

## To Determine the Predisposing Factors, Clinical Features, Bacteriological, Radiological Features of Community Acquired Pneumonia and its Complications

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DOI: [10.36347/sjams.2021.v09i11.003](https://doi.org/10.36347/sjams.2021.v09i11.003)

| Received: 30.09.2021 | Accepted: 04.11.2021 | Published: 06.11.2021

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### Abstract

### Original Research Article

Community acquired pneumonia is one the most common acute infections requiring admission in hospital. It is major cause of mortality and morbidity. Incidence of community acquired pneumonia is increased with age, Smoking and Diabetes. Community acquired Pneumonia with Parapneumonic effusion is common feature. High index of suspicion, good clinical examination and necessity intervention in ICU are life saving with low mortality. We made an attempt to understand the mode of presentation, its clinical features, bacteriological and radiological features for the early detection of disease and emphasis is given to know causative agent and its complications.

**Keywords:** pneumonia, disease, Clinical Features, Bacteriological, low mortality.

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**Aim:** To Determine the predisposing factors, clinical features, bacteriological, radiological features of community acquired pneumonia and its complications.

## METHODOLOGY

### MATERIALS

The source for this study consists of patients presenting with clinical features of pneumonia attending to Bhaskar general hospital.

### METHODS

- Informed and written consent taken from that patient
- This is a clinical Prospective study in patients presenting with signs and symptoms suggestive of pneumonia at Bhaskar medical college and general Hospital

DESIGN OF STUDY: Prospective study

PERIOD OF STUDY: January 2019 to June 2020; over a period of 18 months

SAMPLE SIZE: Source for this study consists of 50 patients presenting with clinical features of pneumonia attending to Bhaskar general Hospital.

### Inclusion Criteria

All patients of both genders, who are presenting with clinical features of pneumonia above the age of 14 years in Bhaskar General Hospital.

### Exclusion Criteria

- Patients with
- Health care associated Pneumonia
- Aspiration pneumonia
- HIV positive status
- Tuberculosis
- Not consenting for this study are excluded

## DATA ANALYSIS

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean  $\pm$  SD and results on categorical measurements are presented in Number (%). Statistical Significance was assessed at 5 % level of significance (P value <0.05 considered).

## RESULTS

### Study Design

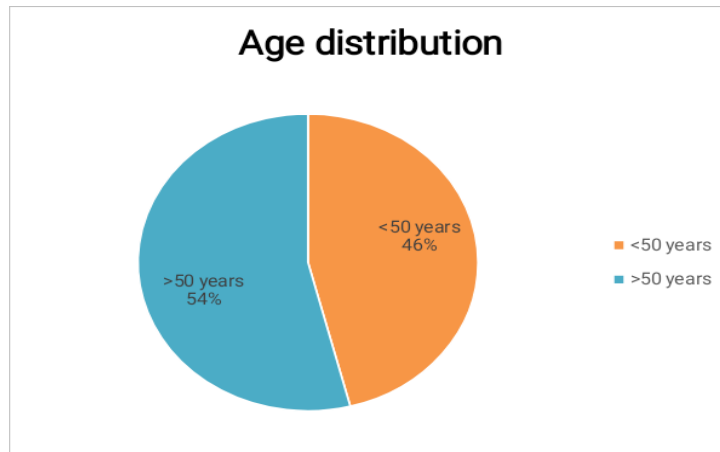
A prospective clinical study consisting of 50 Community Acquired Pneumonia (CAP) patients, were taken up for this study to investigate the magnitude and pattern of clinical, radiological and bacteriological presentation.

**Table 1: Presentation of Cap with Age and Sex**

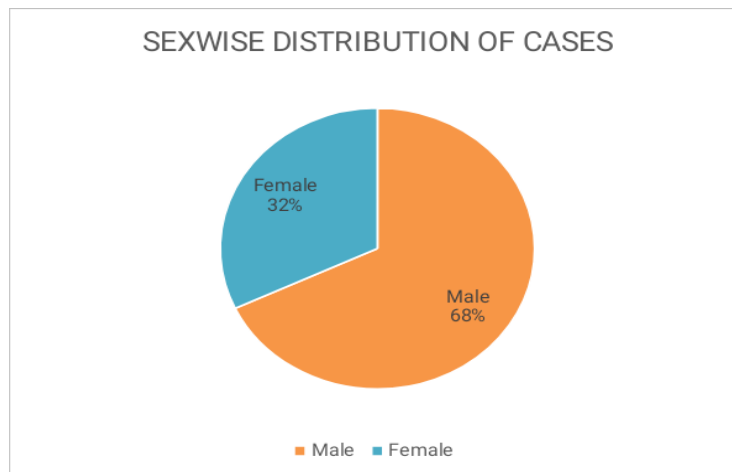
Age in years	Female		Male		Total	
	No	%	No	%	No	%
<=20	2	4	0	0	2	4
21-30	0	0	3	6	3	6
31-40	0	0	7	14	7	14
41-50	2	4	9	18	11	22
51-60	6	12	8	16	14	28
61-70	6	12	6	12	12	24
>70	0	0	1	2	1	2
Total	16	32	34	68	50	100
<b>Mean <math>\pm</math> SD</b>	<b>52.68<math>\pm</math>14.69</b>		<b>48.02<math>\pm</math>13.64</b>		<b>49.52<math>\pm</math>14.00</b>	

The study group consisted of 50 patients, among whom 34 (68%) were males and 16 (32%) were

females. Among 68% males 54% were elderly > 50 years.



**Graph 1: Age distribution**



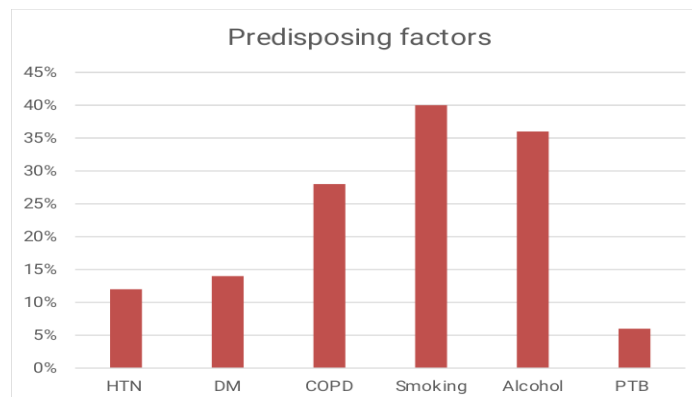
**Graph 2: Sex Distribution**

**Table 2: Sex Distribution**

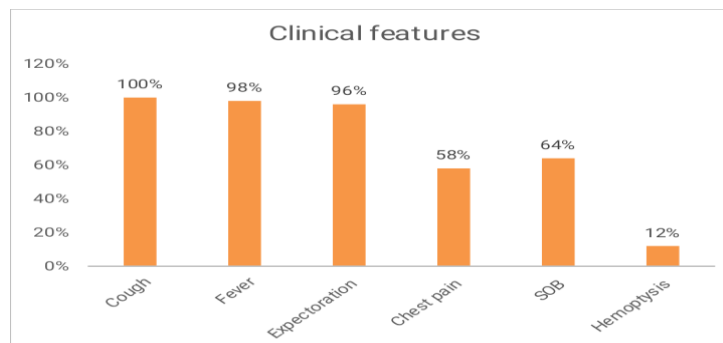
SEX	No of patients	%
MALE	34	68
FEMALE	16	32

**Table 3: Predisposing factors**

Risk Factors	Age ≤50yrs	Age > 50yrs	Total		P value
			No	%	
HTN	1	5	6	12	0.1123
DM	0	7	7	14	0.0085
COPD	3	11	14	28	0.0297
Smoking	5	15	20	40	0.015
Alcoholism	4	14	18	36	0.0114
PTB	1	2	3	6	0.6498



**Graph 3: Predisposing Factors**



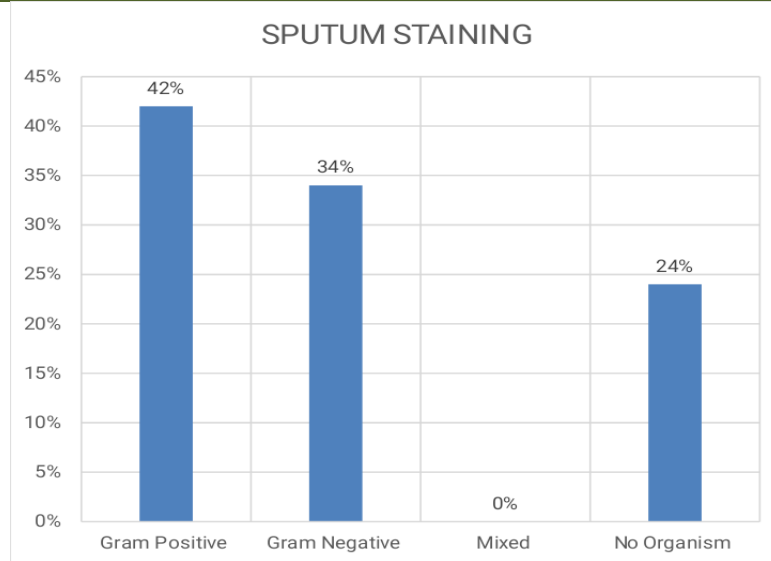
**Graph 4: Clinical Features**

**Table 4: Clinical Features**

CLINICAL FEATURES	NUMBER	%
FEVER	49	98%
COUGH	50	100%
EXPECTORATION	48	96%
DYSPNEA	32	64%
CHEST PAIN	29	58%
HEMPTYSIS	6	12%

**Table 5: Systemic Examination**

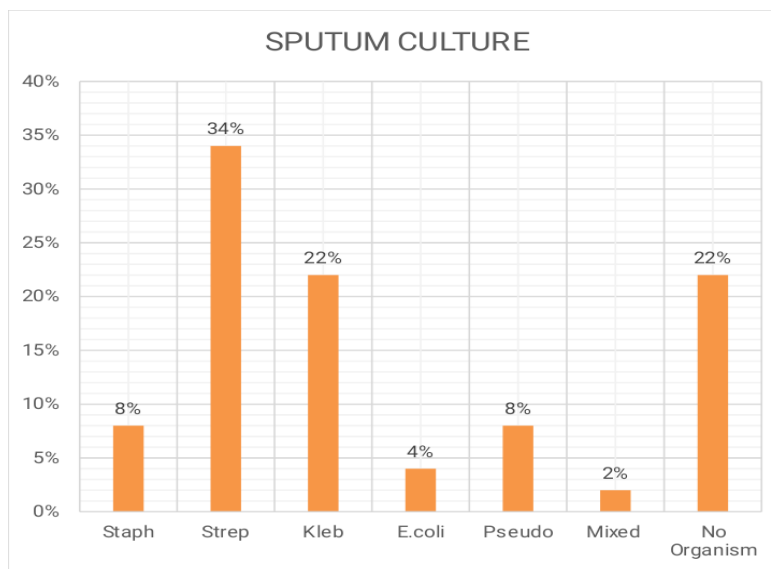
Feature	Number	%
Bronchial Breathing	29	58
Increased VF/ VR	38	76
Creptitations	32	64



**Graph 5**

**Table 6: Sputum Culture**

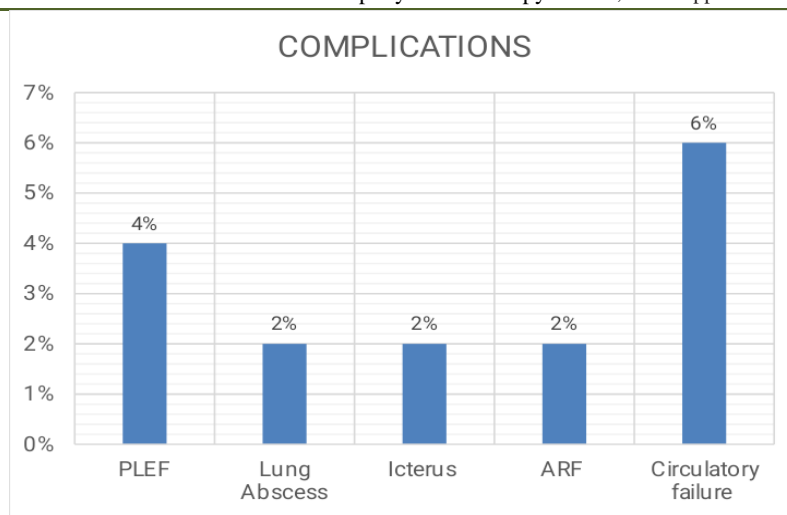
ORGANISM	NO OF CASES	%
Streptococcus pneumoniae	17	34
Staphylococcus aureus	4	8
Klebsiella pneumoniae	11	22
Pseudomonas aeruginosa	4	8
E. coli	2	4
Mixed	1	2
No Organism	11	22



**Graph 6**

**Table 7: Complications**

COMPLICATION	NO OF CASES	%
Pleural Effusion	2	4%
Lung Abscess	1	2%
Jaundice	1	2%
Acute Renal Failure	1	2%
Circulatory Failure	3	6%



Graph 7

## DISCUSSION

Community Acquired Pneumonia (CAP) is a common medical problem in countries like India. This prospective study is of Community Acquired Pneumonia consisted of 50 patients. All cases met inclusion and exclusion criteria. Many studies have been done in different parts of the world on community acquired pneumonia. Some important studies are compared.

### AGE

It is well documented that pneumonia is commonly occurring disease in the community & its incidence rises sharply with extremes of age [27]. The present study included patients of CAP with age ranging from 18-75 years with mean age of  $49.51 \pm 14.00$  years which is similar to the studies done by Shrestha R *et al.*, [32] (51.3 yrs), Bansal S *et al.*, [39] ( $52.7 \pm 18.1$  yrs) and Shah *et al.*, [29] ( $53.68 \pm 14.74$  yrs). The mean age of presentation in males is  $48.02 \pm 13.64$  yrs whereas in females it is  $52.68 \pm 14.69$  yrs.

In this study, 54% of patients with CAP were middle aged and elderly. Similar age distribution was also observed by Dey *et al.*, [28].

### SEX INCIDENCE

In this study of 50 patients of CAP, majority of patients are males (68%) compared to the females (34%) with a male to female ratio of 2.12: 1. Similar male preponderance of CAP was also observed by various studies like Joshua *et al.*, [30], Shah *et al.*, [29], Aroma Oberoi *et al.*, [31] and Shrestha R *et al.*, [32]. This may be attributed to the fact that cigarette smoking and alcoholism, as well as underlying lung disease e.g. COPD predispose to pneumonia and are more common in males.

### PREDISPOSING FACTORS

In the analysis of various predisposing factors in the cases taken up for this study, smoking proved to be a significant predisposing factor for CAP accounting for 40% of cases. This correlates with the Bochud study [33] which mentioned the incidence of smoking as 35.3%.

Other predisposing factors of CAP in present study include alcoholism (36%), COPD (28%) and Diabetes (14%).

Other studies by Aroma Oberoi *et al.*, [31] and Shah *et al.*, [29] also observed smoking to be the most common risk factor for CAP (26.6% and 65% respectively). Smoking is an important risk factor for CAP because of alterations in mechanisms of the host defence system [34]. Alterations in the immune system and inflammatory mechanisms in smokers are well known. Tobacco smoking is the most important risk factor for the development of COPD and these patients were known to be at a higher risk of pneumonia and other respiratory infections.

Both smoking and COPD are predisposing risk factors for CAP<sup>37</sup>. These patients have altered mucocilliary mechanisms in the lower respiratory tract and stasis of secretions in lung parenchyma, which predispose to pneumonia. COPD patients who are on regular inhaled corticosteroids are also susceptible to respiratory infections.

Diabetes is also one of the risk factors for community acquired pneumonia. Diabetes is a predisposing factor for various infections in the body by altering immune and inflammatory mechanisms. In the present study 14% of the patients have diabetes mellitus as predisposing factor for CAP.

### PRESENTING COMPLAINTS:

Cough (100%) and fever (98%) are the most common presenting symptoms of CAP in the present

study. Other presenting symptoms include expectoration (96%), breathlessness (64%) and chest pain (58%) and Haemoptysis (12%). Similar incidence of presenting symptoms of CAP was also observed in other studies done by Mac Fariene *et al.*, [38], Joshua. P *et al.*, [30], Bansal *et al.*, [39] and Shah *et al.*, [29].

### GENERAL PHYSICAL EXAMINATION

In this study Pallor (16%) is significantly more common followed by clubbing (4%), edema and icterus (2%) each.

Anaemia seen in cases of CAP in present study may be an indicator of extent of malnutrition and the resultant impaired immunity in the community.

### SYSTEMIC EXAMINATION

In this study of CAP, the examination of respiratory system revealed various features of pneumonia like bronchial breath sounds in 58%, increased VF and VR in 76% and inspiratory crackles in 64% of patients. These signs in case of pneumonia are well documented to occur frequently as evident from other studies.

### SPUTUM GRAM STAIN

In the present study of CAP, staining of sputum revealed Gram positive organisms in majority of cases (42%) compared to Gram-negative organisms (34%). Similar observations were made by Larry G. Reimer *et al.*, [41] in their study which found Gram positivity in 76%, Gram negativity in 14% while mixed etiology in 10% of the cases. In present study, in about 24% of cases no organism could be seen on Gram staining and culture was negative in these cases. Probably the pathogens were atypical bacteria, fungi etc. in these cases.

### SPUTUM CULTURE

In the present study, sputum culture revealed *Streptococcus pneumoniae* as the most common pathogen in CAP accounting for 34%. Next common are *Klebsiella* (22%) followed by *Staph. Aureus* (8%) and *Pseudomonas* (8%) and *E.coli* (4%). No organisms were grown in 22% of the cultures. These observations are similar to other studies.

*Streptococcus pneumoniae* is the most common organism identified in our study. Studies from USA and UK have reported isolation rates for streptococcus ranging from 39% to 75% [43, 44]. Our study had reported that *Klebsiella* to be the second most common isolate in 22% of the cultures. Studies done during the last three decades from India have reported a higher prevalence of Gram negative organisms among culture positive pneumonias [45]. Most of the patients from whom Gram negative bacteria was isolated were over 50 years of age, smokers or alcoholics or had COPD. It has been reported that old age, smoking, alcoholism and COPD impair pulmonary defenses predispose to CAP

caused by Gram negative bacteria. Our study is in par with many other studies in different regions of India and the world.

### CXR LOCALISATION

Our study based on chest X-ray PA view showed pneumonia to be more common on the right side (54%) with predominant involvement of right lower lobe in 40% of cases. Left side was involved in 28% while bilateral pneumonia was noticed in 18% of cases. Most commonly involved lobe is right lower lobe (40%) followed by left lower lobe (24%), right upper lobe (12%), left upper lobe (4%), right middle lobe (2%) in decreasing order. Multilobar involvement is observed in 20% of cases. Present study is comparable to the study done by Bansal *et al*<sup>39</sup> which demonstrated right lower lobe infiltration to be the most common (48.6%) followed by left lower lobe (21%), multilobar involvement (15.7%), right upper lobe (8.5%). Major involvement of right lower lobe is attributed to the anatomical position of the right main bronchus, which is short, more or less vertical facilitating aspiration in to the basal bronchial segments.

### CONCLUSION

- The age group in this study group varied from 18 to 75 years, where 54% are elderly (>50 years)
- The incidence of CAP is most common in men (68%) compared to females (34%).
- The associated diseases in this study are COPD (28%) and Diabetes (14%).
- Predisposing conditions include Smoking (40%) and Alcoholism (36%)
- The commonest presenting symptoms are Cough (100%), fever (98%), expectoration (96%), breathlessness (64%) and chest pain (58%) and Haemoptysis (12%).
- General physical findings include Pallor (16%) followed by clubbing (4%), edema (2%) and icterus (2%).
- The respiratory signs include bronchial breath sounds in 58%, increased VF and VR in 76% and inspiratory crackles in 64% of patients.
- The sputum examination showed 42% Gram positive and 34% Gram negative.
- The Sputum culture showed 34% streptococcal, 8% staphylococcus aureus, 8% pseudomonas, 22% *Klebsiella*, 4% *E.coli*.
- Radiology showed preponderance of the rt. lung involvement (54%).
- Medical line of treatment in appropriate time and with appropriate antibiotics.

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