Tripolitana Medical Journal; 2023, Vol. 12, No. 1, pp. 1 - 5

Research Article
ISSN 2077-5628

The Epidemiology Characteristics and Trends of Lung Cancer Incidence in Tripoli, Libya

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Received 12 April 2023/ Accepted 15 June 2023

ABSTRACT

Lung cancer is one of the most common cancers in the world and a major cause of death from cancer. One of the important indicators to compare the prevalence and incidence of the disease is a change in the trend.

The aim of this study is to demonstrate the incidence, risk factors and possible causative agents of lung cancer (small cell lung cancer and non-small cell lung cancer) in adult patient who were hospitalized in medical wards of Tripoli University Hospital at Oncology department.

Hospital based records for admitted cases specifically to medical ward, which developed small or non-small cell lung cancer (as defined International Agency for Research on Cancer - World Health Organization).

Out of 248 patients admitted over year's period from 2011 to 2020 whereas 195 patients (79%) were male, 53 patients (21%) were female, and the remaining two patients were missed, the mean age was 64 years (S.D. =8.5, range 20-87). Based on pathology records 35 (14%) patients were diagnosed as having small cell lung cancer, 203 (82%) non-small cell cancer, and the remaining 10 (4%) were clinically diagnosed lung cancer patients.

In conclusion, the incidence of small cell lung cancer was significantly lower than non-small cell lung cancer.

Keywords- *Incidence; Epidemiology; Incidence; Lung Cancer, Libya*

INTRODUCTION

Lung cancer is a multistep and multifactorial disease, has a variety of histological subtypes, and is the fatal cancer worldwide. Globally, lung cancer is the most common cancer diagnosed and the highest cause of cancer-related death. The etiology of lung cancer is not yet clear, smoking and air pollution are two significant risk factors. Other risk factors, such as occupational exposure (e.g., asbestos); also play a significant role in the development of lung cancer.[1]

It was estimated that 234,030 new lung cancer cases were diagnosed in the USA, and 83,550 of cases estimated deaths in 2018. [2,3] Developing countries in the Middle East and North Africa (MENA) region and other parts of the world have witnessed a great increase in the incidence rates of this disease.[4] In Africa, lung cancer incidence was 7.3%, and the mortality rate was 5.8% of total cancer cases for both genders. The world age-standardized ratio among men and women in northern Africa was 16.9 and 3.4/100,000, respectively, in 2018.[1,5] It represents 11.6% of cancer cases that leads to death.[1]

It appreciated that 2.09 million new cases of lung cancer occurred globally in 2018, ranking first among all cancer types. In some developed countries, such as Austria and Germany, lung cancer is one of the most common cancers.[8] However, incidence of lung cancer in the United States has decreased, particularly in recent years, because of effective tobacco control and a series of health education and promotion measures.[9] Interestingly, although Africa has a high smoking prevalence, lung cancer incidence is relatively low in both genders, which may be related to low life expectancy. In terms of gender differences, lung cancer is more prevalent in men, both in worldwide and in most regions.[10]

Lung cancer is classified into small-cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC). NSCLC has four main histological types; squamous cell carcinoma (SQC), adenocarcinoma (AC), and large cell carcinoma (LCC).[6] Malignant mesothelioma is a rare tumor from the mesothelial lining of pleural space, peritoneum, pericardium, and tunica vaginalis. The malignant pleural mesothelioma (MPM) is a most common type, which representing 80%-90%.[4,5]

Different studies have reported risk factors that may increase the occurrence of lung cancer. One of the important risk factors for lung cancer is smoking. Smokers have a 20-fold increased risk of developing lung cancer than never-smokers, with 85%-90% of all subtypes of lung cancers being directly link to tobacco exposure. Smoking accounts for 80% of the worldwide lung cancer burden in males and at least 50% of the burden in females. Smoking avoidance could eliminate the disease.[10] Smoking is implicated in >30% of all cancer deaths, and >80% of

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lung cancers in the Western world are associated with smoking.[1,7] Lung cancer is also associated with asbestos exposure in 60% -70% as a causative agent.[7] Centers for Disease Control and Prevention (CDC) has identified Smoking use as the leading global cause of preventable death, killing almost 6 million people every year and causing huge economic damage worldwide. Most of these deaths occur in the low- and middle-income countries disparity expected to widen over the coming decades.[11]

According to the high mortality rate of lung cancer, the lung cancer is a main health problem especially with the bad prognosis that affects the recognition of the status and trends of lung cancer. The changes in the recent years can be helpful in planning for prevention from lung cancer, and even for predictions of supplying necessary health care in the future. In Libya, there is not enough data on lung cancers. Thus, it is critical to determine the epidemiological distribution of lung cancer in order to provide basic information for cancer etiology, prevention control and ultimately to reduce incidence and mortality, in addition to risk factors of lung cancer.

MATERIALS AND METHODS

Study design and study population:

In this study, hospital-based data for hospitalized patients diagnosed with lung cancer, and MPM was used as a retrospective medical records review during the period from January 2020 to March 2021. All cases were from University of Tripoli Hospital and were treated at the Oncology department. It included all lung cancer patients who are older than 18 years with complete medical records at the Oncology department.

Data collection and variables:

The patient data collection sheets were obtained from clinical records, which included the results of laboratory investigations and chest radiological examinations. Additionally, direct observation of the patients and consultations with the healthcare team were conducted. For each case, various variables were collected, including gender, age group, mortality, stage of lung cancer, type of cancer, and risk factors.

Statistical analysis:

Data were entered and analyzed by the Microsoft excel software version 2010. Variables are expressed as mean standard deviation, whereas frequency and percentile were used for the remaining variables unless otherwise stated. In univariate analysis each of the three pre-diagnosis aggregate scores (the NHP, functioning, and global quality of life as measured by the EORTC QLQ-C30) was used as independent variable. Differences in-continuous variables were compared using a two-tailed student's t-test after ensuring normal distribution to obtain probability P <0.05.

RESULTS

Total cases were 248 lung cancer patients registered from the University of Tripoli Hospital catchment area during the study period (Table 1). Of all patient, the number of male cases was higher than female cases, 195 patients (79%) were male, 53 (21%) were female (Figure 1). The mean age was 64 years (S.D. = 8.5, range 20-87). Based on pathology records 35 (14%) patients were diagnosed as having small cell lung cancer, 203 (82%) non-small cell cancer, and the remaining 10 (4%) were clinically diagnosed lung cancer patients (Figure 2).

Table 1: Lung cancer patient's socio-demographic and clinical characteristics (survivors and deaths).

	Recorded lung cancer cases (n=248)	Deaths (n=41)
Gender		
Male	195 (79%)	36 (88%)
Female	53 (21%)	5 (33%)
Age (years)		
Mean (S.D.)	64 (8.5)	70.0 (10.2)
Marital Status		
Married	185 (75%)	21 (51.2%)
Widowed/divorced	53 (21.4%)	15 (37%)
Single	10 (4%)	5 (12.2%)
Cell Type		
Small cell	35 (14%)	5 (12.2%)
Non-small cell	203 (82%)	28 (68.3%)
Unspecified	10 (4%)	8 (20%)
Extent of Disease		
Limited	221 (89%)	32 (78%)
Extensive	27 (11%)	9 (22%)

	Recorded lung cancer cases (n=248)	Deaths (n=41)
Initial Treatment		
Chemotherapy	47 (19%)	11 (27%)
Radiotherapy	52 (21%)	8 (20%)
Surgery	15 (6%)	0 (0%)
Best supportive care	134 (54%)	22 (54%)
Weight Loss		
Significant weight loss	142 (57.3%)	31 (76%)
Possible weight loss	23 (9.3%)	1 (2.4%)
Weight steady	56 (23%)	5 (12.2%)
No comment	27 (11%)	4 (10%)

The total number of cases with limited disease was 221 (89%), and 27 (11%) cases with extensive disease (Figure 3). There were 114 patients (46%) who had active treatment (chemotherapy, radiotherapy, surgery), while the remaining 134 (54%) received 'best supportive care. 52 (21%) patients have received radiotherapy, 47 (19%) have received chemotherapy, and few cases undergone surgery 5 (6%) (Figure 4).

The most common symptom was observed is weight loss, 143 (57.3%) of cases with significant weight loss, 23 (9.3%) of cases with possible weight loss, and 56 (23%) of cases with body weight steady (Figure 5).

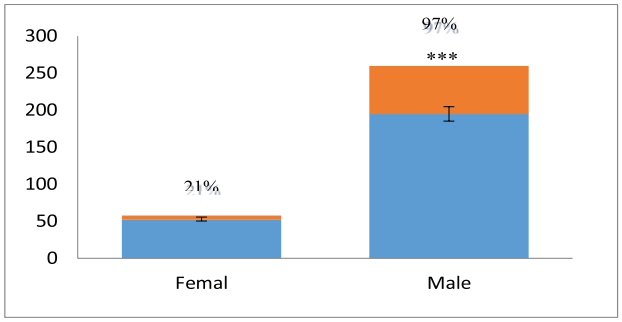

Figure 1: Shows distribution the number of cases, by gender.
*** *P*<0.05, n=248). The error bars represent the standard deviation between replicate samples.

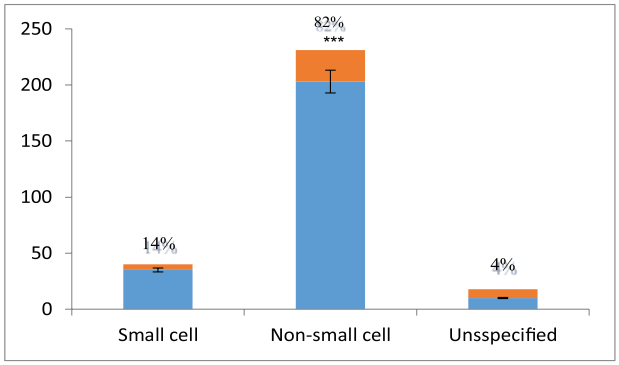

Figure 2: Shows the types of lung cancer
*** p<0.05, n=248. The error bars represent the standard deviation between replicate samples.

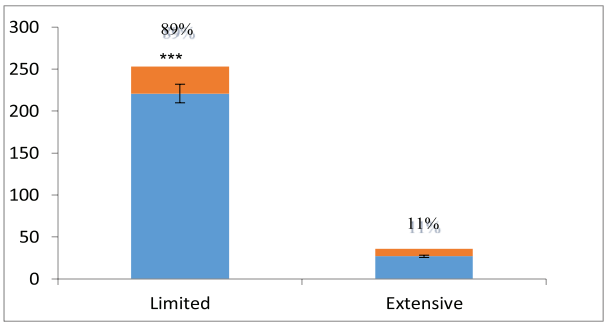

Figure 3: Shows the extent of disease
*** *P* <0.05, n=248). The error bars represent the standard deviation between replicate samples.

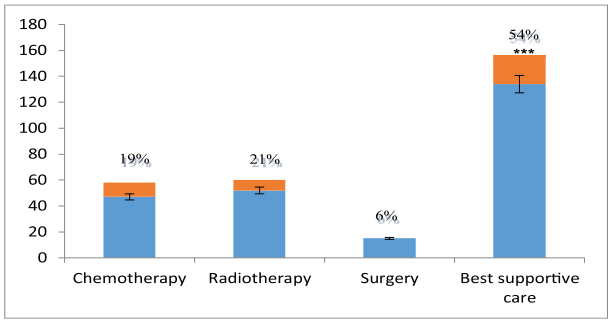

Figure 4: Shows the number of cases, and the received treatment.
*** *P*<0.05, n=248). The error bars represent the standard deviation between replicate samples.

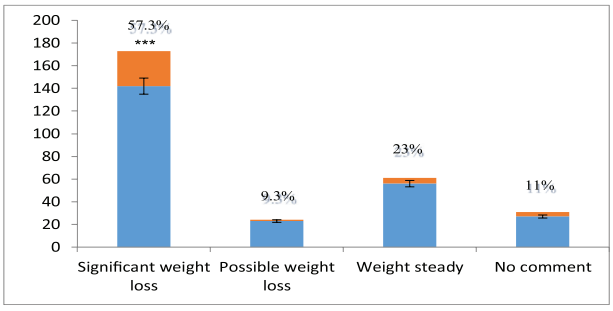

Figure 5: Shows the number of cases and the body weight loss
*** *P*<0.05, n=248). The error bars represent the standard deviation between replicate samples.

In order to allow an adjustment of known prognostic factors; age, sex, performance status, weight loss, and extent of disease, and pre-diagnosis general health status, functioning, and global quality of life scores, Cox's regression analysis was repeated. The results indicated that the pre-diagnosis global quality of life as measured by the health-related quality of life (HRQOL) questionnaires in cancer research remained a major significant predictor of length of survival (age, *P*0.04<; extent of disease 0.03<; weight loss, *P* 0.02<).

DISCUSSION

World Health Organization (WHO) in 2019 estimates that lung cancer is the first or second leading cause of death before the age of 70 years in 112 of 183 countries. Global Cancer Observatory (GLOBOCAN 2020) also believes that lung cancer is a second most commonly diagnosed cancer (11.4%).[17] For that reason, an active study focused on lung cancer, its types and causes. Different studies found that men have a higher rate of lung cancer cases and deaths than women.[1,4,8]

Relevant studies showed that at age less than 45 years, the survival rate for men is (23.6%) and for women it is (27.5). However, the age 75 years, the survival rate for men is (9.9) and for women it is (9.9), accordingly, women have a higher 5-years relative survival rate from lung cancer than men. However, the incidence of lung cancer among women has increased to more than double since the mid-1970s.[12] Epidemiologically, a study in 2020 reported that the incidence of lung cancer is higher among young females than young males. This case is widespread across geographic areas and income levels, which is not fully explained by sex differences in smoking prevalence. The study also found that lung cancer burden in women is higher than men at older ages in the decades to follow, especially in higher-income settings.[12]

Heavy smoking is a higher risk of lung cancer in women than in men, and this difference does not seem to be demonstrated by lung volume. Whereas many studies have shown mixed results, this increase has been attributed to higher vulnerability in women compared to men. According to data from the UK's Health Improvement Network, females who smoke >20 cigarettes per day had a higher risk of lung cancer than males with similar smoking histories.[13] Large prospective cohort research in the United States refuted this increased vulnerability to lung cancer by similar smoking exposure. However, different factors such as environmental exposures, hormonal variables, Genetic variations, and oncogenic viruses have all been related to increasing lung cancer rates in women.[14-16]

GlOBOCAN 2020 reported that lung cancer remains the leading cause of cancer death in both men and women.[17,18] Women have a lower mortality rate than men in the study, the decreased risk of lung cancer among Libyan females may be due to a lower smoking rate. A previous study conducted in the Eastern region of Libya has revealed that NSCLC was the most common type of lung cancer 82%, followed by SCLC 14.0%.[19] However, in United States (2013-2017). Data showed NSCLC was the dominant subtype (84.3%) followed by SCLC (12.5%) of total lung cancer cases.[18,20]

Most cases of lung cancer are asymptomatic or present with nonspecific early symptoms. The common of lung cancer patients present with locally grown or metastatic disease, and therapeutic measures are only linked to lung cancer patients who presented at an early stage. NSCLC was detected at late stages (stage III and stage IV) in the majority of cases (86.2%). Similarly, about three-quarters of SCLC patients were diagnosed with a severe form of the disease. Between 2010 and 2016, 24% were regional, 20% were localized, and just 2% were un-staged/unknown in the United States.[12,20] In the case of SCLC, 4% were localized, 20% were regional, 75% were distant, and 2% were un-staged/unknown.[12]

CONCLUSION

Lung cancer is a major public health concern in terms of primary prevention, screening, diagnosis, and treatment. It is more common among men than in women and occurs predominately in individuals aged 51 to 65 years. NSCLC is the most common type in Libya by 82%. A central national cancer registry center is critical to allow researchers to analyze and assess the present burden of cancer in Libya in order to plan the future and direct the best ways to address this serious health issue. A tobacco control campaign is a primary preventive strategy that should involve the government. More research on cancer epidemiology, therapy, and survival is needed.

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