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Lung Cancer Detection and Diagnosis in Babylon Governorate by Gender and Age Group

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Abstract

Lung cancer is one of the global health problems that has a high incidence and mortality rate. Particularly, it is one cancer that comes under strong effect of age, sex and lifestyle. This study included lung cancer as Babylon Governorate in terms of age groups and sex of the study, and the most important risk factors and methods of diagnosis are seen. Abstract This study has cross sectional design, this study was done in some of the hospitals of Babylon Governorate. Results: The results of the present study showed that the study population consisted of 160 lung cancer patients (120 males, 40 females) with mean age of 62.3 years. The risk factors and clinical symptoms were examined after stratifying the cases according to age and sex. The results showed that the rate of lung cancer was higher in males than females and significantly increased with increasing age. Smoking was the most common risk factor followed by being around chemicals at work and pollution in the environment. The main symptoms found were persistent cough and respiratory problems and chest pain, which resulted in late-stage medical consultations. Diagnosis was accomplished using a combination of methods ranging from chest radiography to computed tomography (CT) imaging to tissue biopsies. The results of the study highlight the importance of detecting lung cancer early, especially among older people and smokers, due to the significant influence of this on the efficacy of the therapeutics and the reduction of adverse effects. Furthermore, the research calls for the improvement of health education programs and the adoption of wider screening programs to help reduce the impact of this disease on society.

Keywords: lung cancer, Detection, Babylon Governate, Age group

Introduction

Lung cancer is a serious health problem across the globe and one of the leading causes of cancer death. Age, gender,

lifestyle, exposure to the environment are just a few of the things which affect how it grows. Studying its distribution among local populations is fundamental to the design of effective prevention measures and early detection, which is fundamental to improving treatment outcomes and reducing complications associated with advanced stages of the disease.

Differences in incidence in genders and age groups give important information on populations at higher risk. Some leading risk factors are tobacco smoking, occupational exposure to chemicals, environment pollution, and genetics. Studying these factors in the regional context of the Babylon Governorate helps to identify vulnerable groups and helps with the implementation of targeted interventions on the reduction of diseases. Accurate diagnosis is basic to timely treatment and management. Imaging techniques like chest radiography and computed tomography (CT) scans and tissue biopsies are commonly performed to establish the presence of lung cancer and to establish the stage of the cancer. Integrating information on demographics, behavior, and environment with practices to diagnose and treat disease can increase the effectiveness of screening programs and help to identify people more accurately who are at high risk .

This study aims to discuss the occurrence of lung cancer in Babylon Governorate with regard to the difference between gender and age groups in addition to finding the most influential risk factors and evaluation of the methods used in diagnosis. The results are anticipated to assist in the formulation of public health strategies, including awareness campaigns and early screening programs, aimed at reducing morbidity and mortality. By presenting a global picture of the local patterns of lung cancer, this research adds to evidence-based planning and better disease management within the community. (1)

The Natural History of Lung Cancer.

The actual natural history of lung cancer remains incompletely understood. Most current knowledge is based on the disease's course after diagnosis and the initiation of treatment. Lung cancer is often diagnosed at relatively advanced stages due to the absence of characteristic symptoms in the early stages, leading to delays in treatment intervention in many cases. This delay is a major reason for the high mortality rates associated with this type of cancer. [1],[2]

Lung cancer presents in multiple histological forms and is primarily classified into non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC), each with distinct biological and clinical characteristics. Different progression pathways have been proposed. Some small, low-grade tumors can grow relatively slowly, while high-grade tumors are characterized by aggressive, rapidly metastatic behavior and invasion of adjacent tissues and distant organs, negatively impacting survival rates even with advanced therapies. [3].

Potential indicators for predicting the course of lung cancer include histological grade, tumor stage, the presence of lymphatic or vascular invasion, and the molecular and genetic status of the cancer cells. Although traditional histological evaluation of a tumor represents an important tool in treatment planning, it is not always enough in itself to predict the precise biological behavior of a tumor. Therefore, studies in genetics, molecular biology and analysis of the carcinogenesis mechanisms have become more important for a better understanding of the development of lung cancer and also for the improvement of diagnostic and treatment strategies.

Lung cancer is divided into two basic types according to the appearance of cancer cells under a microscope, and how quickly the cancer cells grow and spread. The first one is non-small cell lung cancer (NSCLC), which is the most common accounting for about 80-85% of cases. This type is characterized by relatively slower growth compared to other types and includes several subtypes such as adenocarcinoma, squamous cell carcinoma, and large cell carcinoma. The second type is small cell lung cancer (SCLC), which is characterized by rapid growth and early spread to lymph nodes and distant organs, and is strongly associated with smoking. Differentiating between these two types is very important because it directly affects the choice of treatment plan, the prognosis, and the response to treatment. [4], [5]

1. Non-small cell lung cancer (NSCLC): This represents the largest percentage of cases. It grows relatively slowly and includes several subtypes that differ in their histological characteristics. (6)
2. Small cells lung cancer (SCLC): This is an aggressive, rapidly spreading type, often associated with smoking. It is characterized by rapid growth and a relatively low initial response to chemotherapy.
3. Adenocarcinoma: A common subtype, it begins in mucus-producing cells and is common in both smokers and non-smokers. [7].
4. Squamous cell carcinoma: This is directly associated with smoking and usually originates in the central airways of the lung. [6]
5. Large cell carcinoma: This is a less common type, characterized by large, undifferentiated cells. It grows rapidly and may spread early. [8]

Symptoms of lung cancer

The most important symptoms of lung cancer include:

A chronic or worsening cough is one of the most common symptoms. A significant number of patients report a persistent cough that does not respond to standard treatment. A cough may be dry or productive (producing phlegm). If it persists in smokers or the elderly, the patient should be referred for further investigation to rule out lung cancer, especially in those with a long history of smoking. This symptom can also overlap with other conditions such as chronic respiratory infections or chronic obstructive pulmonary disease (COPD). [9],[10]

Coughing up blood (hemoptysis) is a significant symptom, ranging from small streaks of blood to substantial amounts. The amount of blood is not usually related to the stage of the disease. This symptom warrants immediate medical evaluation, especially if it recurs or is accompanied by other symptoms.

Shortness of breath and difficulty breathing may occur due to airway obstruction or fluid accumulation in the pleural cavity. [11]

Chest pain, which may worsen with coughing or deep breathing, is a common sign in relatively advanced stages.

General fatigue, weight loss, and loss of appetite without a clear cause are common symptoms associated with many types of cancer. The following symptoms and signs are associated with advanced or metastatic lung cancer

Bone pain due to tumor spread to the skeleton.

Headaches or neurological disturbances if the tumor has spread to the brain.

Hoarseness due to involvement of the recurrent laryngeal nerve. [11] [10]

Swelling of the face or upper extremities due to superior vena cava syndrome.

A persistent, severe cough with a worsening of the patient's overall condition.

Lung Cancer Stages

Determining the stage of lung cancer is crucial for selecting the appropriate treatment plan and assessing the prognosis. Lung cancer stages are based on tumor size, local spread, and extent of involvement of lymph nodes or distant organs. Early diagnosis significantly improves treatment outcomes and slows disease progression. [12] Stage I: In this stage, the tumor is confined to the lung and has not spread to nearby lymph nodes. The cancer is often small, and the chances of successful surgical or local treatments are relatively high, especially with early detection.

Stage II: In this stage, the tumor increases in size or begins to spread to nearby lymph nodes within the lung or around the bronchi. The tumor may also extend into adjacent tissues within the lung, requiring a combination of surgery and chemotherapy or radiation therapy. [13] [14]

Stage III: This stage is characterized by the spread of cancer to lymph nodes in the mediastinum or to structures adjacent to the lung, such as the chest wall or diaphragm. This stage is locally advanced and often requires a combination of chemotherapy and Stage 4: radiation therapy, with or without surgery. [15]

This is the most advanced stage, where cancer cells have spread to distant organs outside the lungs, such as the brain, bones, liver, or adrenal glands. Treatment at this stage focuses on slowing disease progression, improving the patient's quality of life, and alleviating associated symptoms. [16]

Risk Factors

Lung cancer patients face a number of risk factors that contribute to the development of the disease, the most important of which are the following

Smoking

Smoking is the leading and most influential risk factor for lung cancer in both men and women. The risk is several times higher in smokers compared to non-smokers. The severity of the risk is related to the number of cigarettes smoked, the cumulative duration of smoking, and the age at which smoking began. Exposure to secondhand smoke also increases the risk of lung cancer in non-smokers due to the inhalation of carcinogens present in tobacco smoke. [17]

Occupational and Environmental Exposures:

Occupational exposure to certain chemicals, such as asbestos, arsenic, chromium, and nickel, is a significant risk factor for lung cancer. Workers in the construction, mining, paint, rubber, and printing industries are at higher risk due to continuous exposure to these substances. Additionally, outdoor and indoor air pollution contributes to increased incidence rates, particularly in urban and industrial areas [17], [18].

Chronic Health Factors

Certain chronic lung diseases, such as chronic obstructive pulmonary disease (COPD) and pulmonary fibrosis, are associated with an increased risk of lung cancer. Chronic inflammation and ongoing cellular changes are believed to play a role in the carcinogenesis process. [19]

Prior Radiation Therapy

The risk of lung cancer is increased in individuals who have previously received radiation therapy to the chest area for other cancers, especially when this is combined with smoking. [18]

Drug and Genetic Factors: Exposure to certain medications or a genetic predisposition may increase susceptibility to lung cancer, particularly in individuals with a family history of the disease. [20]

Diagnostic Tests

Current diagnostic methods for lung cancer include a range of clinical, imaging, and laboratory tests aimed at detecting the tumor and determining its type and stage. Chest X-ray is a common first test, as it may show masses or abnormal shadows in the lung; but it is not very sensitive to the beginnings of the disease .

A computed tomography (CT) scan of the chest is the most common way to find lung cancer because it shows detailed images that show the size and location of the tumor and whether cancer has spread to the lymph nodes or the tissue around the lungs. Magnetic resonance imaging (MRI) is also used to checked how far the tumor has supper to nearby structures. It is also helpful when it is thought that the tumor has spread to the brain or spinal cord. [21] Positron Emission Tomography (PET) scans are used to look at how active cancer cells are metabolically. This test helps tell the difference between benign and malignant swellings, correctly determines the stage of the disease, and finds distant metastases. Histological analysis is essential for the conclusive diagnosis of lung cancer. This is done by taking a sample of lung tissue through a number of different methods, such as bronchoscopy, CT-guided biopsy, or surgical biopsy. You can also use cytology to look for cancer cells in sputum or pleural fluid samples. However, the sensitivity rate depends on the type and grade of the tumor.

Other tests, like pulmonary function tests and molecular analyses, help figure out how sick the patient is and what treatments are available. Generally, the diagnosis of lung cancer is based on the combination of the clinical examination, advanced imaging techniques, and histological confirmation which assists to draw up a precise treatment plan and increase the possibility of controlling the disease. [22]

Lung Cancer Staging

(Based on Tumor Type, Lymph Nodes, and Distant Metastases – TNM)

Lung cancer staging is based on the TNM system, which assesses the size of the primary tumor (T), the extent of disease spread to lymph nodes (N), and the presence of distant metastases (M). This staging helps determine the stage of the disease and select the appropriate treatment plan.

First: Primary Tumor (T)

TX: The primary tumor cannot be assessed or its size determined.

T0: No evidence of a primary tumor.

Tis: Carcinoma in situ (cancer in place)

T1: A small tumor confined within the lung that has not spread to the main bronchi or surrounding tissues.

T2: A larger tumor that has spread to the main bronchi or is causing partial lung obstruction.

T3: A tumor that invades the chest wall, diaphragm, or pericardium, or is associated with multiple tumor nodes in the same lobe. T4: Advanced tumor that invades important adjacent structures such as the heart, major blood vessels, esophagus, or vertebrae, or tumor nodes are present in another lobe of the same lung.

Second: Lymph Nodes (N)

NX: Lymph node status cannot be assessed.

N0: No lymph node spread.

N1: Tumor spread to nearby lymph nodes within the lung or around the bronchi on the same side.

N2: Spread to mediastinal lymph nodes on the same side.

N3: Spread to lymph nodes on the opposite side of the chest or to supraclavicular lymph nodes.

Third: Distant Metastasis (M)

MX: Distant metastases cannot be assessed.

M0: No distant metastases.

M1: Distant metastases to other organs such as the brain, bones, liver, or adrenal gland. [22] [23]

Lung Cancer Symptoms

Lung cancer is a serious disease that may not show symptoms in its early stages, leading to delayed diagnosis. Symptoms often begin with a persistent cough that worsens over time and may be accompanied by coughing up blood. Patients sometimes complain of chest pain that is worsened by deep breathing or coughing. They may also suffer from shortness of breath as a result of the obstruction of their airways or the buildup of fluids around their lungs. Other common symptoms include unexplained weight loss, general fatigue and hoarseness. In some advanced cases, the cancer may spread to other parts of the body, such as the bones or brain, and hence cause severe pain or persistent headaches. Therefore, early detection and regular checkups, especially for smokers, play a crucial role in reducing complications and increasing the chances of successful treatment. [24]

These symptoms include

1. A persistent cough that gradually worsens over time and may be accompanied by bloody phlegm or a change in the nature of the usual cough.
2. Shortness of breath resulting from airway obstruction or impaired lung function in gas exchange.
3. Chest pain that worsens with coughing, deep breathing, or even minimal physical exertion.
4. Significant weight loss without a clear cause, accompanied by decreased appetite and persistent fatigue and general tiredness.
5. Hoarseness or a change in voice tone due to the tumor pressing on the nerves responsible for the vocal cords.
6. Coughing up blood or recurrent lung infections that do not respond easily to conventional treatment [21].

Lung Cancer Treatment

Lung cancer treatment depends primarily on the type of tumor tissue, the stage of the disease, and the patient's overall health. Lung cancer is mainly classified into non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC), each with its own treatment strategy. Early detection is of great importance to successful treatment and improved survival rates.

In the early stages of lung cancer (NSC), when the tumor is contained in the lung and not spread to lymph nodes and other distant organs, surgery is the treatment option of choice. This may be followed by chemotherapy or radiation therapy in order to decrease the risk of recurrence. The smallest the tumor and the less advanced the disease the better the outcome of surgery[23] .

In intermediate and locally advanced stages, chemotherapy and radiation therapy are used individually or simultaneously, and they control tumor growth and their spread. One of the more common treatment regimens in these cases that is frequently used is platinum-based chemotherapy. Radiation therapy is also applied to treat local symptoms such as pain and shortness of breath. In the advanced or metastatic stage of lung cancer treatment is focused on systematic therapy (chemotherapy, targeted therapy, immunotherapy). Immunotherapy has been shown to be effective in helping some patients to survive longer by stimulating the immune system to attack cancer cells. The decision on how to treat the cancer at this point is based on the molecular characteristics of the tumor and the patient's response to therapy.

Generally, lung cancer treatment involves multidisciplinary approach with surgery, oncology, radiation therapy, supportive care and follow-up to evaluate treatment response and detect recurrence early [25].

Results

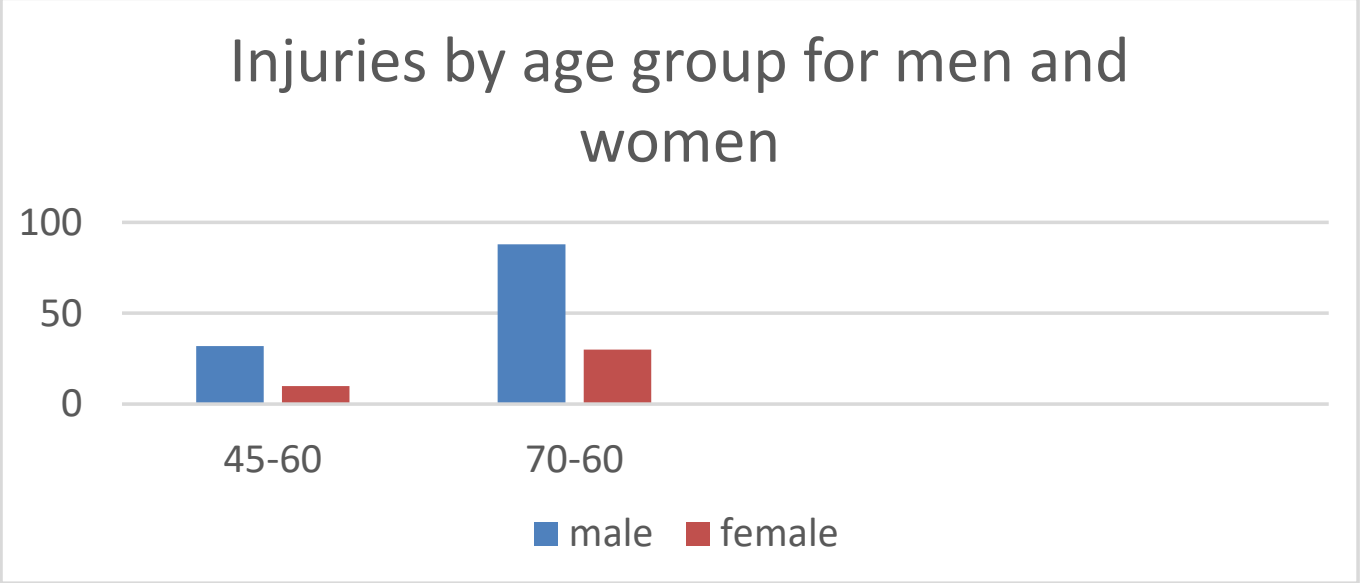
The current study consisted of the collection of data from the included patients as 160 male and female patients were selected during the year of Babylon Governorate, from the group of men and women with 120 men and 40 women and the age of men and women ranged from 45 to 70 years, during the period from the beginning of the eighth month of the year 2023 until the first month of the year 2024. The medical examinations required were performed in order to diagnose lung cancer, and the results were documented according to the age groups and gender.

Table 1: Age groups and number of injuries for men and women

Age groups	Females	males	total	No
60-45	10	32	42	1
70-60	30	88	118	2
	40	120	160	

Table 2: Infection taxes for men and women by age group.

Age groups	female%	male%	No
60-45	33.3	37.5	1
70-60	66.7	62.5	2
total	100	100	3



The results suggest that the incidence of lung cancer rises with age and is greater among men than among women, as a result of the importance of sex-linked risk factors, such as smoking and occupational exposure to carcinogens. These data underscore the need to pay attention to early screening and health education to the most vulnerable age groups.

Discussion

The calculated ratios from the present study show that in men the incidence of lung cancer was much greater than in women, in the age group 45-70 years. About 75% were men, and only 25% were women. This means that men are almost 3 times more likely to get lung cancer than women. The results are in line with earlier research, and they indicate that men have a greater chance of developing lung cancer, a tendency that is caused by a number of factors.

Smoking, which is a leading cause of the disease, contributed to an increase in the risk of lung cancer among both men and women.

The length of time and the intensity of tobacco use have a direct relationship to the level of risk. Inside the lungs, substances in tobacco smoke are to some extent broken down, causing cell harm. This damage to the cell, in turn, increases the risk of cancer.

Men are often more exposed to cancer-causing agents in their occupation and environment. These include substances such as asbestos, arsenic and polycyclic aromatic hydrocarbons (PAHs). These are commonly found in industries such as construction, rubber, paint and printing.

This is thought to increase the risk of lung cancer more in men than in women after prolonged exposure. Consequently, the combination of long-term health issues and genetic vulnerabilities, as seen in chronic obstructive pulmonary disease (COPD), along with repeated exposure to environmental toxins, increases the risk of lung cancer in men.

These observations underscore the critical importance of initiatives aimed at preventing both smoking and exposure to carcinogenic agents. Furthermore, they emphasize the necessity of early detection strategies and health education programs, particularly targeting the most susceptible demographic segments.

In light of their substantial contribution to the elevated incidence rates observed in men, the research findings necessitate the monitoring of environmental and occupational factors within the Babylon Governorate, encompassing air quality assessments, the enforcement of workplace safety protocols, and the management of exposure to hazardous substances.

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Conflict of Interest

The researcher claims that there are no financial, professional, or personal conflicts of interest that may influence the results and/or interpretation of the study. All the data presented is completely impartial and factual.

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