



Short communication

Unchanging clinico-epidemiological profile of lung cancer in North India over three decades

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ABSTRACT

Objective: In the recent past, adenocarcinoma has become the commonest histological type of lung cancer (LC) in the developed countries. The present study was conducted to assess the change in epidemiology of LC, if any, in North India. **Methods:** Prospectively collected data on 250 newly diagnosed LC patients presenting to a tertiary care institute was analyzed. Results were compared with the previously published data from this center. **Results:** No significant differences were observed in the demographical, histological or smoking profiles of LC patients compared to those seen three decades earlier. The mean [standard deviation] age was 57.9 [± 11.3] years (previously 54.3 years). Male to female ratio was 4.43:1 (previously 4.48:1; $p = 0.952$) while the smoker to non-smoker ratio was 2.67:1 (previously 2.68:1; $p = 0.980$). The commonest histological types were squamous cell (34.8%), adenocarcinoma (26.0%) and small cell (18.4%) while previously these were 34.3%, 25.9% and 20.3%, respectively; $p = 0.916$. However, in the present study, significant differences were observed between smokers and non-smokers in relation to distribution of gender, histology and disease stage. **Conclusions:** There has been no significant change in the epidemiology of LC in North India over the past three decades. An absence of change in the smoking pattern of the population could be a possible reason.

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1. Introduction

Lung cancer is the most common cancer worldwide representing approximately 12% of all new cancers [1]. It is also the most common type of cancer in males and remains the most common cause of cancer related mortality in both sexes. Most patients present with advanced disease [1,2]. In the recent past, a relative increase in the incidence of adenocarcinoma has been witnessed. In most of the developed countries, it has become the dominant histological type of lung cancer [3,4]. It has also overtaken squamous cell carcinoma as the most common form of lung cancer among males in some countries while it has continued to be the commonest type among females [4]. This histological shift has been linked to changes in the smoking habits of the population in these regions as well as in the design and composition of cigarettes being marketed therein [5].

There is a paucity of data on the change in epidemiology of lung cancer, if any, from India. The authors' institute (PGIMER) is an apex superspeciality government health-care institute and caters to patients referred from primary, secondary and other tertiary health-care institutes (including medical schools) located in

several North Indian states. The present study was conducted to assess the temporal trends in the epidemiology of lung cancer patients presenting to the authors' institute.

2. Materials and methods

The study population was chosen from newly diagnosed patients with cytologically or histopathologically proven lung cancer presenting to the lung cancer clinic of PGIMER, Chandigarh over an 18-month period (2007–09). Data was prospectively collected for 250 consecutive patients. Baseline characteristics including demographic details (age, gender, residence and contact details), smoking habits, histological type and stage of disease were noted. Patients were classified as non-smokers if they denied having ever smoked; those classified as smokers comprised current smokers and ex-smokers [6]. Staging for non-small cell cancer (NSCLC) cases was done using 6th edition of the TNM classification based on tumor size and extension (T), lymph nodal involvement (N), and presence of distant metastasis (M) [7,8]. Small cell lung cancer (SCLC) was staged as either limited (disease restricted to one hemithorax, with or without regional lymph node metastases and/or ipsilateral pleural effusion) or extensive [9].

The cases were classified on the basis of morphology into different types using WHO classification of lung tumors [10] as:

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1. Non-small cell carcinoma:
 - i. Squamous cell carcinoma;
 - ii. Adenocarcinoma;
 - iii. Large cell carcinoma;
 - iv. Undifferentiated.
2. Small cell carcinoma.
3. Miscellaneous.

2.1. Statistical analysis

Descriptive data is presented as mean [standard deviation (S.D.)] and as percentages. Differences between patient groups were analyzed using the chi-square test for qualitative and Student's *t*-test for quantitative data. Results were compared with those previously published from this center wherein the authors had analyzed the demographic and histological characteristics of 1009 lung cancer cases diagnosed over a period of 10 years (1977–86) [11].

3. Results

The epidemiological characteristics of the study population are depicted in Table 1. Males and smokers comprised 81.6% and 72.8% of the study population, respectively. Squamous (34.8%) and adenocarcinoma (26.0%) were the most common histological types, over all. Significant differences were observed between smokers and non-smokers in relation to distribution of gender, histology and disease stage (Table 1). Overall, 84.0% of males were smokers whereas 76.1% of females were non-smokers ($p < 0.001$). Among smokers, squamous (38.5%) and small cell (21.8%) were the most common histological types and the distribution differed significantly from that seen in non-smokers where adenocarcinoma (46.3%) was the commonest. Majority of the patients of NSCLC presented with advanced disease (stage IIIB–39.6%, stage IV–43.1%). The percentage of patients with NSCLC who presented with advanced disease (stages IIIB and IV) was higher among non-smokers (96.5% vs. 77.4%, $p = 0.004$). No differences were seen in relation to the percentage of SCLC patients who presented with extensive disease (59.0% in smokers vs. 66.7% in non-smokers, $p = 0.72$).

Table 1
Comparison of epidemiological characteristics between smokers and non-smokers.

	Overall ^a (<i>n</i> = 250)	Smokers ^b (<i>n</i> = 179)	Non-smokers (<i>n</i> = 67)	<i>p</i> value
Age (years) ^c	57.9 (11.3)	59.3 (10.2)	53.9 (13.5)	0.004
Males – number (%)	204 (81.6%)	168 (93.9%)	32 (47.8%)	<0.001
Histology				<0.001
Squamous cell	87 (34.8%)	69 (38.5%)	17 (25.4%)	
Adenocarcinoma	65 (26.0%)	33 (18.4%)	31 (46.3%)	
Large cell	5 (2.0%)	5 (2.8%)	0 (0%)	
NSCLC–Undiff	40 (16.0%)	30 (16.8%)	9 (13.4%)	
Small cell	46 (18.4%)	39 (21.8%)	6 (9.0%)	
Miscellaneous	7 (2.8%)	3 (1.7%)	4 (5.9%)	
NSCLC stage				0.004
I–II	11 (5.6%)	9 (6.6%)	1 (1.8%)	
IIIA	23 (11.7%)	22 (16.0%)	1 (1.8%)	
IIIB	78 (39.6%)	57 (41.6%)	20 (35.0%)	
IV	85 (43.1%)	49 (35.8%)	35 (61.4%)	
SCLC stage				0.720
Limited disease	19 (41.3%)	16 (41.0%)	2 (33.3%)	
Extensive disease	27 (58.7%)	23 (59.0%)	4 (66.7%)	

NSCLC = non-small cell lung cancer; NSCLC–Undiff = undifferentiated non-small cell lung cancer; SCLC = small cell lung cancer.

^a Smoking status was available for 246 patients.

^b Includes both current smokers and ex-smokers.

^c Mean (standard deviation).

Table 2

Comparison of epidemiological characteristics of the current and previous studies.

	Current study	Jindal et al. (1990) ^a	<i>p</i> value
Number of cases	250	1009	
Period of data collection	2007–09	1977–86	
Mean [±S.D.], age (years)	57.9 [±11.3]	54.3 [^b]	
Male:female	4.43:1	4.48:1	0.952
Smokers ^c :non-smokers	2.67:1	2.68:1	0.980
Histology			0.916
Squamous cell	34.8%	34.3%	
Adenocarcinoma	26.0%	25.9%	
Small cell	18.4%	20.3%	
Others	20.8%	19.5%	

S.D. = standard deviation.

^a Reference no. [11].

^b S.D. not mentioned.

^c Includes both current smokers and ex-smokers.

The demographical and histological profile as well as smoking status did not differ significantly to that seen three decades earlier (Table 2). The only change noted was the ratio of males to females among smokers (15.3:1 vs. 32.0:1 in the previous study) as well as among non-smokers (0.91:1 vs. 0.69:1 in the previous study).

4. Discussion

The current study was conducted to determine the change in the epidemiological profile of lung cancer patients presenting to the authors' institute. Contrary to the global scenario, it was surprising to find that no real change had occurred in the epidemiology of this disease over three decades (corresponding to the time period when data was collected).

A published compilation of population based morphology-specific lung cancer incidence data from registries contributing to the International Agency for Research on Cancer (IARC) databases revealed that rates of all lung cancer types among women and of adenocarcinoma among men had risen despite a decline in cigarette use in many Western countries as well as a shift to filtered and low-tar cigarettes [12]. Incidence rates for squamous cell carcinoma declined by 30% or more among males in North America and some European countries while the change was less dramatic in other areas. The decline in incidence rates for SCLC was also less pronounced. On the other hand, among females, incidence rates for both squamous cell and SCLC showed an increase in most of the regions. Of note was the incidence of adenocarcinoma which increased among both sexes in virtually all areas. In many areas of Europe, this increase exceeded 50% among males. However, data of sufficient morphologic detail to make a temporal comparison were not available from not available from any of the registries in Central or South America, Asia or Africa [12].

A recent publication compared the data available from the population based National Cancer Registry Program (NCRP) of India to determine the trends in incidence rates of 10 major cancers over a period of almost two decades (1982–2000) [13]. Here also, an important observation was that no significant changes in trends were observed for lung cancer during the study period. In another evaluation of lung cancer cases presenting to the Bombay Cancer Registry over a period of 24 years (1982–2005), age-adjusted incidence rates during the study period showed a statistically significant decreasing trend among males and a statistically significant increasing trend among females [14]. However, this trend was limited to individuals less than 65 years among males while among females, to those aged 65 years or older. Across the other age groups, the incidence rates were found to be stable. The authors had attributed this to a decrease in smoking prevalence among males but had stressed the need to conduct risk assessment

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