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A descriptive study on the pattern of tobacco smoke exposure and its relation to various histological types of lung cancer with special reference to passive smoking

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Abstract
Introduction: In the beginning of 20th century, lung cancer was a rare disease. Indeed in 1912 a well-Known American doctor wrote "primary cancers of the lung are among the rarest forms of disease". Lung cancer is now the commonest malignancy in the developed world and accounts for nearly a half of all cancer deaths in men. Now it has become the leading cause of cancer death in males in the industrialized world. For females the incidence is still increasing, and in some countries, it is already the most frequent cause of cancer death.
The number of new cases is increasing rapidly in most of the developed as well as developing countries. For most other cancers the death rates are either improving or at least, leveling off. But with lung cancer, where the progress in therapy is minimal, and with the increasing use of tobacco, the decrease in incidence or mortality Appears dismal. The lung cancer epidemic was first noted in males in the US and a number of European countries during the 1940. By the early 1950's epidemiologic studies using case control approaches had provided strong evidence that cigarette smoking was the predominant cause of the disease. During the 1950's and 1960s, prospective cohort it is estimated that 1-1.5 million cancers/ year are caused by tobacco use. Although some knowledge is presently available regarding the world tobacco related cancer burden, quite a lot needs to be better known. In order to evaluate the burden correctly, one needs to have precise statistics concerning 3 items.
1. Cancer occurrence
2. Prevalence of tobacco use in its various forms
3. Precise relationship between tobacco use and disease for each country

Objectives of the study
Primary objective: To find out the pattern of Tobacco smoke exposure and its relation to various histological types of Lung cancer with special reference to passive smoking.
Secondary objective: To identify the clinical predictors of histological types of Lung Cancer among the patients attending the tertiary care centre under the Department of Respiratory Medicine, Dr. SM CSI Medical College, Karakonam.
Methodology
Study design: Descriptive study.
Study population: Included patients attending the Department of Respiratory medicine with symptoms and signs suggestive of lung cancer.
Setting: Department of Respiratory Medicine, Medical College, Karakonam.
Inclusion criteria: Patient with definite histological evidence of lung cancer.
Exclusion criteria: Patients without any histological evidence of Lung cancer and those with metastatic Lung cancer.
Period of study: December 2010 - June 2020.
Results and Conclusion: 71% of Lung Cancer patients are found to be smokers. When smoking status is considered in relation to histological types 85% of squamous cell and 82% of small cell carcinoma patients are smokers. These histological types are already proven to have the clearest association with smoking. 50% of Adenocarcinoma patients, the commonest histological type in nonsmokers, are found to be smokers. Among the nonsmokers, predominantly females, 81% are passive smokers. The main histological type in passive smokers is Adenocarcinoma.

Keywords: Smoking, passive, lung, cancer, histology

Introduction
The first large scale case control study from the United States linking cigarette smoking and lung cancer was published in 1960. In this study 597 of the 605 male lung cancer patient had

a smoking history and the ratio of squamous cell lung cancer to adenocarcinoma was 16:1 [1]. Later studies from US demonstrated a significant change in the relative frequency of adenocarcinoma versus other histological types in males. While the number of adenocarcinoma increased [2, 4], the frequency of squamous cell carcinoma remained stable. In women also same trend was seen [3].

Since a significant percentage of men and women who develop Lung cancer have a smoking history, the change in incidence of lung cancer types may be related to the consumption of cigarettes or pattern of tobacco smoking [6]. Exposure to Tobacco Smoke can be either from active smoking or Passive smoking. In 1952 Association between smoking and lung cancer was reported by Richard Doll and Hill [7]. In 1964 - causal relationship between smoking and lung cancer was reported in U S Surgeon General's Report [8]. In developed countries 91% of male Lung Cancer patients and 62% of female lung cancer patients are smokers. In developing countries it 76% and 24% respectively (WHO Report -1960-80) [9, 10]. Analysis of 15 reports in India showed that Smoker to Nonsmoker ratio varied from 3:1 to 5:1. A study conducted in PGI Chandigarh showed that Smoker to Nonsmoker ratio is less compared to West [11].

It is estimated that 1-1.5 million cancers/ year are caused by tobacco use. Although some knowledge is presently available regarding the world tobacco related cancer burden, quite a lot needs to be better known [12-14]. In order to evaluate the burden correctly, one needs to have precise statistics concerning 3 items

1. Cancer occurrence
2. Prevalence of tobacco use in its various forms.
3. Precise relationship between tobacco use and disease for each country [14].

The availability of such data varies greatly from one country to another. Lung cancer can be used as a reliable marker of exposure to tobacco. Good estimate exist for USA, based on Cancer Prevention Studies [15]. Another important observation is that people who have never smoked also get lung cancer. Studies relating passive smoking to the risk of lung cancer have been reviewed by the International Agency for Research on Cancer, which accepts that passive smoking produces some risk of lung cancer. 1/3 of lung cancer in nonsmokers who live with smokers and 1/4 of lung cancer in nonsmokers is attributable to passive smoking" [16-18]. But how applicable are these data for the rest of the world? This we have to find out. Hence the relevance of the study.

Materials and Methods

Study design: Descriptive study

Study population: Included patients attending the Department of Respiratory medicine with symptoms and signs suggestive of lung cancer.

Setting: Department of Respiratory Medicine, Medical College, Karakonam.

Inclusion criteria: Patient with definite histological evidence of lung cancer.

Exclusion criteria: Patients without any histological evidence of Lung cancer and those with metastatic Lung cancer.

Period of study*:* December 2010 — June 2020.

Sample size: Sample size was worked out based on case control methodology. The lowest prevalent risk factor (Predictor) among the control is taken as Py and the estimated Relative Risk of 2, an error of 0.05 and power of (1-8) 80%, the sample size was worked out as 60.

Sampling: The sample population was selected from patients attending the Department of Respiratory Medicine, during the period mentioned above strictly adhering to the inclusion & exclusion criteria.

Study instrument: The details regarding the patients were collected and entered in a proforma which is appended.

Method of data collection: The details of the patients were collected and entered in the proforma personally. Details included age, occupation, and history of illness with special mention to pattern of smoking, both active and passive. Thorough clinical examination was done, chest X-ray was taken for all cases and C T Chest in selected cases were it was indicated. For histological diagnosis sputum was send for cytology in all cases. In patients with specific clinical presentation appropriate specimen was send for histological diagnosis.

In case of any doubt regarding data collections or investigative procedure and for technical assistance the guide was consulted and appropriate decision taken.

Outcome variable: Squamous cell and Small cell carcinoma vs Adenocarcinoma in relation to active and passive smoking.

Analysis: The data were converted to digital format in a personal computer using the software Statistical Package for Social Science (SPSS) version 10. The frequencies with its percentage were expressed in tables and charts. Comparisons and/or associations between various parameters were estimated using cross tab analysis.

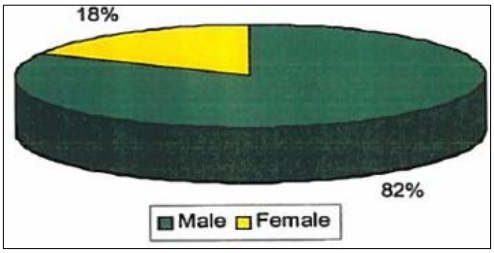
The significance of the relationships were estimated using Chi square analysis.

Results

The datas obtained from the study is analyzed and is given below in the form of tables and charts.

Table 1: Showing gender distribution

Gender	No.	Percentage
Male	103	82.4
Female	22	17.6
Total	125	100



Male:Female – 4.7:1

Fig 1: Gender distribution

Table 2: Age distribution of lung cancer patients

Age group	Male	Female	Total	Percentage
≤ 30	3	2	5	4
31-40	8	2	10	8
41-50	16	3	19	15.2
51-60	28	7	15	28
61-70	30	6	36	28.8
> 70	18	2	20	16

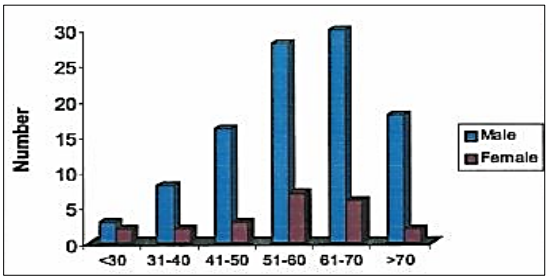


Fig 2: Age distribution of lung cancer patients

Table 3: Frequency of Histological types

Histo: types	Male	Female	Total
Sq.cell ca	34 (85%)	6 (15%)	40 (32%)
Adeno ca	24 (66.4%)	12 (33.4%)	36 (28.8%)
Small Cell ca	27 (96.4%)	1 (3.6%)	28 (22.4%)
Poorly diff:d ca	18 (85.7%)	3 (14.3%)	21 (16.8%)

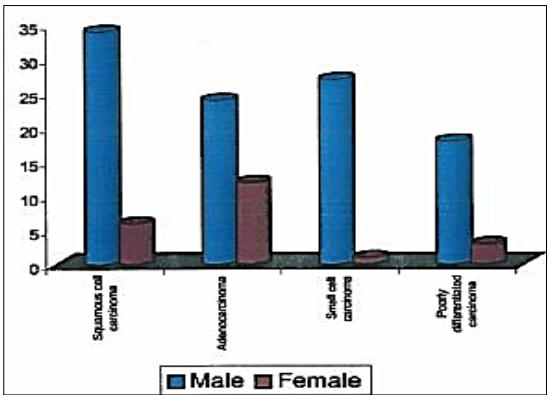


Fig 3: Frequency of Histological types

Table 4: Histological types in relation to age group

Age group	Sq cell	Adeno ca	Small cell	Poorly dlff:d	Total
≤ 30	-	3	2		5
31-40	-	4	4	2	10
41-50	9	4	3	3	19
51-60	14	12	5	4	35
61-70	12	9	8	7	36
> 70	5	4	6	5	20

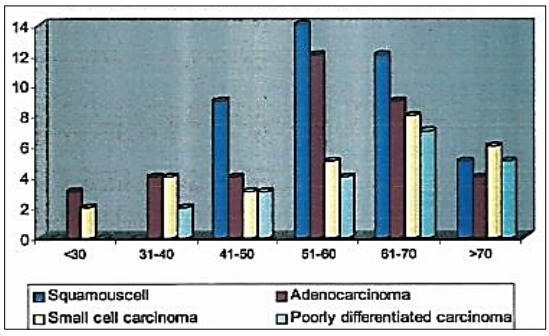


Fig 4: Age distribution in relation to histological types

Table 5: Frequency of selected clinical features clubbing

Clinical features	Yes	No
Clubbing	67 (53.6%)	58
Haemoptysis	63 (50.4%)	62
Lymphadenopathy	39 (31.2%)	86
Pleural effusion	27 (21.6%)	98
Hoarseness	17 (13.6%)	108
SVC	5 (4%)	120
Diaphragm paralysis	5 (4%)	120

Table 6: Clinical features in relation to histological types clubbing

Histo: Type	Clubbing	
	Yes	No
Sqcell ca	21 (31.3%)	19
Adeno Carcinoma	16 (23.9%)	20
Small cell	18 (26.9%)	10
Poorly diffd ca	12 (17.9%)	9

NSCLC 55.2% *P*< 0.05

Summary

1. Of the Lung cancer patients 82% are male and 18% females coming to a ratio of 4.7:1.
2. The largest proportion of patients are found in the age group above 50 years.
3. Only 12% of patients belonged to below 40 years.
4. The commonest histological type is squamous cell carcinoma.
5. More than 50% of patients presented with clubbing and haemoptysis.
6. More than 55% of haemoptysis is associated with central tumors.
7. 59% of patients with adenocarcinoma presented with pleural effusion.
8. 71% of patients are smokers.
9. Out of male patients 85% are smokers but only 4.5% of females are smokers.
10. 81% of nonsmokers is exposed passive smoking and they have more than 30yrs of exposure.
11. Source of ETS is household in the majority.
12. Highest proportion of patients has early initiation of smoking, more than 30yrs of smoking duration and SI above 800.
13. Major proportion of histological types associated with smoking are squamous cell and small cell.
14. 50% of adenocarcinoma patients are smokers.
15. 52% of passive smokers belonged to adenocarcinoma.

Conclusion

71% of Lung Cancer patients are found to be smokers. When smoking status is considered in relation to histological types 85% of squamous cell and 82% of small cell carcinoma patients are smokers. These histological types are already proven to have the clearest association with smoking. 50% of Adenocarcinoma patients, the commonest histological type in nonsmokers, are found to be smokers.

Among the nonsmokers, predominantly females, 81% are passive smokers. The main histological type in passive smokers is Adenocarcinoma.

Among the clinical features, none is attributable to any specific histological type except pleural effusion, 59% of which is due to adenocarcinoma.

In India where 76% of the population is rural, there is yet hardly any awareness of hazards of smoking. With the better

understanding of Tobacco smoking as the etiological factor, smoking cessation programme, needs a more personalized approach than educational programmes. Intensive measures should be undertaken to reduce the chance of passive smoking by avoiding smoking in public places.

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