

# Community Acquired Pneumonia Complications in a Tertiary Care Hospitalized Patients

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## Abstract

**Background:** Community-acquired pneumonia (CAP) is a common respiratory infectious disease and major cause of mortality and morbidity in our country. Recent data on the complications rate of the CAP are not readily available in the Eastern region of Afghanistan. **Aim:** The aims of the study were to identify the rate and type of complications of the CAP in the Internal Medicine Ward of Nangarhar Regional Hospital in the east of Afghanistan.

**Methods:** A prospective analytic study was carried out from (March 2019) to (October 2019) on 120 patients with CAP, who met the inclusion criteria. Data relating to their age, gender, clinical details, complications rate, and complication types, were collected. The statistical package used for data analysis is Statistics Version 20 (IBM, USA). Data were presented in tables.

**Results:** 120 patients were recruited for the study, 63 males and 57 females; giving male: female ratio of 1.05:1. The mean age range was 54 (18.0) years. Complications were observed in 45 patients (the complication rate was 37.5%). Pleural effusion 27/45 (60%) were the most common complications observed, ARDS and Respiratory failure 9/45 (20%) were second common complications observed, Hypotension and hemodynamic changes 5/45 (11.1%) complications were also seen, Lung abscess 3/45 (6.6%) and Empyema 1/45 (2.3%) were less common complications.

**Conclusion:** Complications rate in patients with CAP though higher in older adult patients than Youngers adults. More common occurring complications are Para Pneumonic Pleural Effusion, ARDS and Respiratory Failure.

**Keywords:** Community acquired pneumonia, Complications, Eastern Region of Afghanistan.

## Introductions:

Pneumonia was characterized as consolidation described 2,500 years ago by Hippocrates and Dr. William Osler, described pneumonia as the “captain of the men of death” Community Acquired Pneumonia (CAP) is a major and significant cause of mortality and morbidity, in a developing country like India. Over 155 million cases of pneumonia and 1.8 million deaths occur annually worldwide (WHO, 2009).

Community acquired pneumonia (CAP) is an infectious cause of death world-wide, including, Afghanistan and other developing nations. <sup>[1-3]</sup>

CAP is the 6<sup>th</sup> or 7<sup>th</sup> cause of death in the USA, the number one cause of infection related death and the reason for more than one million hospital admissions. [5-7]

Complications commonly occur in CAP and they are even more common when diagnosis is delayed due to late presentation, initial incorrect diagnosis or wrong choice of initial antibiotics. Complications are more frequently associated with bacterial than viral pneumonia. Important complications include, massive pleural effusion, serious hypotension that produces severe hemodynamic changes, lung abscess, lung cavitation, sepsis with attendant shock, and acute respiratory failure. [2,4,8] These complications may be severe and life threatening. Other complications include mild confusion, mild jaundice, hemoptysis, mild anemia, and arthritis, which are rarely of any clinical consequences. Identification of the CAP complications and role of complications on outcome of CAP has been studied in different regions of the world giving variable results. [2,4,8,9]

A study carried out in *University of Nigeria Teaching Hospital, Enugu, Nigeria in 2013* on CAP complications and role of complications on outcome of CAP, that were severe hemodynamic changes 32%, pleural effusion 32%, Septicemia (Septic) shock 24%, lung abscess 8% and lung cavitation 4% observed.

An observational study was conducted on adult patients admitted with a diagnosis of CAP from January 2002 to August 2003 at Aga Khan University hospital, Karachi, Pakistan. Data on 329 cases, 187 (56.8%) males and 142 (43.2%) females, were analyzed; Complications during their hospital stay developed in 55 (16.7%) cases. These included parapneumonic effusion in 22 (6.7%), multiple system organ failure in 19 (5.8%), respiratory failure in 18 (5.5%), septic shock in 17(5.2%), adult respiratory distress syndrome in 9 (2.7%), empyema in 6 (1.8%).

In India 2016 a study was conducted on CAP complications in tertiary care hospital by A.V. Sowmya et al. Of 150 cases of CAP 30 cases (19.99%) presented with complications, the most common being bacteremia (9.33%), followed by pleural effusion (6%), less common complications empyema (3.33%) and lung abscess (1.33%).

The need to document and observe different type of complications has necessitated this study, since early identification of these complications and managing them along with the CAP will improve the outcome of patients with CAP in our environment.

## Definitions of Terms

CAP was defined as an acute infection of the pulmonary parenchyma that was associated with symptoms and signs of acute infection followed by the presence of an acute infiltrate on chest radiograph in a patient who has not resided in a hospital or health-care facility in the previous 14 days. [3,10]

All the patients were assessed by specialist physician before admission and by a specialist respiratory physician before discharge. The final diagnosis was made by a respiratory physician and was based on the clinical, radiological and laboratory results.

Severe hemodynamic change was defined in this context as systolic BP < 90 or diastolic BP ≤ 60 and requiring fluid resuscitation (B of CURB-65 score).Pleural effusion was defined as mild when it was only detected on chest X-ray and not symptomatic, while massive effusion was symptomatic, detected clinically and seen on chest X-ray. Sepsis was defined when blood culture yielded organisms and involvement of additional organ other than the lungs and septic

shock with clinical features of shock. Patients with CAP were classified into low, intermediate, and high-risk groups according to British thoracic society (BTS) CURB-65 scoring system.<sup>[5,11,12]</sup>

## Methodology

The study was conducted at the internal medicine department of Nangarhar Regional Hospital in Jalalabad city of Nangarhar province, an eastern province of Afghanistan.

this is prospective analytic study was performed from (March 2019) to (October 2019) through 120 patients who were com to emergency department and admitted due to CAP in Nangarhar Regional Hospital, General Medical Ward, in Jalalabad city of Nangarhar province Afghanistan.

## Inclusion and exclusion criteria

All consenting adults  $\geq 18$  years were included in the study. Exclusion criteria included those admitted to the hospital in the previous 14 days, patients whose symptoms develop greater than 48 h following admission, patients with tuberculosis (TB) or previous chest X-ray, which may conflict with diagnosis of CAP; and patients who were unwilling to participate.

## Data collection

A standard questionnaire designed to cover personal data and review symptoms of CAP were used for the study. Data collected during subject assessment included age, gender, and demographic variations. Documented physical signs included pulse rate, axillary temperature, respiratory rate, and blood pressure. Blood pressure was checked prior to intravenous fluid resuscitation or inotropic support.<sup>[3,13]</sup>

Both systolic and diastolic blood pressures were checked. Confusion was assessed as a new disorientation in time, place or person. Specimen for complete blood count, erythrocyte sedimentation rate, fasting blood sugar electrolyte, and serum urea were collected promptly and sent to the laboratory and results were obtained. All samples were collected at the accident and emergency or during the time of admission. Chest radiograph was interpreted by the same radiologist and reviewed with the authors. Patients were managed based on BTS standard for the treatment of CAP.<sup>[10,12]</sup>

## Statistical Analysis

After the completion of Data collection process all those filled questionnaires are arranged according to dates they were obtained and cleaned from errors before being entered in data base. Data were entered in internal medical department of Nangarhar Medical Faculty,. Statistical analysis was performed using SPSS Statistics Version20 (IBM, USA). Database was prepared according to collected data and questionnaires. NPar Chi-Square test was used for categorical organizing of the data and variables. Tables were used for better description of the data.

## Results

Total 120 patients with diagnosis of CAP were recruited for the study as shown in Table 1. Totally 120 sever CAP patients had been resorted to Nangarhar Regional Hospital, 45 had complications, (complication rate was 37.5%), There were 63/120 (52.5%) male patients and 57/120 (47.5%) female patients with CAP. This gave male to female ratio of 1.05:1. The age range was 18-89. Minimum age was 18 years while the maximum age was 89 years.

Table-1: Distribution of CAP according to Sex.  
(n=120)

Sex	Frequency	Percent
Male	63	52.5%
Female	57	47.5%
Total	120	100.0

Male population were 63(52.5%) and females were 57(47.5%) according to statistical analysis there was not a prominent significance.

Table-2: Distribution of participants according to demographic characteristics.  
(n=120)

Demographic characteristics (n=120)		Number			Percentage
Sex	Male	63			52.5%
	Female	57			47.5%
Address	Province	Male	Female	Total	Percentage
	Nangarhar	26	24	90	75%
	Laghman	7	9	16	13.3%
	Kunar	8	2	10	8.3%
	Nuristan	1	1	2	1.6%
	Tagab	1	1	2	1.6%

According to address, many of the population were from Nangarhar province (75%). Other patients were from Laghman (13.3%), Kunar (8.3%), Nuristan (1.6%) and Tagab province (1.6%).

Table-3: Distribution of participants according to age.  
(n=120)

Age (Year)	Male	Female	Number	Percentage
18 – 39	8	7	15	12.5%
40 - 59	23	20	43	35.8%
60 - 89	30	32	62	51.6%

The mean age of the study group was 60 ± 16.3 years (range: 18 to 89 years).

According to the age 15 (8 males, 7 females) patients were 18 – 39 years, 43 (23 males, 20 females) patients were 40 – 59 years and 62 (30 males, 32 females) were 60 – 89 years. This table indicates CAP and CAP complications that are increased with age and female were more than male in the last decades.

Table-4: Distribution of participants according to complain.

Complain	Number of patients	Percentage
Fever	90	75 %
Chills	88	73.3%
Cough	86	71.6%
Dyspnea	57	47.5%
Chest pain	36	30%
Confusion	20	16.6%
Lung crackles	89	74.16%
Bronchial breathing	27	22.5%

Most patients presented within 1-2 week of onset of symptoms. The common presenting symptoms were fever (77.5%), chills (77%), and cough (72%). Other symptoms were dyspnea (46%), chest pain (23%) and confusion (14%). Confusion was significantly more common in patients aged 65 years. On examination, lung crackles were present in 73% and bronchial breathing in 18%. Respiratory examination was normal in 13 (10.3%) patients.

Table-4: Distribution of participants according to complications

Complication	Male	Female	Total	Percentage
Para pneumonic Pleural Effusion	24	13	27	60%
ARDS and Respiratory failure	5	4	9	20%
Hypotension and Circulatory disturbance	3	2	5	11.1%
Lung Abscess	3	1	4	6.6%
Empyema	1		1	3.2%
Death	1	1	2	4.4%

Complications were observed in 45 patients out of 120 (37.5%) patients. Pleural effusion was the most common complications; ARDS and Respiratory failure were the second most occurring complications. Hypotension and circulatory disturbance, Lung Abscess and Empyema were less common complications.

Table-5: Distribution of CAP complications according to the Age.

Age (year)	Para pneumonic pleural Effusion	ARDS and Respiratory failure	Hypotension and circulatory disturbance	Lung abscess	Empyema	Total numbers	Percentage
18 - 39	6	1	1			8	17.7%
40 – 59	8	3	2	1		14	31.1%
60 – 89	13	5	2	2	1	23	51.1%

Commonly complication rate of CAP was increased with age, more complications observed between 60 – 89 years, complications rate were less between 18 – 39 years.

Table-6: Distribution of CAP complications that occurred to gather.

Para pneumonic Pleural Effusion	In 27 (20%) Para pneumonic PE complicated patients, 4 patients had hypotension and 2 were in septic shock.
ARDS and Respiratory Failure	In 9 (60%) ARDS and Respiratory failure CAP complicated patients, 2 of them were multi lobar pneumonia, 1 had hypotension and 1 was in shock.
Hypotension and Circulatory Disturbances	From 5 (11.1%) of CAP hypotensive complicated patients, 2 of them also were with septic shock and 1 was with Respiratory failure too.
Lung Abscess	From 3 (6.6%) of CAP Lung abscess's complicated patients, 1 of them also had COPD and 1 was with Heart failure.
Empyema	1 Empyema complicated patients of CAP, was also with right two lobe pneumonia of the right lungs.

## Discussion

This study designed to determine the complications of CAP in medical ward of Nangarhar Regional Hospital, Nangarhar province of Afghanistan. Complications were found in (37.5%) of patients studied. Pleural effusion 27/45 (60%) were the most common complications observed, ARDS and Respiratory failure 9/45 (20%) were second common complications observed, Hypotension and hemodynamic changes 5/45 (11.1%) complications were also seen, Lung abscess 3/45 (6.6%) and Empyema 1/45 (2.3%) were less common complication found.

A study was conducted in India 2016 on CAP complications in tertiary care hospital by A.V. Sowmya at al. 150 patients who presented with signs & symptoms suggestive of pneumonia

during one-year period and were included in the study group. Majority of the patients were males (66.66%) and most of the study population were in the age group of 21-30 years (22.66%) followed by 51- 60 years (18.67%). Of 150 cases of CAP 30 cases (19.99%) presented with complications, the most common being bacteremia (9.33%), followed by pleural effusion (6%), less common complications empyema (3.33%) and lung abscess (1.33%)<sup>[14]</sup>

In Nigeria 2013 a study was conducted by Mbata GC *et al*, on CAP that complications were observed in 31.3% patients. Pleural effusion and severe hemodynamic changes were noted in 20% of the patients. Other complications observed were septic shock 6.25%, lung abscess 2.5%, and lung cavitations 1.25%.<sup>[15]</sup>

The study by Nwosu *et al*.<sup>[2]</sup> showed that nearly all the patients had complications. The study took account of all the minor complications, which some authors view as normal course of the illness rather than complications.<sup>[8]</sup>

The strength of this study lies in its prospective design, wide age range and the use of BTS guidelines in the initial assessment of patients. It is equally important to stress that all radiographs were reported by the same radiologist giving rise to less potential bias in radiological interpretation. However, this study was a short-term prospective analytic study and could not look at the long-term effects of the disease on the patients; especially, those patients with complications. A larger sample size is required to support some of the conclusions made in this study.

We therefore, recommend complications should be detected early enough and managed actively by doctors treating CAP patients. We suggest a multicenter studies, which requires more funding, to be able to study the role of complications in a larger population of CAP patients and to further elucidate some of the findings in this study.

## Conclusion

Complications rate in patients with CAP though higher in older adult's patients than Youngers adults. More common occurring complications are Para Pneumonic Pleural Effusion, ARDS and Respiratory Failure. Late diagnosis and treatment of pneumonia increase the severity and complications of Community Acquired Pneumonia.

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