar disease, or pleural effusion.

Severity Assessment (Pneumonia Severity Index – PSI)

Each patient's severity was assessed using the Pneumonia Severity Index (PSI) described by Fine et al., which includes 20 variables comprising demographic data, comorbid illnesses, vital signs, laboratory values, and radiological findings. Based on the total PSI score, patients were classified into five risk classes:

- Class I: ≤50 points – low risk (outpatient management).
- Class II: 51–70 points – low risk.
- Class III: 71–90 points – moderate risk (short inpatient stay).
- Class IV: 91–130 points – high risk (hospital admission).
- Class V: >130 points – very high risk (ICU care).

Microbiological Evaluation

Sputum samples were collected under aseptic precautions prior to antibiotic administration. Smears were examined by Gram staining and Ziehl–Neelsen method, and cultures were performed on blood agar and MacConkey agar for bacterial pathogens. Growth was identified using standard biochemical tests. Blood cultures were incubated for 7 days using the BACTEC automated culture system. Sensitivity testing was performed by Kirby–Bauer disc diffusion according to Clinical and Laboratory Standards Institute (CLSI) guidelines.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 25 (SPSS Inc., Chicago, IL). Continuous variables were expressed as mean ± standard deviation (SD) and categorical variables as frequency and percentage. Correlation between PSI score and clinical, microbiological, and radiological parameters was assessed using Pearson's correlation coefficient. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 90 patients clinically and radiologically diagnosed with community-acquired pneumonia (CAP) were included in the study. The results are presented under demographic characteristics, clinical manifestations, laboratory and radiological findings, Pneumonia Severity Index (PSI) correlation, microbiological profile, and antibiotic therapy pattern.

Demographic and Socioeconomic Characteristics

The mean age of the study population was 54.21 ± 18.27 years (range: 19–88 years). The highest prevalence of CAP was observed in the 41–60-year age group (38.9%), followed by 61–80 years

(31.1%) and 21–40 years (21.2%). Only 7.8% of patients were younger than 20 years or older than 80 years. Male predominance was evident, with 52 males (57.8%) and 38 females (42.2%), yielding a male-to-female ratio of 1.4:1. The mean age among males (54.34 ± 18.79 years) was comparable to females (54.02 ± 17.79 years), and this difference was not statistically significant ($p = 0.935$). With regard to socioeconomic distribution, 55 patients (61.1%) belonged to the above-poverty-line (APL) category, while 35 (38.9%) were below the poverty line (BPL). This pattern reflects the predominance of middle-income individuals accessing tertiary-care services. The demographic and socioeconomic data are summarized in Table 1.

Clinical Presentation and Symptomatology

The clinical profile at presentation revealed that expectoration (85.6%), cough (77.8%), and fever (71.1%) were the most frequently reported symptoms. Dyspnea was noted in 61 patients (67.8%), while chest pain occurred in 14 (15.6%). Less frequent symptoms included nausea (18.9%), appetite loss (58.9%), and night sweats (11.1%). Hemoptysis was present in 11 patients (12.2%).

Statistical comparison by age groups revealed no significant association between age and most clinical features ($p > 0.05$), except for weight loss, which was significantly higher among patients aged > 50 years ($p = 0.044$).

Comorbidities were identified in 47 patients (52.2%). The most prevalent conditions were diabetes mellitus (31 patients, 34.4%), hypertension (23 patients, 25.6%), and chronic obstructive pulmonary disease (COPD; 10 patients, 11.1%). Less frequent associations included ischemic heart disease, bronchial asthma, bipolar affective disorder, and prior COVID-19 infection. These comorbidities showed a strong correlation with older age ($p < 0.01$ for DM, HTN, and COPD), suggesting age-related vulnerability. Smoking was significantly more common among males ($p < 0.001$) but did not vary by age group. The majority of patients without comorbidities were younger than 50 years, indicating that advancing age and chronic illness were major predisposing factors for CAP (Table 2).

Clinical Examination and Vital Parameters

On physical examination, tachypnea (respiratory rate > 20 cpm) was observed in 77.8% of cases, whereas hypoxemia ($SpO_2 \leq 80\%$) was present in 27.8%, more frequently among older patients ($p = 0.006$). The mean SpO_2 in the younger group (≤ 50 years) was 83.3 ± 5.5%, compared to 79.2 ± 4.7% in those > 50 years. Fever was present in 41.1% overall; however, afebrile presentations predominated in the elderly, indicating blunted febrile response ($p < 0.001$). The mean systolic blood pressure was 109.9 ± 26.8 mmHg in the younger group versus 128.6 ± 20.3 mmHg in the older group ($p = 0.003$). Pulse rate averaged 104.8 ± 20.2 bpm, with younger patients exhibiting higher values ($p < 0.001$). The Clinical Examination and Vital Parameters are summarized in Table 3.

Radiological Findings

All patients underwent postero-anterior chest radiography at admission. The predominant pattern was unilateral lobar consolidation, observed in 63.3%, while bilateral pneumonia was detected in 33 patients (36.7%). Among unilateral cases, the right lung was more frequently affected (52 patients, 57.8%) than the left (21 patients, 23.3%). Right-lower-lobe involvement was the most common (39.1%), followed by left-lower-lobe (23.9%), right-middle-lobe (17.3%), right-upper-lobe (10.8%), and left-upper-lobe (8.6%) consolidations.

Pleural effusion was present in approximately 20% of cases, while bronchopneumonia was seen in 12.2%. There was no statistically significant correlation between radiological pattern and age group ($p > 0.05$). However, patients with bilateral or multilobar involvement were more likely to have higher PSI scores and biochemical derangements (Table 4).

Pneumonia Severity Index (PSI) Distribution

All 90 patients were classified according to the Pneumonia Severity Index (PSI). The mean PSI score was 86.91 ± 25.74 (range 39–149). The distribution across risk classes was as follows:

The majority of patients (35.6%) fell into Class IV, representing moderate-to-severe risk, followed by Class III (31.1%). Only 6.6% were in Class V, indicating critical illness requiring intensive care support. Statistical analysis revealed a highly significant correlation between PSI class and age (χ^2 = 43.34, $p < 0.001$). All patients in Class IV and V were aged > 50 years, with multiple comorbidities. A significant relationship was also found between PSI class and socioeconomic status ($p = 0.031$); patients belonging to the BPL group showed higher severity indices. Hyponatremia, bilateral infiltrates, and altered mental status were more common among Class IV–V patients, demonstrating the reliability of PSI in stratifying disease severity. The Pneumonia Severity Index (PSI) is summarized in table 5.

Microbiological Profile

Sputum cultures were positive in 48 patients (53.3%), while 42 (46.7%) showed no growth, likely due to prior antibiotic use or viral etiology. Among positive isolates, *Klebsiella pneumoniae* was predominant (25 cases, 27.7%), followed by *Acinetobacter* spp. (8 cases, 8.9%), viral pathogens (8 cases, 8.9%), *Staphylococcus aureus* (5 cases, 5.6%), and *Aspergillus* spp. (2 cases, 2.2%). No specimens were positive for *Mycobacterium tuberculosis* by smear or culture.

Gram-negative organisms (*Klebsiella* and *Acinetobacter*) were more frequently isolated from patients with higher PSI classes (IV–V), suggesting an association between Gram-negative infections and disease severity. The overall microbiological spectrum is shown in Table 6.

Antibiotic Therapy Pattern

All patients were treated empirically upon admission, based on institutional CAP management protocols. The most commonly prescribed regimen was a third-generation cephalosporin plus macrolide combination (ceftriaxone + azithromycin) in 47 patients (52.2%), followed by amoxicillin–clavulanate in 25 patients (27.8%) and respiratory fluoroquinolones (levofloxacin or moxifloxacin) in 14 patients (15.6%). Escalation to broad-spectrum coverage with piperacillin–tazobactam or carbapenems was required in 4 patients (4.4%), mainly among PSI Class IV–V groups after poor initial response or culture confirmation of Gram-negative pathogens.

The mean duration of intravenous antibiotic therapy was 7.4 ± 2.1 days, followed by an oral step-down phase for 3–5 days. Clinical improvement—defined by defervescence, symptom relief, and radiological stabilization within 72–96 hours—was achieved in 77 patients (85.6%) Non-responders (13 patients, 14.4%) were predominantly those with high PSI scores and Gram-negative infections. None of the isolates demonstrated multidrug-resistant (MDR) patterns, and no cases of MRSA were encountered during the study period.

Parameter	**Category**	**No. of patients (n)**	**Percentage (%)**
Age (years)	≤ 20	2	2.2
	21–40	20	21.2
	41–60	35	38.9
	61–80	28	31.1
	>80	5	5.6
Gender	Male	52	57.8
	Female	38	42.2
Economic status	Above poverty line (APL)	55	61.1
	Below poverty line (BPL)	35	38.9
Mean age ± SD (years)		**54.21 ± 18.27**	

Table 1. Demographic and Socioeconomic Profile of Study Participants (n = 90)

Parameter	**No. of patients (n)**	**Percentage (%)**	**p-value**
Common symptoms			

Fever	64	71.1	0.281
Cough	70	77.8	0.733
Expectoration	77	85.6	0.437
Dyspnea	61	67.8	0.118
Chest pain	14	15.6	0.225
Hemoptysis	11	12.2	0.879
Weight loss	5	5.6	**0.044***
Comorbidities			
Diabetes mellitus	31	34.4	**<0.001***
Hypertension	23	25.6	**0.003***
COPD	10	11.1	**0.003***
Ischemic heart disease	1	1.1	0.379
Bronchial asthma	1	1.1	0.379
COVID-19 (past history)	2	2.2	0.847
No comorbidity	43	47.8	**<0.001***

Table 2. Clinical Features and Comorbidities Among CAP Patients (n = 90)

Parameter	**Age ≤ 50 years (Mean ± SD)**	**Age > 50 years (Mean ± SD)**	**p-value**
SpO_2 (%)	83.32 ± 5.54	79.20 ± 4.70	**0.006***
Respiratory rate (cpm)	23.91 ± 3.67	24.70 ± 4.02	0.495
Temperature (°F)	99.84 ± 0.82	98.41 ± 0.93	**<0.001***
Systolic BP (mmHg)	109.94 ± 26.85	128.64 ± 20.31	**0.003***
Serum sodium (mmol/L)	133.58 ± 4.41	131.67 ± 6.04	0.099
Random blood glucose (mg/dL)	148.23 ± 70.09	185.56 ± 97.76	**0.038***
PaO_2 (mmHg)	54.71 ± 3.18	52.78 ± 3.08	**0.005***
Pulse rate (bpm)	113.94 ± 16.46	97.76 ± 20.09	**<0.001***

Table 3. Clinical and Laboratory Parameters in CAP Patients (n = 90)

Radiological pattern	**No. of patients (n)**	**Percentage (%)**
Bilateral pneumonia	33	36.7
Right lobar pneumonia	31	34.4
Left lobar pneumonia	15	16.7
Bronchopneumonia	11	12.2
Lobar involvement		
Right lower lobe	18	39.1
Left lower lobe	11	23.9
Right middle lobe	8	17.3
Right upper lobe	5	10.8
Left upper lobe	4	8.6

Table 4. Radiological Distribution of Pneumonia (n = 90)

PSI Class	**Score range**	**No. of patients (n)**	**Percentage (%)**
Class I	≤ 50	8	8.9
Class II	51–70	16	17.8
Class III	71–90	28	31.1
Class IV	91–130	32	35.6
Class V	>130	6	6.6
Mean PSI ± SD		**86.91 ± 25.74**	

Table 5. Distribution of Patients According to Pneumonia Severity Index (PSI) (n = 90)

Microorganism	**No. of isolates (n)**	**Percentage (%)**
Klebsiella pneumoniae	25	27.7
Acinetobacter spp.	8	8.9
Viral pathogens	8	8.9
Staphylococcus aureus	5	5.6
Aspergillus spp.	2	2.2
Total positive cultures	48	53.3
Table 6. Microbiological Spectrum of Isolates from Sputum Culture (n = 48 positive cases)		

Empirical regimen	**No. of patients (n)**	**Percentage (%)**
Ceftriaxone + Azithromycin	47	52.2
Amoxicillin–Clavulanate	25	27.8
Levofloxacin / Moxifloxacin	14	15.6
Piperacillin–Tazobactam / Carbapenem	4	4.4
Mean duration of IV therapy (days)		**7.4 ± 2.1**
Table 7. Antibiotic Therapy Pattern Among CAP Patients (n = 90)		

Outcome	**PSI I–III (n = 52)**	**PSI IV–V (n = 38)**	**Total (n = 90)**	**p-value**
Clinical improvement	51 (98.1%)	26 (68.4%)	77 (85.6%)	**0.002***
Non-response / deterioration	1 (1.9%)	8 (21.0%)	9 (10.0%)	**0.012***
Mortality	0 (0.0%)	4 (10.5%)	4 (4.4%)	**0.002***
Table 8. Outcome Distribution by PSI Class				

DISCUSSION

Community-acquired pneumonia (CAP) remains one of the leading causes of morbidity and mortality worldwide and continues to pose a significant health burden in developing countries such as India. The present study evaluated the clinical, radiological, microbiological, and biochemical profiles of patients with CAP and assessed their correlation with disease severity using the Pneumonia Severity Index (PSI). In this study, CAP was most prevalent among middle-aged and elderly adults, with a male predominance. This demographic pattern is in agreement with previous Indian and Western studies by Jain et al.[4] and Chawla et al.[8] which demonstrated higher incidence in males above 50 years. Male predominance may be attributed to greater exposure to smoking, occupational hazards, and air pollutants, as well as hormonal and immunological factors. Fever, cough, and expectoration were the predominant presenting symptoms, observed in over 70% of cases, while dyspnea and chest pain were reported in 68% and 15%, respectively. These findings are consistent with the classical presentation of CAP described by Torres et al.[9] The presence of dyspnea and hypoxemia in nearly one-third of cases indicates significant parenchymal involvement and respiratory compromise.

More than half of the patients had one or more comorbidities. The most common were diabetes mellitus, hypertension, and chronic obstructive pulmonary disease, all significantly associated with older age ($p < 0.01$). Similar comorbidity profiles have been reported by Bansal et al.[10] and Vidal et al.[11] who demonstrated that chronic diseases impair pulmonary host defenses and worsen CAP outcomes. Smoking was also a major contributing factor in this cohort, significantly more common among males ($p < 0.001$). Previous studies by Jain et al.[4] and Torres et al.[9] have identified smoking as an independent risk factor for CAP severity. Patients without comorbidities were generally younger and had lower PSI scores, reaffirming that advancing age and chronic illness contribute substantially to disease severity.

In the present study, hyponatremia (<130 mmol/L) was detected in 31.1% of patients and showed a significant association with higher PSI classes ($p = 0.006$). Hyponatremia is a recognized poor prognostic marker in pneumonia and may result from syndrome of inappropriate antidiuretic hormone

secretion (SIADH) triggered by pulmonary infection. Similar trends have been described by Cuesta et al. and Zilberberg et al., emphasizing that low serum sodium correlates with severe infection and prolonged hospital stay. Elevated blood glucose, increased urea, and reduced oxygen saturation ($SpO_2 \leq 80\%$) were more frequent in older patients, consistent with the systemic inflammatory response and metabolic stress of severe CAP. Such biochemical alterations support the prognostic value of routine laboratory markers in risk stratification, as also noted by Lim et al.[6]

Chest radiographs revealed unilateral consolidation in 63.3% and bilateral involvement in 36.7% of patients. The right lower lobe (39.1%) was most commonly affected, followed by the left lower lobe (23.9%). Similar right-sided predominance was documented by Prina et al.[12] and Mani et al.[13] Multilobar and bilateral infiltrates were more frequent in patients belonging to PSI Classes IV and V, highlighting radiological extent as a direct indicator of severity. Pleural effusion was observed in 20% of cases, particularly in severe infections. El-Solh et al.[14] similarly demonstrated that bilateral consolidation and pleural effusion predict increased ICU admission and mortality. Thus, radiological extent complements clinical and biochemical parameters in assessing CAP severity.

Sputum culture positivity was 53.3%, which falls within the 40–70% range reported in previous literature.[7,15] The predominant isolate was *Klebsiella pneumoniae* (27.7%), followed by *Acinetobacter spp.* (8.9%), viral pathogens (8.9%), *Staphylococcus aureus* (5.6%), and *Aspergillus spp.* (2.2%). These findings contrast with some earlier Indian studies where *Streptococcus pneumoniae* predominated,[15,16] suggesting a shift toward Gram-negative etiology in hospitalized patients—especially those with diabetes, COPD, or prior antibiotic exposure. Notably, Gram-negative isolates were strongly associated with higher PSI classes (IV–V), indicating more severe disease. No multidrug-resistant (MDR) or MRSA strains were identified, suggesting that most cases were truly community-acquired and not hospital-derived infections.

Based on the mean PSI score, most patients belonged to Classes III and IV, indicating moderate-to-severe pneumonia. PSI scores were significantly correlated with age, economic status, and clinical parameters such as hyponatremia and altered mental status. Similar findings were reported in studies by Fine et al.[5] Lim et al.[6] and Chauhan et al.[17] who validated PSI as a reliable predictor of mortality and need for intensive care. In this study, mortality was confined exclusively to PSI Class V patients, reaffirming PSI's ability to stratify high-risk individuals accurately. The progressive increase in comorbidities, biochemical abnormalities, and multilobar involvement with advancing PSI class highlights the index's clinical utility in triaging CAP patients.

Empirical therapy with a third-generation cephalosporin plus macrolide (ceftriaxone + azithromycin) was administered in over half of the patients, consistent with standard treatment protocols. Escalation to piperacillin–tazobactam or carbapenems was required in few cases, mostly in PSI Classes IV–V, based on culture and sensitivity results. Clinical improvement was observed in the majority of patients within 72–96 hours of therapy, while 14.4% were non-responders, predominantly those infected with Gram-negative organisms. Similar favorable outcomes were noted in studies by Shah et al.[16] and Capelastegui et al.[18] supporting the efficacy of β-lactam–macrolide regimens for moderate-to-severe CAP. The absence of MDR isolates underscores the importance of antibiotic stewardship and adherence to guideline-based empiric therapy.

This study underscores the utility of the Pneumonia Severity Index as a rapid, objective, and cost-effective prognostic tool for CAP. Its integration with radiological and biochemical assessment allows for early identification of high-risk patients and timely escalation of care. The observed association between Gram-negative infection, hyponatremia, and high PSI class suggests that combining PSI with selected laboratory markers may further enhance risk prediction in Indian settings. Routine implementation of PSI scoring at admission can improve triage accuracy, reduce unnecessary ICU admissions, and optimize antibiotic use—ultimately improving clinical outcomes.

CONCLUSION

Community-acquired pneumonia (CAP) in this study predominantly affected middle-aged and elderly males, especially those with diabetes mellitus, hypertension, and COPD. The Pneumonia Severity

Index (PSI) proved to be a reliable and comprehensive tool for assessing disease severity, correlating strongly with age, comorbidity burden, biochemical derangements, and radiological extent.
Klebsiella pneumoniae emerged as the leading pathogen, reflecting a regional shift toward Gram-negative etiology, particularly in severe (PSI Class IV–V) cases. Hyponatremia, multilobar infiltrates, and altered mental status were key indicators of poor prognosis, while empirical β-lactam–macrolide therapy achieved favorable outcomes in most patients.
Routine implementation of PSI scoring at admission, complemented by early microbiological evaluation and rational antibiotic selection, can significantly enhance triage accuracy and reduce CAP-related morbidity and mortality. Larger multicentric studies using molecular diagnostics and antimicrobial-resistance profiling are recommended to refine empirical treatment strategies and strengthen CAP management protocols in India.

AUTHOR CONTRIBUTION

Dr. Channabasavaiah - Supervision, project administration, critical revision of manuscript & concepulization.
Dr. Prithi Gokuldasrao Jadhav - Data collection, patient management, original draft preparation
Dr. Sanjay B.C. - Literature review, draft preparation, data analysis.

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