

# Investigation and Analysis of Lung Cancer Risk Factors in the Health Check-Up Population

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**Abstract:** *Objective:* To investigate and analyze the risk factors of lung cancer in the population of health checkups. *Methods:* A total of 500 cases of the health check-up population were selected for data study. Surveyed showed that 19 cases of lung cancer were grouped as the lung cancer group and the remaining 481 cases made up the control group, and the risk factors were analyzed. *Results:* Among men, there was a significant proportion of individuals aged 60–69 years old, and women aged 30–39 years old. Additionally, individuals aged 60 and above were at increased risk of developing lung cancer. The results of the multifactorial analysis were that the risk factors affecting the detection of lung cancer in healthy people were smoking history, family history of lung cancer, secondhand smoke, history of respiratory diseases, psychosomatic factors, living environment, and kitchen fumes. *Conclusion:* People over 60 years of age were prone to early lung cancer, followed by individuals aged 30–39 years. It is important to identify the risk factors of lung cancer to strengthen the screening of high-risk groups for early detection and treatment.

**Keywords:** Health check-up population; Lung cancer; Risk factors; Survey

**Online publication:** April 29, 2024

## 1. Introduction

Analyzing the factors related to the occurrence of lung cancer, including family history and smoking, environmental problems, psychological conditions, as well as poor living habits, etc., revealed that the incidence of lung cancer is now affecting the younger population, which poses a serious threat to the patient's lives <sup>[1]</sup>. Lung cancer occurs in different regions with different data, and health screening should be strengthened to identify asymptomatic lung cancer patients, realize early diagnosis and treatment, promote the improvement of patients' prognosis, and prolong their survival period of the patients. Given this, the clinic needs to investigate and analyze the risk factors of lung cancer in the health checkup population.

## 2. Information and methods

### 2.1. General information

A total of 500 cases of health checkups from January to December 2023 were selected for the data study. Survey data revealed 19 cases of lung cancer were grouped as the lung cancer group and the remaining 481 cases were grouped as the control group. The lung cancer group consisted of 12 males and 7 females aged 27–74 years old, with an average of  $52.33 \pm 4.85$  years. The control group consisted of 341 males and 140 females aged 26–75 years old, with an average of  $52.31 \pm 4.81$  years.

### 2.2. Methods

A questionnaire was developed and filled out by the health screening population with a 100.00% recall rate. The examination was implemented using a 64-row ultra-high-end spiral computed tomography (CT) machine involving a low-dose spiral CT scan of the chest, scanning from the lung apices upward and downward to the costal diaphragmatic angle and the entire lung, with lesions detected. Multiplanar reconstructive imaging techniques were also carried out to diagnose the lesions. Solid nodules 5 mm or more in diameter, non-solid nodules 8 mm or more in diameter, or nodules in the lumen of the trachea suggest positive results. A fiberoptic bronchoscopy was also carried out.

### 2.3. Statistical analysis

Data analysis was carried out using the SPSS 25.0 statistical software. Measurement data were expressed as mean  $\pm$  standard deviation and the count data were expressed as %. Measurement data were analyzed using a *t*-test, and count data were analyzed using a chi-squared ( $\chi^2$ ) test. Results were considered statistically significant at  $P < 0.05$ .

## 3. Results

As shown in **Table 1** to **Table 3**, the incidence of lung cancer was higher among men aged 60–69 years old, women aged 30–39 years old, and individuals aged 60 years and above. The result of the multifactorial analysis showed that the risk factors affecting the detection of lung cancer in healthy people were smoking history, family history of lung cancer, secondhand smoke, history of respiratory diseases, psycho-psychological factors, living environment, and kitchen fumes.

**Table 1.** Detection of lung cancer

Age (years)	Cases, <i>n</i>	Male cases	Male lung cancer	Female cases	Female lung cancer
Up to 30	61	43	1 (2.32)	18	0
30–39	80	60	3 (5.00)	19	1 (5.26)
40–49	163	125	4 (3.20)	38	1 (2.63)
50–59	120	93	4 (4.30)	27	1 (3.70)
60–69	51	32	1 (3.12)	20	1 (5.00)
> 69	25	17	2 (11.76)	8	0
Total	500	370	15 (4.05)	130	4 (3.07)

**Table 2.** Single factor analysis

Factors	Lung cancer group (n = 19)	Control group (n = 481)	$\chi^2$	P
Age				
Up to 40 years old	5	141	0.0795	> 0.05
> 40	14	340		
Smoking history				
Yes	18	120	44.5505	< 0.05
No	1	361		
Sex				
Male	14	357	0.0027	> 0.05
Female	5	124		
Body mass				
> 65 kg	9	184	0.6407	> 0.05
< 65 kg	10	297		
Second-hand smoke				
Yes	17	174	21.9946	< 0.05
No	2	307		
Family history of lung cancer				
Yes	9	79	12.0684	< 0.05
No	10	402		
History of respiratory disease				
Yes	13	184	6.9668	< 0.05
No	6	297		
Psychosomatic factors				
Yes	10	140	4.8171	< 0.05
No	9	341		
Occupational exposure				
Yes	3	49	0.6156	> 0.05
No	16	432		
Living environment				
Yes	10	93	12.3893	< 0.05
No	9	388		
Kitchen oil smoke				
Yes	12	142	9.7025	< 0.05
No	7	339		

**Table 3.** Multi-factor analysis

Factors	$\beta$	SE	OR	95% CI	<i>P</i>	Wald
Smoking history	1.366	0.451	3.919	1.619–9.487	< 0.05	6.716
Family history of lung cancer	1.247	0.347	3.480	1.763–6.870	< 0.05	10.356
Second-hand smoke	1.651	0.264	5.212	3.107–8.745	< 0.05	23.689
History of respiratory disease	1.742	0.196	5.709	3.888–8.383	< 0.05	45.346
Psychosomatic factors	1.395	0.385	4.035	1.897–8.581	< 0.05	9.411
Living environment	1.575	0.218	4.831	3.151–7.406	< 0.05	33.141
Kitchen oil smoke	1.247	0.357	3.480	1.729–7.006	< 0.05	9.784

## 4. Discussion

Lung cancer is common in clinical practice and physical examination and screening for high-risk groups play an important role in the prevention and treatment of the disease. This study showed that the incidence of lung cancer was higher among men aged 60–69 years old, women aged 30–39 years old, and individuals aged 60 years and above. The result of the multifactorial analysis showed that the risk factors affecting the detection of lung cancer in healthy individuals include smoking history, family history of lung cancer, secondhand smoke, history of respiratory diseases, psychosomatic factors, living environment, and kitchen fumes.

The above analysis showed that young people are at high risk due to increased work and life pressure, especially individuals aged 30–39 years old. As the body is in a negative state and high tension, the incidence of the disease increases. Tobacco smoke affects human lung function and the respiratory system, leading to an increase in the incidence of lung cancer in individuals who smoke [2–4]. At the same time, passive smoking is more harmful, especially in women, and the CY1P1 enzyme in the body is effectively stimulated. Patients with a family history of lung cancer may carry cancerous genes, which increases their risk of lung cancer [5,6]. If there is a history of respiratory system diseases, the function of the respiratory system may be impaired, and it is easy to induce cancer into the body. At this stage, the patient's mental tension as well as anxiety will lead to aggravation of immune system dysregulation and susceptibility to tumors [7]. Residential environment-related lung cancer occurrence and long-term exposure to pollution as well as dust can lead to an increase in the incidence of lung cancer. Additionally, there are carcinogens in kitchen fumes that will induce cancer. Therefore, it is necessary to target high-risk groups for early disease prevention and control [8–10].

## 5. Conclusion

Men aged 60–69 years old, women aged 30–39 years old, and individuals aged 60 years and above have a higher risk of developing lung cancer. The risk factors of lung cancer should be taken into consideration and strengthen the implementation of disease screening for high-risk groups to achieve early detection and treatment of the disease.

## Disclosure statement

The authors declare no conflict of interest.

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