Assessment of the length of the hospital stay and need for intensive care in CAP patients with their CURB 65 and expanded CURB 65 score

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Abstract
Background: Community-acquired pneumonia continues to be one of the most significant public health issues. Typically, 80% of the affected patients receive outpatient care, while 20% receive inpatient care. The mortality rate for hospitalized patients can range from 12 to 40 percent, although it is less than 5 percent for outpatient treatments. The aim of this study is to assess the length of stay in hospital in CAP patients and need for intensive care in CAP patients with their CURB 65 and expanded CURB 65 score. **Methodology-** The study was carried out in the Department of General Medicine, at a tertiary care centre from April 2022 to September 2022. 100 patients of community acquired pneumonia and fulfilling the inclusion exclusion criteria were taken into consideration for the study. Patients were examined and vital signs and findings of systemic examination will be recorded. Further patient's length of hospital stay, need for intensive medical care, will be calculated and compared with both the scores. **Result-** In this study it was found that both scores predicted the length of hospital stay, need for intensive care, with equal significance. **Conclusion-** In a resource limited setting, CURB 65 is not inferior to expanded curb 65 in identifying at risk patients.
Keywords: CAP, CURB 65, pneumonia, hospital, intensive care.

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Introduction
An infection of the pulmonary parenchyma is known as pneumonia. Despite the fact that the prevalence of community-acquired pneumonia ranges from 5.16 to 6.11 per 1000 cases per year.[1] it is frequently underestimated, misdiagnosed, and treated incorrectly. According to statistics, pneumonia is the eighth most prevalent cause of death in the US.[2,3] with a fatality rate of 1% in outpatient settings and close to 45%–60% in hospitalized patients. The

mortality rate for hospitalized patients can range from 12 to 40 percent, although it is less than 5 percent for outpatient treatments. Lower respiratory tract infection symptoms within a week, systemic symptoms like fever (>37.70 C), chills, rigidity, and malaise, clinical indicators like bronchial breathing and lung crepitation, and infiltrates in the chest on an X-ray are the criteria for diagnosis. 25% of instances could have extra-pulmonary symptoms such autoimmune symptoms, difficulties with the central nervous system, or dermatological symptoms. In places where people are in close and extended proximity, such as jails, schools, military bases, and hostels, it seems to happen more frequently.[4] Staphylococcus aureus: Homosexual and I.V. drug users, prisoners, and homeless nomads are more likely to get community-acquired MRSA. It is followed by an influenza-like sickness in a young adult who was otherwise asymptomatic. [5,6] There have been more incidences of CAP and VAP caused by MRSA over the previous 20 years. Multi-lobar cavitations and necrotizing pneumonia are common effects of the more severe variety.[5-7] More than 80% of patients with MRSA pneumonia are brought to the intensive care unit, more than 60% require mechanical breathing, and 45% require the installation of a chest tube.

The severity of pneumonia can be measured using a variety of scores. The original grading system, the Pneumonia Severity Index (PSI), developed by the American Thoracic Society and the Infectious Disease Society of America, has 20 clinical and laboratory characteristics (IDSA). Later, the British Thoracic Society recommended a criteria for evaluating patients with Community Acquired Pneumonia that included disorientation, urea, respiratory rate, blood pressure, and age >65 (curb-65 score). Other ratings, such as SMART-COP and A-DROP, were created to aid in deciding if a patient needs to be admitted to the hospital or even the intensive care unit. Numerous studies have discovered that the biomarkers can differentiate between bacterial and viral pathologies and may provide further information on the severity of patients with community-acquired pneumonia. However, the majority of biomarkers are pricy and difficult to obtain in urgent situations. The existence of underlying inflammation is one of numerous factors that affect albumin, an acute phase reactant. In cases of acid-base problems, albumin serves as a buffer and possesses anti-oxidant properties. Additionally, it regulates osmotic pressure, distributes hormones, and inhibits apoptosis. It has been demonstrated that inflammation lowers albumin levels regardless of the patient's dietary status. Hypoalbuminemia is linked to problems and a longer hospital stay.

Hence, the above study was conducted to assess the length of stay in hospital in CAP patients and need for intensive care in CAP patients with their CURB 65 and expanded CURB 65 score.

Materials And Methods
Study place-The study was conducted at the Government Royapettah Hospital, Government Kilpauk Medical College Hospital, Chennai in the Department of General Medicine. The duration of the study was of 6 months (April 2022 to September 2022).

Study design- Prospective cohort study.

Inclusion Criteria- Patients with at least two clinical signs and symptoms related to pneumonia (fever, cough, chest pain, dyspnoea and crackles on auscultation), new infiltrates on chest x ray, age more than 18 years, belonging to both genders and ready to give written informed consent.

Exclusion Criteria-Patients having symptoms after 48 hours of hospitalisation, age less than 18 years, having HIV infection, organ transplant recipient, on immunosuppressant and steroids and those denying to give informed consent for participation.

Sample size-100 patients of community acquired pneumonia in Government Royapettah Hospital. From literature, the sensitivity of the CURB in predicting the 30-day mortality was

found to be 66.67 anticipating the same in our study with 95% confidence level and 10% precision the sample size was calculated to be 85, after accounting for 10% loss the final sample size was calculated to be 92, the final sample was rounded of to 100

Data analysis-The data was analyzed using SPSS 21 version and entered into the Microsoft Excel sheet.

Ethical considerations- All the necessary permissions were taken from the Institutional Ethical Committee before beginning of the study.

Patients were subjected to thorough history taking to collect information on presenting symptoms, its duration, addictions & comorbid conditions. Patients were also examined and vital signs and findings of systemic examination were recorded. CURB 65 and expanded CURB 65 were calculated. Further patient's length of hospital stay, need for intensive medical care, were calculated and compared with both the scores.

CURB 65 calculation

C-Confusion (new confusion to time, place and person)

U- Blood urea nitrogen more than 19 mg/dl

R- Respiratory rate of 30 and more

B-Low systolic blood pressure (<90mmm hg) or diastolic blood pressure (<60mmhg)

AGE>65 years

0-1 low risk-home treatment

2 in patient

3-5 manage as severe

EXPANDED CURB 65 SCORE

AGE>65 years

Confusion

Blood Urea Nitrogen>19mmol

Respiratory Rate >30

Blood Pressure- systolic blood pressure <90mmhg or

Diastolic blood pressure<60mmhg

1.Serum Albumin- <3.5

2.Serum LDH >230

3.Platelet Count< 100000

Calculation

0-1   low risk

3-4 intermediate risk

5 -8 high risk

Results

Table 1: Age Distribution

AGE GROUP	Frequency	Percent
<40	4	4.0
41-50	11	11.0
51-60	29	29.0
61-70	33	33.0
Above 70 years	23	23.0
Total	**100**	**100.0**

Majority of cases in the above study were between age of 50 to 70(62%) with particular crowding in the age group between 61 to 70 years (33%)

Table 2: ICU Admission

ICU admission	Frequency	Percent
No	69	69.0
Yes	31	31.0
Total	100	100.0

Out of 100 patients 31 patients were admitted to intensive care and 14 patients were under mechanical ventilation support and 16 patients died due to complications of community acquired pneumonia.

Table 3: Mechanical Ventilation

MECHANICAL VENTILATION	Frequency	Percent
No	86	86.0
Yes	14	14.0
Total	100	100.0

Out of 100 patients 14 patients received mechanical ventilation in intensive care.

Table 4: CURB 65 Scores And ICU Admission Rates

			ICU admission		Total	P value
			No	Yes		
CURB-65	Low risk	Count	42	7	49	<0.0001
		% within CURB-65	85.7%	14.3%	100.0%	
	Inpatient	Count	22	12	34	
		% within CURB-65	64.7%	35.3%	100.0%	
	Severe	Count	5	12	17	
		% within CURB-65	29.4%	70.6%	100.0%	
Total		Count	69	31	100	
		% within CURB-65	69.0%	31.0%	100.0%	

Table 5: CURB 65 and E-CURB 65 correlation with length of hospital stay

		LENGTH OF HOSPITAL STAY
CURB-65	Pearson Correlation	0.521
	P value	<0.0001
E-CURB 65	Pearson Correlation	0.763
	P value	<0.0001

Table 6: CURB 65 and length of hospital stay

		LENGTH OF HOSPITAL STAY		P value
		Mean	Standard Deviation	
CURB-65	Low risk	4.08	3.71	<0.0001
	Inpatient	7.12	3.33	

Severe	9.47	4.05	

In curb 65 scoring 0-1, 2, 3-5 are graded as low risk, moderate risk and high risk respectively. The mean hospital stay among the low risk patients were 4.08 days. Among the intermediate risk group, the mean hospital stay was 7.12 days and among the high risk patients the mean hospital stay was 9.47 days.

TABLE 7: Expanded curb 65 and length of hospital stay

		LENGTH OF HOSPITAL STAY		P value
		Mean	**Standard Deviation**	
E-CURB 65	Low risk	2.82	2.49	<0.0001
	Intermediate risk	6.37	2.89	

The expanded curb 65 score 0-2, 3-4,5-8 corresponds to low risk, moderate risk and high risk respectively. Among the low risk the mean hospital stay was 2.82 days. Among the intermediate risk patient's, the mean hospital stay was 6.37 days and 10 days among the high risk patients.

Table 8: Serum Albumin and Hospital Stay

		LENGTH OF HOSPITAL STAY
S.ALB	Pearson Correlation	-0.511
	p value	<0.0001

Discussion

In the above study the highest incidence of community acquired pneumonia was between 60 to 70 years (33%) followed by 29 % in patients between 50 to 60 years. Patients in their seventh decade had an incidence of 23 %.

Of the 100 patients, 31 patients were admitted in intensive care owing to respiratory distress and hemodynamic instability. Among them 16 patients went up to receiving mechanical ventilation. In those patients with curb 65 score with low risk, 14.3% patients needed ICU admission whereas those with moderate risk had 35.3% ICU admission rate and those with high risk score had intensive care admission rate of 70.6%.

Applying the expanded curb 65 score for predicting ICU admission, those with low risk had a 7.7% admission rate, those with moderate risk had admission rate of 28.6% and those with high score had an admission rate of 69.2%. This signifies that CURB 65 and expanded curb 65 had similar role in predicting the admission in intensive care in community acquired pneumonia patients.

Comparing the length of hospital stay in both curb 65 and expanded curb 65 score, in curb 65 score those with low risk had a mean stay of 4 days, moderate risk had a mean stay of 7 days and those with high risk had a mean hospital stay of 9 days. Using the expanded curb 65 score, those with low risk had a mean stay of 2 days, those with m6oderate risk had a mean hospital stay of 6 days and those with high risk score had a mean stay of 10 days. From this data analysis, both scores predicted the severity of infection and was equally found to be useful (p value<0.001). Regarding serum albumin levels and length of hospital stay there was a positive correlation was significant p value (0.0001) and Pearson correlation (-0.511).

CONCLUSION

From the above study we can conclude, that CURB 65 and expanded CURB 65 has equal prognostic significance. Comparing the specificity, both scores share equal prognostic significance though CURB 65 has higher specificity compared to the other. Hence, in a resource limited setting, CURB 65 is not inferior to expanded curb 65 and better predicts ICU admission, the need for mechanical ventilation. Of the biochemical parameters, serum albumin better predicts the length of hospital stay.

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