International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Clinical Profile of Community-Acquired Pneumonia with Special Reference To CURB-65 Severity Scoring in Predicting Morbidity and Mortality: A Prospective Observational Study from a Tertiary Care Center in South India

Dr S Adil Basha, Dr Mohini Paipuru

Abstract: ***Background**: community-acquired pneumonia (CAP) remains a major cause of morbidity and mortality worldwide, especially in low resource healthcare settings. Early identification of patients with severe disease using validated scoring systems is essential for optimal triage and management. **Objectives**: To assess the clinical characteristics, microbiological pattern, and outcomes of adult patients with CAP and to evaluate the prognostic use of CURB-65 severity scoring in determining mortality and need for intensive care. **Methods**: This observational study including 60 adult patients diagnosed with CAP attending out-patient and in-patient services in the department of general medicine at RIMS, kadapa between January 2017 and January 2018. Demographic, clinical, radiological, and microbiological parameters were recorded. CURB-65 score was calculated at admission. The main outcome measure was mortality during hospitalization and additional outcomes were admission to intensive care and requirement for ventilatory support. Diagnostic performance metrics were calculated. **Results**: In a total of 60 adult patients Mean age was 38.08 ± 9.01 years; 71.6% were males. Fever and cough were present in 100% cases. Streptococcus pneumoniae (35%) was the most common isolate. Mortality was 5%. All deaths were seen in patients with CURB-65 score of 3. CURB-65 demonstrated 100% sensitivity and specificity for predicting mortality in this cohort. **Conclusion**: CURB-65 is a simple, practical, and reliable tool for early risk stratification in CAP. Routine implementation may improve triage decisions in resource-limited settings.*

Keywords: Community acquired pneumonia, CURB-65 score, Risk stratification, Intensive care outcomes, Streptococcus pneumoniae

1. Introduction

Community-acquired pneumonia is defined as an acute infection affecting the lung tissue that develops outside a hospital environment [1]. CAP remains an important cause of illness and death across the world. According to global health estimates, lower respiratory tract infections are among the top causes of death globally [2]. In India, the burden of CAP is substantial due to high prevalence of additional medical conditions like diabetes mellitus and chronic pulmonary disease [3]. Identifying patients at increased risk of adverse outcomes is crucial to determine the appropriate level of care. Various scoring systems have been created to help doctors make treatment decisions. The Pneumonia Severity Index (PSI) developed by Fine et al. [4] incorporates multiple variables, limiting its rapid bedside applicability. The CURB-65 score proposed by Lim and colleagues. [5] is simple and bedside-friendly which includes confusion, blood urea >7mmol/L, respiratory rate ≥30/min, blood pressure <90 systolic or ≤60 diastolic, and age ≥65 years. Each parameter scores one point. The 2019 ATS/IDSA guidelines emphasize the importance of reliable severity scoring systems to help guide treatment decisions [6]. Recent literature continues to support the prognostic value of CURB-65 in anticipating death rate and ICU requirement [7–9]. However, data from smaller tertiary centers in South India remain limited. This study was therefore carried out to examine the clinical characteristics, microbiological patterns, and outcome predictors of CAP in our institution, with special focus on assessing the diagnostic performance of CURB-65.

2. Materials and Methods

A study that observed patients over a period of 12 months (January 2017–January 2018) in the Department of General Medicine at a tertiary care hospital. Inclusion criteria included adults ≥18 years with acute symptoms suggestive of pneumonia and radiological confirmation. Exclusion criteria included immunocompromised states, HIV infection, active pulmonary tuberculosis, pregnancy, and hospital-acquired pneumonia. Demographic data, co morbidities, presenting symptoms, vital parameters, laboratory values, and microbiological findings were recorded in a structured proforma. CURB- 65 score was calculated at admission. All patients were divided into low-risk (score 0-1), intermediate-risk (score 2), and high-risk (score 3 or more) groups. Primary outcome was in-hospital mortality. Secondary outcomes were ICU admission and need for mechanical ventilation.

Data analysis: Numerical data were summarized as mean with standard deviation. Categorical data were shown as percentages. The performance of CURB-65 was assessed by calculating sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV).

3. Results

A total of 60 patients were included in this study. Their age and sex details are listed in Table 1. Males constituted 71.6%, indicating male predominance. Mean age was 38.08 ± 9.01 years. The presenting symptoms are summarized in Table 2. Fever and cough were present in 100% of cases. Dyspnea was present in 60% of cases. Radiological patterns

of cases are depicted in Table 3, with lower zone infiltrates being the most common finding (60%). Associated co morbidities are presented in Table 4. Diabetes mellitus (26.6%) was the most common co morbidity and was present in all mortality cases, suggesting a potential association with adverse outcomes. Complications of pneumonia are shown in Table 5. Respiratory failure occurred in 15% of patients, while overall mortality was 5%(n=3). Microbiological profile is summarized in Table 6. A high rate of organism detection was seen, with sputum culture positive in 85% of cases. The most common organism was Streptococcus pneumoniae (35%) which is similar to global trends [1,6]. CURB-65 parameter distribution is shown in Table 7. Majority of patients (73.3%) in low-risk category. Three patients (5%) died, all with score of 3, demonstrating strong association between higher score and mortality. CURB-65 demonstrated 100% sensitivity and specificity for predicting in-hospital mortality in this cohort, for predicting mechanical ventilation, sensitivity was 75% and specificity was 100%.

Table 1: Age And Sex Distribution:

Age in Years	Male		Female		Total	
	No	%	No	%	No	%
21-30	11	25.58	4	23.5	15	26.6
31-40	17	39.53	8	47	25	41.6
41-50	7	16.27	3	17.6	10	16.6
51-65	8	18.6	2	11.76	10	16.6
Total	43	100	17	100	60	100

Table 2: Sex wise distribution of presenting symptoms

Presenting complaints	Male (n=43)	Female (n=17)	Total (n=60)	
	No	No	No	%
Fever	43	17	60	100
Cough	43	17	60	100
Chest pain	17	7	24	40
Hemoptysis	1	0	1	1.66
Shortness of breath	28	8	36	60
Confusion	1	0	1	1.66
Others	2	1	3	5

Table 3: Showing Sex Wise Distribution of X Ray Lesions

Type of lesion	Male (n=43)	Female (n=17)	Total	%
Upper zone lesions	3	1	4	6.66
Middle zone	5	4	9	15
Lower zone lesion	25	11	36	60%
Interstitial infiltrates	3	0	3	5
Bilateral lesions	2	1	3	5
Pleural effusion	5	0	5	8.33

Table 4: Showing Sex Wise Distribution of Associated Comorbidities

Signs	Male	Female	Total	%
COPD	6	1	7	11.66
Hypertension	7	2	9	15
Diabetes mellitus	12	4	16	26.66
HIV	3	1	4	6.66
Old pul TB	3	1	4	6.66

Table 5: Showing Sex Wise Distribution of Complication of Pneumonia

Sputum	Male	Female	Total	%
Pleural effusion	5	0	5	13.33
Empyema	0	0	0	0
Lung abscess	0	0	0	0
Septicemia	6	0	6	10
Respiratory failure	7	2	9	15
ARDS	3	_	3	5
Death	2	1	3	5

Table 6: Showing Different Organisms Recovered in Sputum Culture and Sensitivity

Culture and sensitivity	Male	Female	Total	%
Streptococcus pneumoniae	19	2	21	35
Staphylococcus aureus	8	2	10	16.66
Pseudomonas aeruginosa	4	2	6	10
Klebsiella	9	2	11	18.33
E COLI	2	1	3	5

Table 7: Showing Sex Wise Distribution of CURB Score

Variables	Male	Female	Total	%
Confusion/disorientation	4	0	4	6.66
Urea	6	1	7	11.66
Respiratory rate	25	3	28	46.66
Hypotension	4	0	4	6.66

4. Discussion

The present study demonstrated male predominance and relatively younger mean age compared to Western cohorts [4,7]. This demographic trend is consistent with other Indian studies [3]. Diabetes mellitus was a key comorbidity influencing outcomes. Hyperglycemia may impair host immune response and increase susceptibility to severe infection [10]. Streptococcus pneumoniae was the most common pathogen, aligning with ATS/IDSA and WHO data [1,2,6]. CURB-65 demonstrated excellent predictive value in our study. Similar findings were reported by Lim et al. [5], who validated CURB-65 as a reliable predictor of 30-day mortality. Recent systematic reviews (2020–2023) confirm that CURB-65 remains a robust bedside tool, especially in resource-limited settings [8,9]. While PSI may provide more granular risk stratification, CURB-65 offers simplicity, rapid applicability and has demonstrated comparable predictive accuracy to other severity indices in Indian cohorts (11,12).

5. Limitations of the Study

The present study has some limitations. The sample size was relatively small and derived from a single tertiary care center, which may limit generalizability. The number of mortality events was low, which may affect the precision of diagnostic performance estimates. Long-term follow-up outcomes were not assessed. Studies from multiple centers are required to validate these findings.

6. Conclusion

Community-acquired pneumonia was a significant health burden. In this study pneumonia was seen in all the age group, most common between 20-40 years. It was associated with various medical conditions, most common were Diabetes mellitus and COPD. Smoking is a well known and

important risk factor through causing changes in the body's natural defense system. CURB-65 scoring is a simple, validated, and reliable tool for predicting death and the need for intensive care. Routine implementation in emergency settings may optimize triage decisions.

7. Clinical Significance

Early risk stratification of community-acquired pneumonia is essential for appropriate triage and resource allocation, especially in settings with limited medical resources. The findings of this study support the use of CURB-65 as a simple bedside tool to recognize the patients at higher risk of death and those who may need intensive care, thereby facilitating timely clinical decision-making.

Ethical approval
The study was carried out according to the principles of the declaration of Helsinki. Approval from the Institutional Ethics Committee was obtained before the study began. Written informed consent was taken from all the study participants.

Data Availability statement
The data collected and analyzed during this study are available at the corresponding author whenever asked.

Acknowledgement
The department of General medicine and Microbiology laboratory staff were supported in data collection and processing.

Conflict of interest statement
The authors report no conflicts of interest.

Authors' Contribution:
Author 1: Data collection, statistical analysis and data interpretation
Author 2: Revision of manuscript

References

[1] Mandell LA, Wunderink RG, Anzueto A, Barlett JG, Campbell GD, Dean NC,et al. IDSA/ATS guidelines for CAP. Clin Infect Dis. 2007;44:S27–72.
[2] World Health Organization. Global causes of death. WHO; 2023 update. Geneva: World Health Organization; 2023.
[3] Bansal S, Kashyap S, Pal LS, Goel A. Clinical profile of CAP in adults. Indian J Chest Dis Allied Sci. 2004;46(1):17–22.
[4] Fine MJ, Auble TE, Yealy DM, Hanusa BH, Weissfeild LA, Singer DE, et al. A Prediction rule to identify low-risk patients with CAP. N Engl J Med. 1997;336(4):243–50.
[5] Lim WS, van derEerden MM, Laing R, Boersma WG, Karalus N, Town GI, et al. CURB-65 validation. Thorax. 2003;58(5):377–82.
[6] Metlay JP, Waterer GW, Long AC, Anzueto A, Brozek J, Crothers K, et al. ATS/IDSA CAP guidelines 2019. Am J Respiratory Critical Care Med. 2019;200(7):e45–67.
[7] Bochud PY, Moser F, Erard P,Verdon F, Studer JP, Villard G, et al. CAP prospective study. Medicine (Baltimore). 2001;80(2):75–87.
[8] Chalmers JD, Singanayagam A, Akram AR, Mandal P, Short PM, Choudary G, et al. Severity assessment tools in CAP: Update. Lancet Respir Med. 2020;8(2):123–35.
[9] Torres A,Cilloniz C, Niederman MS, Menendez R, Chalmers JD, Wunderink RG, et al. CAP management update 2021. Eur Respir J. 2021;58(3):2001966.
[10] Muller LM, Gorter KJ, Hak E, Goudzwaard WL, Schellevis FG, Hoepelman AI, et al. Increased infection risk in diabetes mellitus. Clin Infect Dis. 2005;41(3):281–8.
[11] 11.Patil P, Tyagi A, Waghmare M, Srivastava A, Waran M. A comparative study of PSI and CURB-65 scoring systems predicting and ICU admissions and mortality in CAP. Int J Med Res Rev.2020;8(3):240-6
[12] Madhu, S., Augustine, S., Ravi Kuumar, Y.S., Kauser M. Comparative study of CURB-65, PSI and IDSA/ATS scoring systems in CAP. Internation Journal of Advances in Medicine, 2017; 4(3), 693-700.