

# Morbidity and Mortality in Young Patients of Community Acquired Pneumonia Admitted to a Tertiary Care Centre in North India

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## ABSTRACT

**INTRODUCTION:** In CAP patients, the mortality rate within 90 days after discharge can be as high as 14% (this is in addition to the inpatient mortality referred to early) and considerably higher than in the general population or in those hospitalized for other reasons. However, the mortality & morbidity data in young patients of CAP ( $\leq 60$  years) is sparse, this is the reason for undertaking this study.

**AIMS & OBJECTIVES:** To study the 90 day mortality /morbidity and complications in young patients of CAP ( $\leq 60$  years).

**MATERIALS & METHODS:** 100 cases, 60 years old or younger, who were diagnosed as CAP (defined as pneumonia identified 48 hours or less from hospitalization) were studied for morbidity (complications and/or  $\geq 10$  days hospital admission and/or admission to ICU) and the 90-day mortality was calculated.

**RESULTS:** Sepsis was significantly present in complicated hospitalisations (p value  $< .001$ ). Also CCF (p value  $= .002$ ) and shock (p value  $= .023$ ) were significantly present in complicated group. Elevated CURB SCORE ( $\geq 2$ ) and PSI ( $\geq 2$ ) were significantly associated with 90 day mortality and present in complicated hospitalisation compared to uncomplicated ones.

**CONCLUSIONS:** Young patients with CAP who had higher CURB/PSI score had higher mortality and morbidity. Also patients in

complicated hospitalisation group had higher rate of associated complications and vice versa.

**Keywords:** Community Acquired Pneumonia, CURB-65, Pneumonia severity Index (PSI).

## INTRODUCTION

One of the leading causes of morbidity and mortality worldwide is community acquired pneumonia (CAP) [1,2]. Pneumonia and kindred lower respiratory tract infections are the world's most common infectious diseases, accounting for 3.0 million fatalities in 2016 [2]. Pneumonia also ranks fourth among all causes of mortality. Children in poor countries and the elderly in affluent countries are the main populations affected by CAP [2]. Young children and older individuals have the highest rates of CAP [3], but older adults have the highest rates of death [4–6]. Hospitalization is necessary in many CAP cases, and according to certain research, the admission rate ranges between 20 and 30% [7,8]. The incidence rates of hospitalisation and the risk of death differ with age, according to a number of studies, with the highest rates occurring in the oldest age categories, primarily those over 75[1,8].

Decision regarding the most appropriate site of care is the first and the most important decision in the overall management of CAP

and is assessed according to the severity of illness at presentation. Various severity scoring systems and predictive models have been developed in an attempt to help the clinician to identify CAP patients with a poor prognosis in an early stage. One of the best validated scores and easy to use in clinical practice is CURB-65 score (recommended by British Thoracic Society) [10,11]. Community-acquired pneumonia patients may still experience adverse outcomes after discharge, including readmission and death due to relapse of pneumonia or other causes. Early readmission rates are about 2.3% in ambulatory patients [11] and 8-46% in hospitalized patients, particularly in the presence of advanced age or relevant comorbidities (chronic renal, cardiac or respiratory disease, malignancy) [12]. Moreover, it has been shown that recurrent pneumonia in elderly people is associated with increased 1-year mortality [13]. In CAP patients, the mortality rate within 90 days after discharge can be as high as 14% (this is in addition to the inpatient mortality referred to early) and considerably higher than in the general population or in those hospitalized for other reasons [14,15,16]. However, the mortality & morbidity data in young patients of CAP ( $\leq 60$  years) is sparse, this is the reason for undertaking this study.

### **AIMS & OBJECTIVES**

1. To study the 90 day mortality in young patients of CAP ( $\leq 60$  years) with comparison in complicated and uncomplicated cases.
2. To study the nature and incidence of complications in young patients of CAP ( $\leq 60$  years).

### **MATERIALS & METHODS**

Our study was prospective study in the Department of Medicine, Sher I Kashmir Institute Of Medical Sciences, J&K, India, over a period of 2 years. 100 cases, 60 years old or younger, who were diagnosed as CAP (defined as pneumonia identified 48 hours

or less from hospitalization) were studied for morbidity (complications and/or  $\geq 10$  days hospital admission and/or admission to ICU) and the 90-day mortality was calculated. PNEUMONIA SEVERITY INDEX (PSI) and CURB65 score were calculated (as per Fig. I and Fig. II). Patients were followed for mortality closely by noting their home addresses, cell/telephone numbers. The subjects who changed their cell numbers were followed by their home visits.

**INCLUSION CRITERIA:** Community acquired pneumonia was defined as an acute illness (fewer than 14 days of symptoms), the presence of new chest infiltrates, and clinical features suggestive of acute pneumonia. The clinical features required were one of group A (fever;  $37.8$  °C, hypothermia  $36$  °C, cough and sputum production) or two of B (dyspnea, pleuritic pain, physical findings suggestive of lung consolidation and leukocyte count greater than 10,000 or less than 4000). These criteria are consistent with the published guidelines of community acquired pneumonia [17].

**COMPLICATED HOSPITALIZATION** was defined as at least one of the following parameters: hospitalization longer than 10 days, admission to ICU and in-hospital mortality. Otherwise, the hospitalization was defined as uncomplicated.

**EXCLUSION CRITERIA:** These include:

- 1) Hospitalization for any cause other than CAP during the 30 days prior to admission,
- 2) Hospital-acquired pneumonia (defined as pneumonia which was diagnosed more than 48 hours after admission).
- 3) Patients with severe immunodeficiency as defined by the Centres for Disease Control Criteria for patients with acquired immune deficiency syndrome [18].
- 4) Patients receiving treatment with corticosteroids equivalent to

prednisolone at more than 20 mg/day for more than 14 days.

- 5) Patients receiving immunosuppression after organ transplantation;
- 6) Patients receiving cyclosporine, cyclophosphamide, or azathioprine.

### FOLLOW UP

Patients were followed up for mortality and morbidity for 90 days closely by noting their home addresses, cell/telephone numbers. The subjects who could not be contacted on cell/telephone were followed by their home visits.

Figure I. PNEUMONIA SEVERITY INDEX (PSI)

PATIENT CHARACTERISTICS	SCORE ASSIGNED
<b>DEMOGRAPHIC FACTORS</b>	
Age (in years)	Age
Males	Age -10
Females	Age +10
Nursing home resident	+10
<b>COEXISTING FACTORS</b>	
Neoplastic disease	+30
Liver disease	+20
CHF	+10
Cerebrovascular disease	+10
Kidney disease	+10
<b>INITIAL PHYSICAL EXAMINATION</b>	
Altered mental status	+20
Respiratory rate $\geq$ 30/min	+20
Systolic blood pressure $\leq$ 90 mm Hg	+20
Temperature $<$ 35 or $\geq$ 40°C	+15
Heart rate $>$ 125/min	+10
<b>INITIAL LABORATORY FINDINGS</b>	
pH $<$ 7.35	+30
BUN $>$ 30 mg/dl	+20
Sodium $<$ 130 mEq/ L	+20
Glucose $\geq$ 250 mg/ dl	+10
Hematocrit $<$ 30%	+10
pO <sub>2</sub> $<$ 60 mmHg or O <sub>2</sub> saturation $<$ 90%	+10
Pleural effusion	+10

Figure III.CURB-65 SEVERITY SCORE FOR COMMUNITY ACQUIRED PNEUMONIA

Clinical factor	Points
Confusion	1
BUN $>$ 19 mg/ dl	1
Respiratory rate $>$ 30/ min	1
Systolic blood pressure $<$ 90 mmHg or Diastolic blood pressure $\leq$ 60mmHg	1
Age $\geq$ 65 years	1
Total points	

### STATISTICAL ANALYSIS

Comparing of patients' characteristics from groups (complicated and uncomplicated) was done by using chi-square test. Student's t-test was used to compare parameters between the two groups, whereas, Fischer Exact test / Mann-Whitney test was used as

nonparametric test. Two-tailed P values of 0.05 or less were considered as statistically significant. All statistical analyses were performed using SPSS (Statistics Products Solutions Services; Armonk, New York, USA 17.0 software for Windows).

### RESULTS

Table 1: Complication profile of patients in complicated and uncomplicated hospitalization groups

Complication	Complicated Hospitalization Group (N=46)	Uncomplicated Hospitalization Group (N=54)	P-value
PLEURAL EFFUSION	16	11	0.106
EMPHYEMA	3	0	0.094
SHOCK	8	2	0.023
SEPSIS	32	15	$<$ 0.001
ARF	22	21	0.368
CCF	18	6	0.002

Table 1 shows complication profile in patients with complicated and uncomplicated hospitalisations, the most common complication was sepsis which was significantly present in complicated hospitalisations (p value<.001). Also CCF (p value .002) and shock (p value=.023) was significantly present in complicated group. Although pleural effusion was also common but it was not significantly present in any specific group.

Curb 65 Score	Hospitalization		Total
	Complicated	Uncomplicated	
<2	16(34.7%)	38(70.37%)	54
≥2	30(65.2)	16(29.6%)	46
Total	46(100%)	54(100%)	100
p value <0.001			

Table 2 shows that elevated CURB SCORE (≥2) was significantly present in complicated hospitalisation compared to uncomplicated ones (p value <0.001).

Curb 65 Score	90 Day Mortality		Total
	Yes	No	
<2	0(0%)	54(63.5%)	54
≥2	15(100%)	31(36.4%)	46
Total	15(100%)	85(100%)	100
p value <0.001			

Table 3 shows that elevated CURB SCORE (≥2) was significantly present in patients with 90 day mortality than patients with no mortality (p value< 0.001).

PSI	Hospitalization		Total
	Complicated	Uncomplicated	
<2	20(43.4%)	40(74%)	60
≥2	26(56.5%)	14(26%)	40
Total	46(100%)	54(100%)	100
p value <0.001			

Table 4 shows that elevated PSI(≥2) was significantly present in complicated hospitalisation compared to uncomplicated ones (p value=.002)

PSI	90 Day Mortality		Total
	Yes	No	
<2	0(0%)	60(70.5%)	60
≥2	15(100%)	25(29.4%)	40
Total	15(100%)	85(100%)	100
p value <0.001			

Table 5 shows that elevated PSI score (≥2) was significantly present in patients with 90 day mortality than patients with no mortality (p value< 0.001)

## DISCUSSION

In this observational study we tried to evaluate young patients of CAP in terms of complication status and prognostic scores – PSI/CURB65 and compared with 90 day mortality. In complication profile in patients with complicated and uncomplicated hospitalisations the most common complication was sepsis which was significantly present in complicated hospitalisations (p value <.001). Mortensen et al [19] studied 1555 patients of CAP , among which 1419 (91%) patients survived beyond 90 days post discharge. Also CCF (p value =.002) and shock (p value.023) was significantly present in complicated group. Although pleural effusion was also common but it was not significantly present in any specific group. Moine et al [20] et al and Diaz A et al [21] also found similar results, greater PSI scores were associated with greater mortality and postoperative complications in these studies.

Elevated CURB65 SCORE (≥2) and PSI (≥2) were significantly associated with increased 90 day mortality and present significantly in complicated hospitalisation compared to uncomplicated ones (p value <.001) in our data, results similar to this was published by Braun et al [22] and Lee et al [23], showing increasing mortality and complication with higher CURB65 and PSI scores.

## CONCLUSION

Young patients with CAP who had higher CURB/PSI score had higher mortality and morbidity. Also patients in complicated



hospitalisation group had higher rate of associated complications.

### **Declaration by Authors**

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**Conflict of Interest:** The authors declare no conflict of interest.

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