Review Article

Lung cancer and smoking relationship

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Abstract

Cancer refers to diseases in which abnormal cells divide out of control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems, which help the body get rid of toxins, Lung cancer is the most frequent malignant tumor with the highest mortality around the world. The most common clinical manifestations are coughing, weight loss, and shortness of breath and chest pain. Globally, lung cancer is the most common cancer and the leading cause of cancer death in men and is the third most common cancer and the second leading cause of cancer death in women. About 1.8 million new cases of lung cancer were diagnosed in 2012, which accounted for 12.9% of the world's total cancer incidence. The worldwide lung cancer mortality rate amounted to 1.59 million deaths in 2012, accounting for 19.4% of the total cancer deaths. Lung cancers was uncommon before the advent of cigarette smoking it was not even recognized as a distinct disease until 1769.Smoking is a known major risk factor for lung cancer, so lung cancer epidemiologic trends, and its variations, reflect the past trends of cigarette smoking to a great extent. In the United States, most states drew up legislation for smoking restrictions in public areas about 20 years ago and have continually promoted the awareness of smoking hazards to their residents. Many states have passed the peak of the tobacco related epidemic, therefore both the incidence and mortality rates of lung cancer in these areas are decreasing. Healthy lifestyle behaviors for cancer risk reduction include a healthy diet, weight management, regular exercise, reduction in alcohol consumption and smoking cessation lifestyle could modify cancer risk factors.

Keywords: Lung, lung cancers, smoking, DNA, cigarette, immunity

Introduction

Cancer refers to diseases in which abnormal cells divide out of control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems, which help the body get rid of toxins, Poisons in cigarette smoke can weaken the body's immune system, making it harder to kill cancer cells(Aizaz *et al.,* 2023; Obeagu *et al.,* 2021; Obeagu and Obeagu, 2023; Obeagu *et al.,* 2021; Ahiara *et al.,* 2022; Obeagu *et al.,* 2022; Obeagu and Babar,

2021). When this happens, cancer cells keep growing without being stopped, Poisons in tobacco smoke can damage or change a cell's DNA. DNA is the cell's "instruction manual" that controls a cell's normal growth and function. When DNA is damaged, a cell can begin growing out of control and create a cancer tumor(Ofor *et al.,* 2016; Obeagu and Obeagu, 2016; Obeagu *et al.,* 2016; Obeagu, 2018; Obeagu, 2018; Obeagu, 2018). Lung cancer is the leading cause of cancer death worldwide with 1.7 million global deaths attributed to cigarette smoking in 2015. Tobacco use is the leading cause of lung cancer; 55% of lung cancer deaths in women and over 70% of lung cancer deaths in men are due to smoking. These global estimates, however, mask major differences in smoking prevalence in men and women across populations, with rates below 5% for women in most Asian and African countries to 40% and above for men in many parts of Asia and Eastern Europe (Linda *etal.*, 2016)

Lung cancer is the leading cause of cancer death, both in the United States and worldwide. It is estimated that lung cancer will cause over 160,000 deaths in the United States in 2007, and greater than one million deaths worldwide. The most important risk factor for lung cancer is tobacco smoking, and the data supporting this relationship are compelling. Compared with nonsmokers, smokers have as much as a 30-fold increased risk of developing cancer. Thirty-one percent and 26% of all cancer deaths in men and women, respectively, result from lung cancer in the United States (Walser *et* al., 2008).

Lung cancer or lung carcinoma is a malignant lung tumor characterized by uncontrolled cell growth in the lung tissues, .The highest rates are in North America, Europe, and East Asia, with over a one third of new cases in China. The rates in Africa and South Asia are much lower. Worldwide in 2012, lung cancer occurred in 1.8 million people and resulted in 1.6 million deaths. This makes it the most common cause of cancer related death in men and second most common in women after breast cancer. Malaysian National Cancer Registry (2007) reported 1865 lung cancer cases with male 70.8% and female

29.2%.Contributory factors include long- term tobacco smoking(85%),10 to 15% of cases occurred in people who have never smoked. These cases are often caused by a combination of factors and exposure to random gas, asbestos, second- hand smoke, or other forms of air pollution. The two main types of cancer are small –cell lung carcinoma (SCLC) and non-small-cell lung carcinoma (NSCLC).The most common clinical manifestations are coughing (including coughing of blood), weight loss, and shortness of breath and chest pain. Diagnosis mainly by chest radiographs and computed tomography (CT) scans. The diagnosis is confirmed with biopsy by bronchoscopy or CT-guidance. Common treatment include surgery, chemotherapy, and radiography, NSCLC is sometimes treated with surgery, whereas SCLC usually respond to chemotherapy and radiotherapy. Prevention by avoiding risk factors including smoking and air pollution (Mustafa *et* al., 2016).

Lung cancers

Lung cancers was uncommon before the advent of cigarette smoking it was not even recognized as a distinct disease until 1761. Different aspects of lung cancer were described further in 1810. Malignant tumors made up only 1% of all cancers at autopsy in 1878, but has risen to 10-15% by early 1900. Case reports in the medical literature numbered only 374 worldwide in 1912, but a review of autopsies showed the incidence of lung cancer had increased from 0.3% in 1852 to 5.66 in 1952. In Germany in 1929, physician Fritz Lickint recognized the link between smoking and lung cancer, which led to an aggressive antismoking campaign. British Doctors' Study published in the 1950s, was the first solid epidemiological evidence of the link between lung cancer and smoking .As a result, in 1964 the Surgeon General of the United States recommended smokers should stop smoking (Mustafa *et al.*, 2016).

Epidemiologic characteristics of lung cancer

Globally, lung cancer is the most common cancer and the leading cause of cancer death in men and is the third most common cancer (after breast and colorectal cancers) and the second leading cause of cancer death (after breast cancer) in women. About 1.8 million new cases of lung cancer were diagnosed in 2012, which accounted for 12.9% of the world's total cancer incidence. The worldwide lung cancer mortality rate amounted to 1.59 million deaths in 2012, accounting for 19.4% of the total cancer deaths, Smoking is a known major risk factor for lung cancer, so lung cancer epidemiologic trends, and its variations, reflect the past trends of cigarette smoking to a great extent (Yousheng *etal.,* 2016).

Lung cancer rates vary around the world, reflecting geographical differences in tobacco use and air quality. Worldwide, lung cancer incidence is increasing. Rates of lung cancer in men are considerably higher in developed countries than in less-developed ones, predominantly related to smoking habits, but overall incidence is decreasing in men from developed countries due to tobacco control policies. Lung cancer in women is also more prevalent in the developed world and linked with cigarette smoking. Worldwide, rates of female lung cancer are increasing. For instance, female lung cancer incidence in Europe has been rising for most of the 21st century and in 2017 exceeded breast cancer mortality rates for the first time, 14.6 lung cancer deaths per 100,000 compared with 14 per 100,000 for breast cancer (Patricia *etal.*, 2018).

In Africa, Ghana it was reported as the third most common cancers among males (5.3%).Furthermore, in Ethiopia and Egypt, lung malignancy is one of the most common cancers with crude incidence rate of 1.9% and 0.8%, respectively. However in Nigeria with an incidence of 1.4%, lung malignancy ranked 14th overall on the yearly new diagnosed cancer cases (Winkler *etal.*, 2015).

In Nigeria, there is no specific lung cancer registry and figures are derived from few institutional all-cancer registry. The other challenge is that the data from these registries are inexact and irregular. In the West African sub region, the mortality from lung cancer remains high as a result of late presentation with an advanced stage of the disease. Some of the reasons earlier reported for this late presentation include delay in achieving diagnosis, limited access to tertiary care facilities and inability to pay out of-pocket. Furthermore, the facilities for establishing early diagnosis for lung cancer are limited in the sub region.Ogunbiyi about 20 years ago, advocated for enhancement of facilities for earlier diagnosis in developing countries. Ezemba noted that with an apparent increase in the incidence of lung malignancy and lack of advanced diagnostic modalities, treatment outcome had remained poor (Winkler *etal.*, 2015).

Personal history and life style choices

Current research suggests that if a member of your immediate family (mother, father, sibling, aunt, uncle, or grandparent) has or had lung cancer you may have slightly higher risk developing the disease. This is true even if you don't smoke, at this point it's unclear whether genetics cause lung cancer or merely increases your susceptibility to it (Team *et al.*, 2014).

It is increasingly appreciated that the chances of developing cancer are significantly affected by the choice of our lifestyle. There are several uncontrollable risk factors which account for the majority of cancers, but we can modify our lifestyle to reduce enhanced threat of cancer. Healthy lifestyle behaviors for cancer risk reduction include a healthy diet, weight management, regular exercise, reduction in alcohol consumption and smoking cessation lifestyle could modify cancer risk factors. Cancer is a genetic disease in which tumor cells differ from their normal progenitors by genetic alterations that affect growth-regulatory genes. It has been recognized that malignant transformation occurs through successive mutations in specific cellular genes, leading to the activation of oncogenes and inactivation of tumor suppressor genes. Compiling the most recent data

on cancer incidence, mortality and survival based on incidence data from the National Cancer Institute, Centers for Disease Control and Prevention, and the North American Association of Central Cancer Registries and mortality data from the National Center for Health Statistics, the American Cancer Society estimated 1,479,350 number of new cancer cases and 562,340 deaths in the United States in the year 2009. The large differences in cancer rates among countries, striking changes in these rates among migrating populations, and rapid changes over time within countries indicate that some aspects of lifestyle and/or environmental factors are largely responsible for the common cancers which are more prevalent in Western countries. The great interest during the last several decades (Naghma *et al.*, 2009).

Gender in lung cancer and smoking

Data show that more men than women develop lung cancer, and more men than women die from the disease. For both women and men, the single most important risk factor is smoking. Despite the narrowing of the gap between men and women in tobacco use in recent years, the figures for lung cancer mortality still show higher rates for men than women due to the time-lag between exposure to smoking and the development of cancer. However, as the gap in tobacco use continues to narrow, the male: female difference in lung cancer mortality is also expected to decrease further over time. Some research has suggested women may suffer a greater risk of developing lung cancer than men for the same degree of exposure to the various risk factors; however, these findings have yet to be confirmed (WHO, 2004).

Gender-linked factors can be divided into those that affect exposure to risk factors and those that affect access to treatment. In the case of lung cancer the most significant risk factor is smoking, and one of the most pressing research questions, in terms of primary prevention, is how do the determinants of smoking differ between girls and boys, and between women and men Other avenues of investigation are concerned with

differences in smoking behavior between males and females, and how these might play a role in determining lung cancer risk. Worldwide, there are more male than female current smokers. About 47% of all men and 11% of all women smoke, with men accounting for four-fifths of all smokers. Presents data on smoking prevalence in selected countries for which data are available and illustrates the wide variation that exits in the ratio of male: female smokers. In India, for example, there are 12 times as many men smokers as women smokers, but in Norway and Sweden the numbers are fairly even. The globally-averaged ratio of male: female smokers is estimated to be 4.3:1 (WHO, 2004).

The possibility that women are more susceptible than men to developing lung cancer after exposure to similar amounts of cigarette smoke has generated substantial controversy. A recent meta-analysis did not resolve this debate, although there were apparent differences in the relative risk estimates for men and women, the author noted that virtually all of the data came from case–control studies and that the one prospective study in the meta-analysis did not fit the pattern of a greater risk for women. Have also cited prospective mortality data from the American Cancer Society (ACS) cohorts that contradict the proposition that women are at higher risk of lung cancer than men. Despite the controversy, the belief that the sexes differ in susceptibility to lung cancer caused by smoking has been cited as the hypothesis motivating mechanistic studies and continues to be publicized in the lay press. The strongest test of the hypothesis lies with direct measurement and contrast of sex-specific rates (preferably incidence rates of lung cancer at comparable levels of smoking exposure. This approach avoids the vagaries introduced by indirect comparison of sex-specific relative measures that may be influenced by differences in baseline rates, control selection, and recall (Chris *etal.*, 2004).

Conclusion

Lung cancer is prevalent worldwide, and with high mortality. Smoking is the main risk factor. Prevention by avoiding risk factors, smoking and air pollution. Early detection has better outcomes. A disease of lung cancer is one of the most fatal forms of cancer around worldwide, lung cancer growth very rapid rate compared with other cancers. Healthy lifestyle behaviors for cancer risk reduction include a healthy diet, weight management, regular exercise, reduction in alcohol consumption and smoking cessation lifestyle could modify cancer risk factors.

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