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"A Study to Assess Socio Clinical profile of Lung Cancer Patients in a Tertiary Care Hospital of India"

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ABSTRACT:
INTRODUCTION: - Lung cancer is among the five main types of cancer leading to overall cancer mortality contributing about 1.3 million deaths/year globally. There are only few Indian studies on bronchogenic carcinoma in patients below 40 years, describing its pattern and epidemiology. Hence we planned this study to evaluate the profile of lung cancer in patients of age less than 40 years and elderly patients
MATERIAL AND METHODS: This was a cross-sectional descriptive study (including retrospective secondary and prospective primary data) using data base of patients of primary lung cancer diagnosed between 1st January 2006 to 31st December 2012 in indoor and outdoor of department of Respiratory Medicine, J.L.N. Medical College, Ajmer, a tertiary level hospital and teaching center.
RESULTS: - In the present study there were 1418 male and 352 female patients with male: female ratio of 4.03 suggesting that the disease was more common in males.The maximum number of cases (46.89%) were from the 41-60 year age group followed by (39.21%) in 61-80 years. 9.03% patient were below the age of 40 year.

KEY WORDS: Lung Cancer; Profile.

Introduction:

Lung cancer is among the five main types of cancer leading to overall cancer mortality contributing about 1.3 million deaths/year globally[1], and it is estimated to rise to more than three million per year by the year 2015. The incidence is increasing globally at a rate of 0.5% per year [2].

Bronchogenic carcinoma is the most common malignancy in males over 50 years of age but is infrequent under the age of 40 years [3]. Several genetic changes are required for a normal progenitor cell to acquire a neoplastic nature; most human cancers tend to occur after the fourth decade of life. Therefore, lung cancer in patients aged 40 years or less is uncommon and has characteristics that distinguish it from cancer in older patients, including a higher incidence of adenocarcinoma and a lower male-to-female ratio in young patients.[4]

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There are only few Indian studies on bronchogenic carcinoma in patients below 40 years, describing its pattern and epidemiology. Hence we planned this study to evaluate the profile of lung cancer in patients of age less than 40 years and elderly patients.
Objectives :

1. To study profile of lung cancer in Ajmer among various age groups [young (≤ 40), elderly and very elderly (>80)].
2. To analyze demographic characteristics, smoking habits, clinico-radiological presentation, with different histopathologic type and difference in such presentation between young and elderly patients if any.

Material and methods:

This was a cross-sectional descriptive study (including retrospective secondary and prospective primary data) using data base of patients of primary lung cancer diagnosed between 1st January 2006 to 31st December 2012 in indoor and outdoor of department of Respiratory Medicine, J.L.N. Medical College, Ajmer, a tertiary level hospital and teaching center.

All patients with confirmed histological and cytological diagnosis of bronchogenic carcinoma who attended this department were included in this study. The cases with secondary lung cancer, lymphoproliferative disease, malignant pleural effusion of unknown primary, or nonpulmonary site, sarcomatoid tumors and other rare varieties were excluded from this study. All bed head tickets were retrieved from record section of J.L.N. Hospital to fill the designated proforma of this study.

All cases of bronchogenic carcinoma registered at our institute over last 6 yrs, were scanned in the light of distinctive clinico-radiological features, histological types, evolving trends in the clinical, radiological, histological behavior, response to therapy, patient adherence to treatment and to evaluate their distribution among different age groups. In the present study, we took 40 years as the cutoff age, so as to make sure that there were an acceptable number of younger patients. The definition of non-smoker or never-smoker has been adapted from previous literature as a person who had never smoked or had smoked <20 cigarettes in his or her lifetime, and those who have smoked ever in their life more than just occasional smoking as "smoker." [5]

This study also provides an overview of aspects of the burden of lung cancer in the elderly in India highlighting certain demographic and epidemiological data. In India the normal retirement age is 60 years and also according to various census figures the definition of the elderly, in India is considered above the age of 60 years. Government of India adopted 'National Policy on Older Persons' in January, 1999. The policy defines 'senior citizen' or 'elderly' as a person who is of age 60 years or above. [6] Hence we have taken more than 60 yrs old patients as elderly and above 80 yrs as very elderly.

Following details of patients looked into - name, age, sex, residence, occupation, smoking history including object, duration, smoking index (average number of bidis or cigarettes consumed per day multiplied by the duration of smoking in years)[7], family history.

Any co-morbid illness in this study population were recorded such as pulmonary tuberculosis, occupational lung diseases especially silicosis, Chronic obstructive pulmonary disease, hypertension, diabetes mellitus, arrhythmia, myocardial infarction etc.

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Histological type and diagnostic modality by which histopathologic diagnosis was made were recorded from the record section of J.L.N. Hospital. The histological typing based on the accepted system for the clinical staging of lung cancer and the revised international system for lung cancer staging [8]. Those tumors that could not be accurately classified were designated as 'unclassified'.Various modes for tissue procurement are FNAC/ Biopsy of lung, pleural fluid cytology, pleural biopsy, fiber optic bronchoscopy and allied procedure such as bronchial biopsy, brushing, washing, lavage, transbronchial lung biopsy, transbronchial needle aspiration, FNAC / excisional biopsy of lymph node or metastatic sites etc. Diagnostic work up if individualised for further analysis have also been mentioned. The site for FNA / BIOPSY of pulmonary lesion has been decided by clinical sign, x-ray chest with corresponding lateral views, USG and CECT thorax if required.

Pretreatment evaluation included complete clinical history (general as well as respiratory symptoms), physical examination, previous treatment record (chemotherapy or supportive), histopathology and other investigation reports (complete blood count, biochemical studies (RFT, LFT), chest radiograph, ultrasound of abdomen / pelvis, ECG, CT scan of chest) were documented including investigations carried out for staging and to find out metastasis etc. CT scan of thorax was done in majority of cases. But CT scan of abdomen, brain or other parts of body were done in restricted cases if suggestive symptoms of involvement was there as appropriate due to economic constrains. Chemotherapy and or supportive and symptomatic treatment carried out in the department were noted and response of the treatment were observed and documented. All the documents were compiled with patients database accordingly, and informed written consent was taken from each patient.

According to performance status (ECOG), hematological parameters, cardiac function, liver function, kidney function test, chemotherapy was prescribed and carried out. The patients unfit for chemotherapy were treated symptomatically. After completion of the chemotherapy, the patients were advised for follow up three weekly.

All attempts made to stage the disease process as per 7th edition of TNM [8] classification based on clinical presentation and available diagnostic tools in resource limited setting & all the data were analyzed statistically by applying chi-square test (epicalc software).

Results:

Table 1: Primary Lung Cancer Patients

Year wise Age and Sex Distribution

Year	Male (%)	Female (%)	M : F	Total
2007	206 (82.4)	44 (17.6)	4.68	**250**
2008	218 (81.9)	48 (18.1)	4.54	**266**
2009	225 (80.6)	54 (19.4)	4.17	**279**
2010	233 (78.2)	65 (21.8)	3.58	**298**
2011	251 (78.19)	70 (21.81)	3.57	**321**
2012	285 (80.06)	71 (19.94)	4.01	**356**
Total	**1418** (80.11)	**352** (19.89)	**4.03**	**1770**

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Chi-square : 2.87
P-value : 0.719518 (N S)

Year wise primary lung cancer patients both in male and female shows increasing trend.
There is 42.4 % increase in total no. of diagnosed cases between 2007 – 2012 as well as there is increased prevalence among females as suggested by decreasing male: female ratio. (Statistically not significant)

Table 2: Primary Lung Cancer Patients Age and Sex Distribution

Age Group	Male (%)	Female (%)	M:F	Total (%)
≤ 40	124 (8.7)	36 (10.2)	3.44	**160(9.03)**
41-60	663 (46.7)	167 (47.4)	3.97	**830 (46.89)**
61-80	560 (39.4)	134 (38)	4.18	**694 (39.21)**
>80	71 (5)	15 (4.26)	4.73	**86 (4.86)**
total	**1418 (80.11)**	**352(19.88)**	**4.03**	**1770**

Chi-square : 1.18
P-value : 0.757165 (N S)
In the present study there were 1418 male and 352 female patients with male: female ratio of 4.03 suggesting that the disease was more common in males.

The maximum number of cases (46.89%) were from the 41-60 year age group followed by (39.21%) in 61-80 years. 9.03% patient were below the age of 40 year.

Incidence of lung cancer is significantly higher among young female (10.23 %) as compared to young male (8.74 %). Whereas in older group number of male suffering from lung cancer than female.

There were 1418 male patients with mean age of 58.5 years. Of the 352 female patients, means age was 54.5 years. The mean age at diagnosis in young and old age respectively 34.3 and 60.8. (Statistically not significant)

Table 3: Primary Lung Cancer Patients Smoking Status.

Smoking status	**≤ 40**		**41- 60**		**61 - 80**		**> 80**	
	Male (%)	**Female (%)**	**Male (%)**	**Female (%)**	**Male (%)**	**Female (%)**	**Male (%)**	**Female (%)**
Smoker (1179)	85 (68.5)	5 (13.8)	517 (77.9)	22 (13.2)	464 (82.8)	17 (12.7)	65 (91.5)	4 (26.6)
Nonsmoker (591)	39 (31.5)	31 (86.1)	146 (22.1)	145 (86.8)	96 (17.2)	117 (87.3)	6 (8.5)	11 (73.3)
Total	**124 (77.5)**	**36 (22.5)**	**663 (37.4)**	**167 (9.43)**	**560 (80.7)**	**134 (19.3)**	**71 (82.5)**	**15 (17.5)**
OR (CI)	13.51 [4.88-37.39]		23.34 [14.38-37.89]		33.26 [19.11-57.90]		29.79 [7.22-122.93]	

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All odds ratios are found to be significant.
Smoking is appears to be significantly associated with lung cancers patients and this significance maximal associated between 61-80 years age group.
Of the 1770 patients 66.6 % (1179/1770) are smoker (current & ex-smoker), 33.38% are non-smoker (591/1770).
In this study female with lung cancer was more commonly non smoker.
Among younger patients (≤ 40yrs) 56.25 % are smoker, 66.93% are smoker among elderly and 80.23 % are smoker among very elderly (≥80yrs).

Table 5: Primary Lung Cancer Patients Total Duration Of Illness

Duration (months)	**≤ 40 yrs (%)**	**41- 60 yrs (%)**	**61 – 80 yrs (%)**	**> 80 yrs (%)**	**Total (%)**
< 3	70 (44)	315 (37.9)	222 (32)	19 (22)	626(35.3)
3– 6	56 (35)	298 (35.9)	249 (36)	31 (37)	634((35.8)
>6	34 (21)	217 (26.1)	223 (32)	36 (43)	510(28.8)

Chi-square : 6.40
P-value : 0.093517 (N S)

Younger patients (44%) and most of the 41-60 yrs age group patients (40%) presented with < 3 months average duration of symptoms at the time of diagnosis.
61-80 yrs age group patients (36%) mostly presented 3-6 months average duration of symptoms and most of the >80yrs age group patients(43 %) were presented > 6 months average duration of symptoms at the time of diagnosis. (Statistically not significant)

Table 6: Primary Lung Cancer Patients Constitutional Symptoms

Symptoms	**≤ 40 yrs (%)**	**41- 60 yrs (%)**	**61 – 80 yrs (%)**	**> 80 yrs (%)**	**Total (%)**	***Chi Sq& P* -value**
Loss of appetite	85 (53)	547 (65.9)	475 (68.5)	58 (68)	1165 (65.8)	896.14 0.000004
Wt loss	62 (39)	448 (53.9)	458 (66)	57 (67)	1025 (57.9)	804.82 0.000004
Fever	67 (42)	257 (30.9)	194 (28)	33 (38)	551 (31.1)	323.15 0.000002
Generalized weakness	54 (34)	356 (42.8)	333 (48)	53 (62)	796 (44.9)	568.72 0.000003

Chi-square : 31.14
P-value : 0.000281

(Significant difference of symptoms among lung cancer patients)

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Anorexia (65.8%) and Weight loss (57.9%) were the commonest general symptoms and more commonly seen among older age groups (61-80 yrs) & (>80yrs) (68%) followed by weakness or malaise (62%).
Wt. loss least commonly noticed (39%) among younger age group.
Fever (42 %) is more common among patients of younger age group than elderly.

Table 7: Primary Lung Cancer Patients Respiratory Symptoms

Symptoms	**≤ 40 yrs** (%)	**41- 60 yrs** (%)	**61 – 80 yrs** (%)	**> 80 yrs** (%)	**Total (%)**	***ChiSq& p*-value**
Cough	132 (82.5)	605 (72.8)	548 (79)	78 (91)	1363 (77)	880.82 0.000004
Breathlessness	85 (53.1)	481 (57.9)	430 (62)	53(62)	1049 (59.2)	768.08 0.000004
Chest pain	110 (68.7)	539 (64.9)	444 (64)	50 (59)	1143 (64.57)	820.21 0.000004
Hemoptysis	48 (30)	423 (50.9)	428 (62)	68(79)	967 (54.6)	746.92 0.000004
Expectoration	89 (55.6)	506 (60.9)	478 (69)	69(81)	1142 (64.5)	802.00 0.000004

Chi-square : 32.78
P-value : 0.001047 **(significant difference)**

Among respiratory symptoms cough (77%) and chest pain (64.57%) were commonly seen followed by shortness of breath almost equally in all age group.
Expectoration (81%) were more common among patients > 80 yrs old and chest pain more commonly (68.7%) seen among younger patients.
Haemoptysis was least common symptom (30%) among younger patients as compare to old and patients of > 80 yrs age group most commonly (79%) presented with hemoptysis.

HISTO. TYPE	**≤ 40 yrs**		**41 – 60 yrs**		**61-80 yrs**		**> 80 yrs**		Total (%)
	Male (%)	**Female (%)**	**Male (%)**	**Female (%)**	**Male (%)**	**Female (%)**	**Male (%)**	**Female (%)**	
Small cell	13 (10.4)	4 (11.1)	99 (14.9)	19 (11.3)	91 (16.2)	21 (15.6)	8 (11.2)	2 (13.3)	257 (14.5)
Sqam cell	41 (33)	10 (27.7)	**256 (38.6)**	47 (28.1)	**221 (39.4)**	40 (29.8)	**30 (42.5)**	**6 (40)**	651 (36.7)
Adeno	**46 (37)**	**17 (47.2)**	212 (31.9)	**71 (42.5)**	165 (29.4)	**49 (36.5)**	20 (28.1)	4 (26.6)	584 (32.9)
Large cell	7 (5.6)	1 (2.7)	34 (5.1)	13 (7.7)	32 (5.7)	13 (9.7)	6 (8.4)	1 (6.6)	107 (6)

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Unclassified	17 (13.7)	4 (11.1)	62 (9.3)	17 (10.1)	51 (9.1)	11 (8.2)	7 (9.8)	2 (13.3)	171 (9.6)
TOTAL	**M=124** (77.5)	**F=36** (22.5)	**M=663** (79.8)	**F=167** (20.1)	**M=560** (80.6)	**F=134** (19.3)	**M=71** (82.5)	**F=15** (17.4)	**1770**
Chi sq & P value	1.58, 0.811709		11.29, 0.023448		7.20 , 0.125819		0.26 , 0.992148		

Table 8 : Primary Lung Cancer Patients Histological Types

In the present study, the incidence of squamous cell carcinoma was 36.7, adenocarcinoma 32.9% , large cell carcinoma 6%, small cell carcinoma 14.5% and unclassified including rare tumors 9.6 %. (NSCLC=85.5%) Squamous Cell Carcinoma is the predominant type in male (38.64%) and adenocarcinoma in female (40.05%).

Both adenocarcinoma (47.2% versus 37%) and Small Cell Carcinoma (11.1% versus 10.4%) are found to be more common in young female than young male.

Whereas the most common type in elderly female (>60yrs) is adenocarcinoma (39.5%). Squamous Cell Carcinoma (39%) is most common in old male (>60yrs). Whereas in very elderly patients (>80yrs) squamous cell carcinoma commonest type in both male and female. (Statistically not significant).

Table 9: Primary Lung Cancer Patients Radiographic Pattern (CXR & CT)

Radiographic Pattern (CXR & CT)	**≤ 40 yrs (%)**	**41 –60yrs (%)**	**61 – 80 yrs (%)**	**> 80 yrs (%)**	**Total (%)**
Mass lesion	101 (63.1)	572 (68.9)	478 (69)	61 (71)	1212(68.4)
Collapse/ cosolidation	34 (21.2)	315 (37.9)	291 (42)	45(52)	685 (38.7)
Pleural effusion	72 (45)	312 (37.5)	236 (34)	24 (28)	644(36.38)
Mediastinal widening	19 (12)	126 (15.1)	118 (17)	14 (16)	277(15.6)
Rib erosion	7 (4.3)	58 (6.9)	46 (6.7)	5 (6)	116(6.5)
cavitation	3 (2)	34 (4)	36 (5.2)	4 (4.6)	77(4.3)
Vertibral erosion	1 (.5)	24 (2.8)	23 (3.4)	3 (3.4)	51(2.88)
Diphragmatic palsy	4 (2.5%)	39 (4.6)	37 (5.3)	4 (4.6)	84(4.74)
Metastasis in liver	5 (3.2)	34 (4)	33 (4.8)	4 (4.3)	76(4.29)
Metastsis in brain	4 (2.3)	26 (3.1)	24 (3.4)	3 (3.8)	57(3.22)
Metastasis in adrenal	3 (2)	23 (2.7)	22 (3.2)	3 (3.8)	51(2.88)
Opposite lung nodule	2 (1)	20 (2.4)	20 (3)	3 (3.8)	45(2.54)

On radiological examination mass lesion(68.4%) was the commonest sign in all age groups & presented more commonly as the age increases.

Vertebral erosion (3.4%) & opposite lung nodule were also commonly seen among >60 yrs age groups.

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Younger patients more commonly present with pleural effusion(45%) as compare to collapse and consolidation which is more common among 61-80yrs age group(42%) and >80 yrs old patients(52%).

Mediastinal widening perihilar mass, rib erosion, raised hemidiaphragm; abscess/ cavitating mass were also seen in some patients but no significant difference seen among different age groups.

DISCUSSION:

The present cross-sectional descriptive study (including retrospective secondary and prospective primary data) of one thousand seven hundred seventy (1770) cases of bronchogenic carcinoma, carried out in the department of respiratory medicine, J.L.N. Medical Collage and Associated Groups of Hospitals at Ajmer.

All cases of bronchogenic carcinoma registered at our institute over last 6 years extending from January 2007 to December 2012, were scanned in the light of distinctive clinico-radiological features, histological types, evolving trends in the clinical, radiological, histological behavior, response to therapy and to evaluate their distribution among different age groups. From our extensive search and literature review, we did not find any similar study looking at distribution among different age groups including > 80 yrs age group patients, among lung cancer patients.

In the present study, 160 out of 1770 patients (9.03%) with bronchogenic carcinoma seen at our tertiary care center were 40 years old or younger at diagnosis. Other Indian studies on bronchogenic carcinoma have also found a similar proportion of young (≤ 40 years) patients, the figures reported ranging from 9 to 14% [9,10,11,12](table 4&5).The proportion of young patients of bronchogenic carcinoma as per the Indian cancer registry ranges from 4.1 to 10% [13].The problem when comparing earlier studies on lung cancer with the Indian cancer registry is the difference in the definition of 'young' (table-2). In the present study, we took 40 years as the cutoff age, so as to make sure that there were an acceptable number of younger patients.

In the present study there were 1418 male and 352 female patients with male: female ratio of 4.03 suggesting that the disease was more common in males. The male, female ratio has widely differed in our country. The ratio of male to female patients among the younger patients was 3.44: 1, which is lower than the 4.9: 1 male to female ratio seen among the older patients. This is in comparable with most previous studies (table- 4).These other studies showing higher proportion of females among younger patients were conducted in western populations and they may be explained partly by the fact that a high percentage of young women smoke in western countries. In our study, most of the female among younger group (31/36 female patients; 86.1%) were nonsmokers; however, exposure to household smoke and the higher susceptibility of females, mentioned by Zang and Wynder[14] that the relative risk for developing lung cancer was 1.5 times higher in women than in men, even after controlling exposure to smoke, may be reasons for lung cancer among females in the younger age-groups. Smith,[15] in a study conducted in four villages in western India, reported that the average daily exposure to benzopyrene during cooking was nearly 4000 ng/m^3, which is equivalent to smoking approximately 20 packs of cigarettes per day.

In the present study, major constitutional symptoms were weight loss and anorexia which were more common in elderly and very elderly patients (68%) followed by generalized weakness or malaise in 62% cases and fever. Fever (42%) is more common among patients of younger age group than elderly, which was similar to study by R.Prasad et al[16]. In other Indian studies, weight loss and anorexia were seen in 77% cases by Gupta et al[17]. 52.5% cases by Guleria et al[18], weakness was seen in 69.2% cases and fever was seen in 20% cases by Jindal and Behera [19] and 34% cases by Gupta et al [17].

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Among respiratory symptoms in young patients, cough was the most common symptom (82.5%), followed by chest pain (68.7%), expectoration (55.6%), breathlessness (53.1%), and hemoptysis (48 patients; 30 %). In the older patients, cough was the most common complaint (75.9%) and also in very elderly (91 %) was followed by expectoration (64.9%) in elderly and very elderly (81%). Hemoptysis was more commonly seen among very elderly (79%) and elderly (56%) as compare to young patients (30 %). This is concordance to study by R prasad[20] and Jagdish et al[21.]

In the present study, the incidence of squamous cell carcinoma was 36.7, adenocarcinoma 32.9% , large cell carcinoma 6%, small cell carcinoma 14.5% and unclassified including rare tumors 9.6%. In our study, Squamous Cell Carcinoma was the predominant type in male (38.64%) and adenocarcinoma in female (40.05%). Both adenocarcinoma (47.2% versus 37%) and Small Cell Carcinoma (11.1% versus 10.4%) are found to be more common in young female than young male. Whereas the most common type in elderly female (61-80 yrs age group) was adenocarcinoma (39.5%), Squamous Cell Carcinoma (39%) was most common in elderly male. Whereas in very elderly patients squamous cell carcinoma commonest type in both male and female. Adenocarcinoma was the predominant histological type in female, especially in young and SCC in male according to most of the previous literatures. [22,23,24,25]

On radiological examination mass lesion (68%) was the commonest sign in all age groups. Younger patients more commonly present with pleural effusion (45%) as compare to collapse and consolidation which were more common among elderly patients. In the present study finding of mass lesion and pleural effusion were more common in contrast to collapse in younger patients as reported in other Indian studies needs further research in this direction.

CT scan thorax has advantage over routine chest radiography in detection of bronchogenic carcinoma[26] and the present study also suggested incomparability of CT scan in detection of mediastinal adenopathy, hilar adenopathy rib erosion and liver metastasis.

Conclusion:

This study was done to assess the profile of lung cancer patients. It gives future direction to researcher to conduct more studies in same domain to produce data which may help in prevention and control of this creeping malady.

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