

**CLINICAL, BACTERIOLOGICAL AND RADIOLOGICAL STUDY OF COMMUNITY ACQUIRED PNEUMONIA**Akash Shrikhande<sup>1</sup>, Suman Khangarot<sup>2</sup>, Anil Saxena<sup>3</sup>, Ganesh Patel<sup>4</sup>, Babulal Bansiwali<sup>5</sup>**HOW TO CITE THIS ARTICLE:**

Akash Shrikhande, Suman Khangarot, Anil Saxena, Ganesh Patel, Babulal Bansiwali. "Clinical, Bacteriological and Radiological Study of Community Acquired Pneumonia". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 13, February 12; Page: 2112-2119, DOI: 10.14260/jemds/2015/304

**ABSTRACT: BACKGROUND:** Community acquired pneumonia (CAP) is major cause of morbidity and mortality in all age groups. The presentation may be variable and severity of the disease is seen to be more if co-morbid conditions are present, especially chronic lung disease. Etiological variation in various region of country. The present study was designed to evaluate the clinical, bacteriological and radiological profile of CAP in Hadoti region of Rajasthan. **MATERIAL AND METHODS:** Fifty patients with community acquired pneumonia aged more than 12 years were enrolled in this study. In all the patients demographic data and detailed history were recorded followed by complete physical examination, chest x-ray, blood culture, sputum culture and pleural fluid culture (if available) and other investigation wherever applicable in a preformed proforma were done. **RESULTS:** Mean age of patients was 49 years. Smoking was the most common predisposing factor (52%). COPD was most common associated co-morbidity. Etiology was determined in only 26 patients, commonest being *Streptococcus pneumoniae*. Radiologically lobar pneumonia was commonest finding. **CONCLUSION:** Our observations will be useful to monitor the trends of CAP in the population of the region and will help the physicians to start rational empirical treatment for patients with CAP. There is need for further conventional serologic tests for atypical and viral pathogens in all patients admitted with CAP. **KEYWORDS:** Community acquired pneumonia, Etiology, Smoking, COPD.

**INTRODUCTION:** Pneumonia is an infection of pulmonary parenchyma.<sup>1</sup> It is a major cause of morbidity and mortality with an incidence of 20-30% in the developing countries and 3-4% in developed countries.<sup>2</sup> *Streptococcus pneumoniae* is the major etiologic agent of bacterial pneumonia in various regions of the world.<sup>1,3,4,5</sup> Other causes are *H.influenzae*, *S.aureus* and gram negative bacilli *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. The atypical organisms include *Mycoplasma pneumoniae*, *Chlamydia pneumoniae* and *Legionella* species.<sup>1,4</sup> Viruses are etiologic agents that are frequently associated with CAP and are poorly identified.<sup>5,6</sup>

The etiological agent of CAP varies with geographical distribution even in India variable results obtained from various regions e.g. *Streptococcus pneumoniae* predominates as etiological agent of CAP in Shimla<sup>7</sup> and Delhi<sup>8</sup> whereas *Pseudomonas aeruginosa* pre-dominates as an etiological agent in blood culture positive CAP in Ludhiana.<sup>9</sup> This study was conducted in Department of Pulmonary Medicine government medical college Kota with a population representing patients from all parts of Hadoti region to study the clinical, bacteriological and radiological profile of hospitalized CAP patients.

**MATERIAL AND METHODS:** Patients over 12 years of age admitted to the Pulmonary medicine and General medicine ward with CAP between September 2102 and August 2013 were included prospectively in the study after due consent. Permission for the study was taken from the

## ORIGINAL ARTICLE

institutional ethical board, GMC, Kota. Patients were evaluated by taking detailed history with general examination and detail respiratory examination findings followed by hematological test, blood culture, sputum AFB, sputum gram stain, sputum culture, x ray chest, USG thorax if required.

### INCLUSION CRITERIA:

1. Patients with age >12 years.
2. Patients having clinical features like fever, cough with or without expectoration, chest pain, breathlessness.
3. Radiological evidence of pneumonia.

### EXCLUSION CRITERIA:

1. Patients having hospital acquired pneumonia, HIV positive status, Tuberculosis were excluded.

**OBSERVATION AND RESULTS:** After the study of 50 consecutive cases of pneumonias the following observations were made:

- **AGE DISTRIBUTION:** The mean age of patients was  $49.34 \pm 17.44$  years.

Age group in years	No. of patients n=50	Percentage %
<40 years	16	32
41-50	6	12
>50 years	28	56

Table 1: Age Distribution

- **Gender Distribution:**

Sex incidence	No. of patients n=50	Percentage %
Male	35	70
Female	15	30

Table 2: Gender Distribution

- **Clinical Manifestation:**

Major symptoms and signs	No. of patients n=50	Percentage %
Cough	46	92
Fever	44	88
Expectoration	30	60
Pleuritic chest pain	28	56
Dyspnoea	24	48
Hemoptysis	3	6
Pallor	11	22

## ORIGINAL ARTICLE

Cyanosis	03	06
Crepitations	44	88
Bronchial breath sound	38	76
Altered sensorium	03	06

**Table 3: Clinical Manifestation**

- Comorbid Disease/ Risk factors:**

Factor	No. of patients n=50	Percentage %
Smoking	26	52
COPD	17	34
Alcohol	07	14
DM,HTN	06	12

**Table 4: Comorbid Disease/ Risk factors**

- Sputum gram staining:**

Gram positive cocci	17	34
Gram negative bacilli	6	12
Mixed	3	6
Undetermined	24	48

**Table 5: Sputum gram staining**

Majority of the patients (8/10) from whom Gram negative bacilli were isolated were older than 50 years of age, smokers or had COPD.

- Microbiological Agent Isolated From Sputum C/S:**

Bacteria	No. of patients n=50	Percentage %
Streptococcus pneumoniae	10	20
Staph. Aureus	1	2
Pseudomonas aeruginosa	4	8
Klebsiella pneumoniae	2	4
E.coli	3	6
No growth	30	60

**Table 6: Microbiological Agent Isolated From Sputum C/S**

## ORIGINAL ARTICLE

- **Microbiological Agent Isolated From Blood C/S:**

Staph.aureus	3	6
Klebsiella pneumonia	1	2
S.pneumoniae	1	2
No growth	45	90

**Table 7: Microbiological Agent Isolated From Blood C/S**

- **Microbiological Agent Isolated From Pleural Fluid:**

Staph.aureus	1
No growth	3

**Table 8: Microbiological Agent Isolated From Pleural Fluid**

- **Lobar distribution of consolidation:**

<b>Lobes</b>	<b>No. of patients n=50</b>	<b>Percentage %</b>
Right upper lobe	6	12
Right middle lobe	2	04
Right lower lobe	12	24
Rt middle and lower	1	2
Left upper lobe	6	12
Left lower lobe	9	18
Whole lt lung	1	2
Bilateral	13	26

**Table 9: Lobar distribution of consolidation**

- **Complication:** Various complications noted in our study were pleural effusion 3 (6%), septic shock 3(6%), congestive cardiac failure 1(2%).One mortality occur out of 50 patient study.

**DISCUSSION:** There were many studies done in different parts of the world and different regions of India on CAP. Few of the important studies considered for comparison purpose and comparative study discussed here.

- **Age distribution (%):**

<b>Age Group</b>	<b>Dey et al<sup>10</sup></b>	<b>Lancet study<sup>11</sup></b>	<b>B A Shah et al<sup>12</sup></b>	<b>Present study</b>
<50 years	40%	40%	33%	44%
>50 years	59%	60%	77%	56%

**Table 10: Age Distribution**

## ORIGINAL ARTICLE

**INFERENCE:** Old age predisposition can be explained by lower immunity and greater predisposing risk factors in the extremes of ages.

- **Sex distribution (%):**

Sex	Lancet study <sup>11</sup>	Joshua et al <sup>13</sup>	B A Shah et al	Present study
Male	68%	80%	58%	70%
Female	32%	20%	42%	36%

Table 11: Sex Distribution

**INFERENCE:** Previous studies showed males were affected more than females. Present study matches with previous study. This could be attributed to the well-established fact that cigarette smoking and alcoholism, as well as underlying lung disease e.g. COPD predispose to pneumonia and are more common males in developing country like India. In this study 64 % of the patients were from urban population and majority were daily wage workers and manual labourers belonging to low socio-economic status. This may attributed to environmental pollution, change in the patients habits, like smoking, alcoholism etc.

- **Risk factors (%):**

Factor	Vali Series <sup>14</sup>	B A Shah et al	Present Study
Smoking	36.2%	52%	52%
COPD	32.2%	34%	34%
Alcoholism	38.2%	14%	14%
DM,HTN,CCF	18%	-	12%

Table 12: Risk Factors (%)

- **Presenting complaints:**

Symptoms	Lancet Study	Mac Fartane Study	Joshua P. Metlay Study	Present study
Cough	80%	86%	92%	92%
Fever	72%	92%	88%	88%
Expectoration	30%	54%	65%	60%
Dyspnoea	-	67%	71%	48%
Chest Pain	66%	62%	-	56%
Hemoptysis	3%	-	-	6%

Table 13: Presenting complaints

From above comparing manifestations it can be inferred that clinical manifestations like cough, fever, expectoration, chest pain are more or less common and thus can be considered as sensitive for diagnosis of CAP.

## ORIGINAL ARTICLE

- **Microbiological agents isolated from gram staining:**

Sputum Examination	Lary G. Reimer <sup>15</sup>	Present study
Gram+	76%	34%
Gram -	14%	12%
Mixed	10%	6%

**Table 14: Microbiological agents isolated from gram staining**

- **Microbiological agents isolated from sputum culture:**

Sputum culture	Lary G. Reimer	Shah et al	Shreshta R et al <sup>16</sup>	Present study
Streptococcal pneumoniae	15-76%		73%	20%
Staphylococcal	15-76%		32%	4%

**Table 15: Microbiological agents isolated from sputum culture**

The causative bacteriological agent diagnosis of CAP was obtained in only 52% of patients with standard sputum and blood cultures and pleural fluid culture. A. Oberoi et al<sup>16</sup> study at Ludhiana etiological diagnosis was done in 47.7% cases. While S. Bansal et al<sup>17</sup> study at Shimla confirmed etiology in 75.6% cases. S.pneumoniae was most common etiological agent in our study. S. Bansal et al study at Shimla (HP) and Capoor et al<sup>8</sup> study at Delhi S. Pneumoniae was predominant as etiological agent of CAP while A. Oberoi et al study at Ludhiana Shah et al Srinagar. P. aeruginosa was pre-dominant as an etiological agent for CAP.

- **Lobewise distribution (%) on CXR:**

Lobes	Allen Series	Vali Series	Lancet Study	Ajay Savaliya al <sup>19</sup> Study	Present Study
Rt. Upper lobe	5.2	5	2	2	2
Rt. Middle lobe	10.2	15.3	-	21	4
Rt. Lower lobe	37	32	46	35	24
Lt. upper lobe	5.6	11.7	2	11	12
Lt. lower lobe	43	36	44	30	18
Bilat. Diffuse	-	-	6	1	26
Rt middle and lower	-	-	-	-	2
Whole left lung	-	-	-	-	2

**Table 16: Lobewise distribution (%) on CXR**

**CONCLUSION:** Common pre-disposing factors for CAP in Hadoti area are smoking, COPD, old age alcoholism. S. pneumoniae most common etiology for CAP in this area and Gram negative bacteria are common cause in patients with co-morbid illness and old age in the area. Chest X-ray is an important early investigation for diagnosis as most of the patients presented with lobar consolidation.

## ORIGINAL ARTICLE

---

In our set up, the yield for causative agent detection was low because of lack of serological and invasive tests. This is also because of rampant use of antibiotics before the patient reaches tertiary care hospital. Our observations will be useful to monitor the trends of CAP in the population of the region and will help the physicians to start rational empirical treatment for patients with CAP. There is need for further conventional serologic tests for atypical and viral pathogens patients with CAP.

### REFERENCES:

1. Mandell LA, Wunderink R. Pneumonia. In: Fauci AS, Braunwald E, Kasper D, et al ed. Harrison's principles of Internal Medicine. Volume 2. 17th edn. McGraw-Hill; 2008: 1619-28.
2. Shah BA, Ahmed W, Dhobi GN, et al. Validity of Pneumonia Severity Index and CURB-65 severity scoring systems in Community acquired pneumonia in an Indian setting. *Indian J Chest Dis Allied Sci* 2010; 52: 9-17.
3. Almirall J, Bolibar I, Vidal J, et al. Epidemiology of community acquired pneumonia in adults: a population based study. *Eur Respir J* 2000; 15: 757-63.
4. Johansson N, Kalin M, Tiveljung-Lindell A, et al. Etiology of community acquired pneumonia: increased microbiological yield with new diagnostic methods. *Clin Infect Dis* 2010; 50: 202-9.
5. Camilla J, Leena H, Helvi J, et al. Microbial etiology of community acquired pneumonia in the adult population of 4 municipalities in Eastern Finland. *Clin Infect Dis* 2000; 32: 1141-54.
6. De Roux A, Marcos M, Garcia E, et al. Viral Community- Acquired Pneumonia in non immunocompromised adults. *Chest* 2004; 125: 1343-51.
7. Bansal S, Kashyap S, Pal LS, Goel A. Clinical and Bacteriological profile of community acquired pneumonia in Shimla, Himachal Pradesh. *Indian J Chest Dis Allied Sci.* 2004; 46: 17-22. [Pub Med: 14870864]
8. Capoor MR, Nair D, Agarwal P, Gupta B. Rapid diagnosis of community acquired pneumonia using the Bac T/ alert 3 D system. *Braz J Infect Dis.*2006; 10:352-6. [Pub Med: 17293925]
9. Oberoi A, Agarwal A. Bacteriological profile, Serology and antibiotic Sensitivity pattern of microorganisms from community acquired Pneumonia. *JK Sci.*2006; 8: 79-82.
10. Dey et al. clinical presentation and predictors of outcome in adult patients with community-acquired pneumonia. *Natl Med-India.* 1997 July-Aug; 104: 169-172.
11. Brown P D, Lerner S A. community acquired pneumonia, *Lancet* 1998; 352; 1295-302.
12. Shah BA, Singh G, Naik MA, Dhobi GN. Bacteriological and clinical profile of community acquired pneumonia in hospitalized patients. *Lung India.*2010; 27(2): 54-7.
13. Josuha P. Metlay and Micheal J. Fine testing strategies in the initial management of patients with CAP. *Annals of Internal medicine* Jan, 2003: 138, 2: CINAHL.
14. Vali G., M, S.G.Desai:changing profile of bacterial pneumonia(journal of Indian medical association 1985 (83,5,49).
15. Larry G. Reimer and Karen C. Carrol, Role of the microbiology laboratory in the diagnosis of lower respiratory tract infection, *Clinical Infectious Diseases* 1998; 26: 742-8.
16. Shrestha R, Etiology and clinical profile of inpatients with Community acquired pneumonia in Manipal Teaching hospital, Pokhara, Nepal. *NJMS* 2012; 1(2): 84-8.
17. Oberoi A, Agarwal A. Bacteriological profile, Serology and antibiotic Sensitivity pattern of microorganisms from community acquired Pneumonia. *JK Sci.*2006; 8: 79-82.

## ORIGINAL ARTICLE

18. Bansal S, Kashyap S, Pal LS, Goel A. Indian J Chest Dis Allied Sci. 2004; 46(1): 17-22.

19. Ajay Savaliya, Kiran B. Sodavadiya, Ketan K. Manguliya. I.J.S.N. 2013; 4: 702-710.

### **AUTHORS:**

1. Akash Shrikhande
2. Suman Khangarot
3. Anil Saxena
4. Ganesh Patel
5. Babulal Bansiwala

### **PARTICULARS OF CONTRIBUTORS:**

1. Assistant Professor, Department of Pulmonary Medicine, Peoples Medical College, Bhopal.
2. Professor, Department of Pulmonary Medicine, G. M. C. Kota.
3. Professor & HOD, Department of Pulmonary Medicine, G. M. C. Kota.

### **FINANCIAL OR OTHER**

**COMPETING INTERESTS:** None

4. Post Graduate Resident, Department of Pulmonary Medicine, G. M. C. Kota.
5. Post Graduate Resident, Department of Pulmonary Medicine, G. M. C. Kota.

### **NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Akash Shrikhande,  
Assistant Professor,  
Department of Pulmonary Medicine,  
Peoples Medical College, Bhopal.  
E-mail: akashshrikhande@gmail.com

Date of Submission: 05/01/2015.  
Date of Peer Review: 06/01/2015.  
Date of Acceptance: 04/02/2015.  
Date of Publishing: 10/02/2015.