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Lung Cancer among Young Adult Patients in National Guard Hospitals in Saudi Arabia

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ABSTRACT

Background: *Lung cancer is the leading cause of death among patients with cancer worldwide. The prevalence in Saudi Arabia is 4.1%, with an increasing trend in recent years. The increase in smoking in the population has been attributed to an increase in the incidence rate of lung cancer.* ***Aim:*** *To measure the prevalence of lung cancer among adult patients aged 18-54 in National Guard hospitals in Saudi Arabia.* ***Methods and Material:*** *Retrospective cohort study at National Guard hospitals in Saudi Arabia. The study included patients diagnosed with lung cancer between January 2016 and May 2021. The data collection sheet included the demographics (age and sex) and other information, such as diagnosis, type of lung cancer, smoking status, smoking type, and comorbidities.* ***Results:*** *This study included 140 participants. The sample comprised 59.3% men and 40.7% women. Seventy percent of the participants were between 43 and 54 years. Smokers constituted 45% of the sample, non-smokers 35.7%, while the remaining were of unknown status (19.3%); 26.4% were cigarette smokers, and 0.7% used water pipe smokers. A significant correlation was observed between the type of cancer and sex. Age was also associated with the smoking status.* ***Conclusions:*** *The number of cases of lung cancer is increasing, according to previous studies. Our data showed that most patients with lung cancer were male smokers aged >43 years. Screening programs for lung cancer can be used in this population. Screening should be encouraged in smokers of the appropriate age group for early detection of cancer and better outcomes.*

Keywords: Lung cancer, Smokers, Young adults, Saudi Arabia

INTRODUCTION

Lung cancer is the leading cause of death among all cancers worldwide, with an estimated mortality rate of 1.8 million deaths per year. Moreover, it is the second most common cancer affecting the population worldwide, with a recent estimation of 2.2 million new cases [1]. In the United States, lung cancer is the second most common cancer and the leading cause of death. With a prevalence of 4.1% in Saudi Arabia, lung cancer is more common in men than women in Saudi Arabia [2]. Recently, the incidence of lung cancer has increased. The Saudi Cancer Registry reported a 3.5% incidence in 2015 [3,4]. The highest proportion was reported among men in the eastern region, followed by the northern region, Makkah, Tabuk, and Riyadh. The median ages of men and women with lung cancer were 64 and 63.5 years, respectively [4]. The increased incidence was owing to the high prevalence of smoking, which increased by 1.5% in men and 2% in women [5]. In contrast, the proportion of lung cancer in surrounding countries, such as Oman, was 4.5% [6]. The main risk factor for lung cancer is smoking, more notably in 30-pack-year smokers, and all types of smoking were included, such as water-pipe smoking; however, there are no sufficient studies on the association of electronic cigarettes with lung cancer. Other risk factors include second-hand smoke, asbestos, radon, air pollution, human immunodeficiency virus, idiopathic pulmonary fibrosis, Chronic Obstructive Pulmonary Disease (COPD), and bronchial asthma [7-10].

Early detection of lung cancer is reportedly associated with a higher percentage of cure and a better overall prognosis.

The National Lung Cancer Screening Trial reported that screening for lung cancer using a low dose chest Computed Tomography (CT) scan reduces mortality by 20%. Therefore, the American Cancer Society established a mass lung cancer screening program for high-risk patients aged 55-75 years as part of clinical practice guidelines. However, this type of program has not been adopted as part of the practice recommendations in the population of Saudi Arabia, since lung cancer is more prevalent and associated with higher mortality than colon, prostate, and breast cancer in the US and Western populations. Furthermore, such screening programs are less likely to be cost-effective or successful in our study population. The Saudi Lung Cancer Association (SLCA) and Saudi National Cancer Centre do not recommend screening programs for lung cancer on a nationwide scale; instead, the option of intentions to screen high-risk patients lies with the physicians based on their estimation.

Nevertheless, their recommendations emphasized the importance of initiating smoking cessation programs for primary prevention, in addition to the early detection of symptomatic patients with lung cancer [11,12]. The diagnosis of lung cancer cannot be established without tissue biopsy, for which different modalities are available. The choice of the modality is dependent on the physician's assessment of the case presentation and is performed following initial clinical evaluation, proper imaging, cytological testing, and workup [13].

Lung cancer is classified into two main types: small-cell lung carcinoma and non-small cell lung carcinoma. Non-small-cell types have different subtypes, including adenocarcinoma, squamous cell carcinoma, and large-cell carcinoma. These classifications are used for the treatment choice and prognosis of the disease [14]. While lung cancer is the fifth most common cause of cancer-related death in Saudi Arabia, only 14% of lung cancers are diagnosed early [2,5]. Although, lung cancer results in the death of 85% of the patients diagnosed with it, lung cancer is highly preventable. The cure rate for cases diagnosed early in stage I may be as high as 85%; however, it drops to 1% in stage IV [12]. Alghamdi, et al. conducted a retrospective study on 404 patients with lung cancer to estimate the predictors of mortality for both lung cancer types, Small-Cell Lung Cancers (SCLCs) and Non-Small Cell Lung Cancers (NSCLC), and observed that the tumor stage was the strongest predictor of mortality for both small cell lung cancers and non-small cell lung cancers [5]. In a randomized trial study evaluating whether screening with low-dose CT could reduce mortality from lung cancer, the National Lung Screening Trial Research Team et al. found that screening using low-dose CT reduces the mortality attributed to lung cancer [15]. The primary objective is to Identify the prevalence of lung cancer among adult patients aged 18-54, Compare the gender differences in the prevalence of lung cancer, and identify the types of lung cancer among adult patients. The secondary objective is to identify the difference in smoking types in correlation to lung cancer and the correlation between bronchial asthma, and COPD to lung cancer.

SUBJECTS AND METHODS

Study Design

This retrospective cohort study included patients from January 2016 to May 2021. Data were retrieved from the hospital electronic system (BESTCARE database), which is used in all National Guard health centers in Saudi Arabia.

The study sample was estimated according to the following formula: $N = Z^2 \times \frac{P(1-p)}{d^2}$

$$N = (1.96)^2 \times 0.041 \times \frac{(1-0.041)}{(0.05)^2}$$

$$N = 61$$

N=minimum required sample size; Z=1.96 at a 95% level of significance

P=proportion of lung cancer in Saudi Arabia. It was assumed to be 4.1% D the degree of precision. It is assumed to be 5%

Data Collection and Analysis

The data collection sheet included demographic data (age and sex) and other information, such as diagnosis, type of lung cancer (small cell lung cancer or non-small cell lung cancer), smoking status, smoking type (cigarettes, shisha, electric cigarettes, or others), and comorbidities (bronchial asthma, COPD).

Inclusion Criteria

- Patients diagnosed with lung cancer from January 2016 to May 2021
- Aged 18 to 54 years old

Exclusion Criteria

- Patients with lung metastasis

The data were collected and organized in an Excel sheet and analyzed using SPSS software. Descriptive data are expressed as mean ± standard deviation for numerical variables, and frequency and percentage for categorical variables. The chi-square or t-test was used for correlation analysis according to the variables. p-values at less than or equal to 0.05 were considered statistically significant.

Study Settings

This study was conducted at the National Guard hospitals in Saudi Arabia for patients diagnosed with lung cancer.

RESULTS

The study included 140 patients diagnosed with lung cancer in the range of age 18 to 54 years and comprised 59.3% men and 40.7% women. Most patients were from the western region of Saudi Arabia (60.7%), while others were from the eastern (38.6%) and central regions (0.7%). Seventy percent of the participants were aged 43-54 years, whereas other participants were 31-42 years old (24.3%) and 18-30 years old (5.7%).

The majority of the participants in the current study had non-small cell type of lung cancer (82.1%). Other types include small cell (8.6%), carcinoid (8.6%), or unknown (0.7%) types. A total of 91.4% of participants had no comorbidities (we included bronchial asthma and COPD owing to their association with lung cancer), 6.4% had bronchial asthma, and 8.6% had COPD.

Smoking is a known risk factor for developing lung cancer; thus, the smoking status was considered in our study [16]. As described in Table 1, many participants included in the study were smokers (45%), while non-smokers comprised 35.7%, and the remaining were of unknown status (19.3%). The type of smoking practiced was also included in this study; 26.4% were cigarette smokers, one participant was a water pipe smoker (0.7%), and the remaining had an unknown type of smoking (37.1%). Smokers were further categorized based on the number of packs consumed annually. The sample was divided into five groups as follows: <10 packs per year (1.4%), 10-20 packs per year (0.7%), 20-30 packs per year (0.7%), >30 packs per year (21.4%), an unknown number of packs (37%).

Considering the correlation between lung cancer and sex, the results showed a significant correlation. The type of cancer was associated with sex (p=0.028) (Table 2). Moreover, the age of the participants showed a significant association with their smoking status; 77.8% of the participants between 43-53 years of age were found to be smokers (p=0.031) (Table 3). The relation between gender and smoking is given in Table 4.

Table 1 Participant information on the number of smokers, number of packs per year, and the smoking types

		Number	%
Smoking status	Non-Smoker	50	35.70%
	Smoker	63	45.00%
	Not known	27	19.30%
Smoking type	Cigarette	37	26.40%
	Water pipe	1	0.70%
	Non- Smoker	50	35.70%
	Not known	52	37.10%

Smoking pack-year	<10 pack-year	2	1.40%
	10-20 pack-year	1	0.70%
	21-30 pack-year	1	0.70%
	>30 pack- year	30	21.40%
	Non- Smoker	50	35.70%
	Not known	56	40.00%

Table 2 Relation between sex and type of cancer

		Sex				
		Female		Male		p-value
		Count	Row N %	Count	Row N %	
Type of lung cancer	**Non-small cell**	49	42.60%	66	57.40%	0.028
	Small cell	1	8.30%	11	91.70%	
	Carcinoid	7	58.30%	5	41.70%	
	Not known	0	0.00%	1	100.00%	

Table 3: Relation between age and smoking status

		Age						
		18–30		31-42		43-54		p-value
		Count	Row N%	Count	Row N%	Count	Row N%	
Region	Central region	4	7.40%	12	22.20%	38	70.40%	0.859
	Western region	4	4.70%	22	25.90%	59	69.40%	
	Eastern region	0	0.00%	0	0.00%	1	100.00%	
Type of lung cancer	Non- small cell	6	5.20%	29	25.20%	80	69.60%	0.584
	Small cell	0	0.00%	2	16.70%	10	83.30%	
	Carcinoi d	2	16.70%	3	25.00%	7	58.30%	
	Not known	0	0.00%	0	0.00%	1	100.00%	
Smoking status	Non- Smoker	4	8.00%	12	24.00%	34	68.00%	0.031
	Smoker	4	6.30%	10	15.90%	49	77.80%	
	Not known	0	0.00%	12	44.40%	15	55.60%	

Table 4 Relation between gender and smoking

		Gender				p-value
		Female		Male		
		Count	Row N %	Count	Row N %	
Smoking status	Non-Smoker	37	74.00%	13	26.00%	<0.001
	Smoker	4	6.30%	59	93.70%	
	Not known	16	59.30%	11	40.70%	

Smoking type	Cigarette	1	2.70%	36	97.30%	<0.001
	Water pipe	0	0.00%	1	100.00%	
	Non-Smoker	37	74.00%	13	26.00%	
	Not known	19	36.50%	33	63.50%	
Smoking pack-year	<10 pack-year	0	0.00%	2	100.00%	<0.001
	10-20 pack-year	0	0.00%	1	100.00%	
	21-30 pack-year	0	0.00%	1	100.00%	
	>30 pack-year	1	3.30%	29	96.70%	
	Non-Smoker	37	74.00%	13	26.00%	
	Not known	19	33.90%	37	66.10%	

DISCUSSION

Lung cancer is ranked as the seventh most common cancer in Saudi Arabia, with a mortality rate of 7.4%, according to a meta-analysis study conducted in 2019 [11]. Nevertheless, according to previous studies, an increasing trend in the incidence rate of cancer has been observed in Saudi Arabia over the past few years [17,18]. Althubiti and Nour Eldein revealed that the lung cancer incidence rate increased 3.5 folds in the period between 1990 and 2016 [3]. This study assessed the prevalence of lung cancer in three regions of Saudi Arabia: central, eastern, and western. According to the results of the current study, the western region had the highest number of lung cancer cases.

Upon comparison with previous literature, based on the Saudi cancer registry, the eastern region showed the highest incidence rate followed by the northern region of Saudi Arabia [4]. This could be due to the higher number of patients seen in the National Guard hospitals in the western region, including two hospitals in Jeddah and one in Medina.

The Saudi Cancer Registry has shown that women between 45 and 59 years of age are most commonly affected by cancer in general; similarities can be seen with the results of the current study in which most cases were recorded in participants of the age group between 43 and 54 years. Moreover, our study demonstrated a male predominance in the reported cases, which is following the report of the Saudi Cancer Registry that shows that lung cancer is more common among men and ranks third among the most prevalent cancers in men [4].

Smoking is a known risk factor for lung cancer [19]. Cigarette smoking is found in 23.5% of men and 17.9% of women in the United States [20]. The relative risk of lung cancer increases by 15 to 30-folds in cigarette smokers compared to non-smokers [16]. Other types of smoking, such as smoking cigars and water pipes, have shown a lower risk of lung cancer compared to that cigarette [21,22]. In the United States, lung cancer is found in one in nine smokers [23]. According to a survey conducted in 2013, the smoking rate in Saudi Arabia was 28.9% in men and 2% in females [24]. The mean age for the initiation of smoking was 19.1 years (± 6.5 years). Results of the current study showed a smoking rate of 93.7% among male patients with cancer, while female smokers comprised 6.3% of the cancer cases. Differences in the number of cases between men and women can be related to the smoking status of the participants since most of the smokers in our sample were men. Qattan, et al. demonstrated that the current smoking status is associated with sex, age, region, and marital status, with a higher prevalence in the Riyadh region [25].

Non-small cell lung cancer accounts for 85% of lung cancers, while small cell lung cancer accounts for the remaining 15%, as reported by a study conducted in the United States in 2010 [26]. The results of our study correspond to the percentage of cases found in the literature. Our study showed a significant correlation between the type of cancer and sex. Women who have never smoked are more prone to lung cancer than men with no history of smoking [27]. However, many studies have suggested that female smokers are more susceptible to carcinogens in tobacco smoke than men [28-30].

This study adds data to the epidemiology of lung cancer and its prevalence among smokers in Saudi Arabia. One of the main limitations of this study was that only patients from the National Guard Hospitals were included. This resulted in the limited sample size of this study. This also limited the inclusion of participants from other regions of the country. The association between smoking and different types of cancer is another area that can be implemented in

future studies to determine the type of smoking associated with a higher risk of cancer in each region. Moreover, only those with a mentioned smoking status in the medical records were labeled as smokers; therefore, the majority of the patients with lung cancer would include smokers.

However, it was not possible to confirm or refute the status of those with no details about smoking in their records, which might not truly reflect the reality of the situation in terms of the smoking status.

CONCLUSION

Lung cancer is the leading cause of cancer-related death worldwide. The number of cases of lung cancer is increasing, and new types of smoking are being promoted among youngsters; thus, authorities need to organize more campaigns targeting this population to increase awareness of the risks of all types of smoking. Our data demonstrated that most patients with lung cancer were male smokers aged >43 years. Screening programs for lung cancer can be used in this group of studies. Screening should be encouraged for early detection of cancer and better outcomes in smokers of the appropriate age group.

DECLARATIONS

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Consideration

All the collected data were secured and used for research purposes. The patients' demographic information was coded to ensure confidentiality. The patients' medical record numbers were used to scrutinize specific information (such as age, sex, diagnosis, type of lung cancer, smoking status, and smoking type).

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REFERENCES

[1] Sung, Hyuna, et al. "Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries." *CA: A Cancer Journal for Clinicians,* Vol. 71, No. 3, 2021, pp. 209-49.

[2] GLOBOCAN, WHO. "Cancer fact sheets lung cancer." 2012.

[3] Althubiti, Mohammad A., and Mohamed M. Nour Eldein. "Trends in the incidence and mortality of cancer in Saudi Arabia." *Saudi Medical Journal,* Vol. 39, No. 12, 2018, pp. 1259-62.

[4] Alrawaji, A., et al. "Kingdom of Saudi Arabia Saudi Health Council National Health Information Center Saudi Cancer Registry: Cancer incidence report Saudi Arabia 2015." 2018.

[5] Alghamdi, Hatim I., Ali F. Alshehri, and Ghada N. Farhat. "An overview of mortality & predictors of small-cell and non-small cell lung cancer among Saudi patients." *Journal of Epidemiology and Global Health,* Vol. 7, 2018, pp. S1-S6.

[6] Al-Lawati, Jawad A., et al. "Epidemiology of lung cancer in Oman: 20-year trends and tumor characteristics." *Oman Medical Journal,* Vol. 34, No. 5, 2019, pp. 397-403.

[7] Rahal, Zahraa, et al. "Smoking and lung cancer: A geo-regional perspective." *Frontiers in Oncology,* Vol. 7, 2017, p. 194.

[8] Bravo-Iniguez, Carlos E., et al. "Cumulative nonsmoking risk factors increase the probability of developing lung cancer." *The Journal of Thoracic and Cardiovascular Surgery,* Vol. 158, No. 4, 2019, pp. 1248-54.

[9] Latimer, Kelly, and Timothy Mott. "Lung cancer: Diagnosis, treatment principles, and screening." *American Family Physician,* Vol. 91, No. 4, 2015, pp. 250-56.

[10] Alsharairi, Naser A. "The effects of dietary supplements on asthma and lung cancer risk in smokers and non-smokers: A review of the literature." *Nutrients,* Vol. 11, No. 4, 2019, p. 725.

[11] Jazieh, Abdul Rahman, et al. "Lung cancer in Saudi Arabia." *Journal of Thoracic Oncology,* Vol. 14, No. 6, 2019, pp. 957-62.

[12] Jazieh, Abdul Rahman, et al. "Saudi lung cancer prevention and screening guidelines." *Annals of Thoracic Medicine,* Vol. 13, No. 4, 2018, pp. 198-204.

[13] Lappi-Blanco, Elisa, et al. "Good sampling in the diagnosis and prevalence of lung cancer." *Duodecim,* Vol. 132, No. 6, 2016, pp. 564-70.

[14] Collins, Lauren G., et al. "Lung cancer: Diagnosis and management." *American Family Physician,* Vol. 75, No. 1, 2007, pp. 56-63.

[15] National Lung Screening Trial Research Team. "Reduced lung-cancer mortality with low-dose computed tomographic screening." *New England Journal of Medicine,* Vol. 365, No. 5, 2011, pp. 395-409.

[16] Youlden, Danny R., Susanna M. Cramb, and Peter D. Baade. "The international epidemiology of lung cancer: Geographical distribution and secular trends." *Journal of Thoracic Oncology,* Vol. 3, No. 8, 2008, pp. 819-31. Google Scholar Crossref

[17] Bawazir, Amen, et al. "The burden of leukemia in the Kingdom of Saudi Arabia: 15 years period (1999-2013)." *BMC Cancer,* Vol. 19, No. 1, 2019, pp. 1-10.

[18] Alyabsi, Mesnad, Mohammed Algarni, and Kanan Alshammari. "Trends in colorectal cancer incidence rates in Saudi Arabia (2001-2016) using Saudi National Registry: Early-versus late-onset disease." *Frontiers in Oncology,* Vol. 11, 2021.

[19] Malhotra, Jyoti, et al. "Risk factors for lung cancer worldwide." *European Respiratory Journal,* Vol. 48, No. 3, 2016, pp. 889-902.

[20] Centers for Disease Control and Prevention (CDC). "Cigarette smoking among adults and trends in smoking cessation-United States, 2008." *MMWR. Morbidity and Mortality Weekly Report,* Vol. 58, No. 44, 2009, pp. 1227-32.

[21] Schabath, Matthew B., and Michele L. Cote. "Cancer progress and priorities: Lung cancer." *Cancer Epidemiology and Prevention Biomarkers,* Vol. 28, No. 10, 2019, pp. 1563-79.

[22] Christensen, Carol H., et al. "Association of cigarette, cigar, and pipe use with mortality risk in the US population." *JAMA Internal Medicine,* Vol. 178, No. 4, 2018, pp. 469-76.

[23] Jemal, Ahmedin, et al. "Trends in the leading causes of death in the United States, 1970-2002." *JAMA,* Vol. 294, No. 10, 2005, pp. 1255-59.

[24] Moradi-Lakeh, Maziar, et al. "Tobacco consumption in the Kingdom of Saudi Arabia, 2013: Findings from a national survey." *BMC Public Health,* Vol. 15, No. 1, 2015, pp. 1-10.

[25] Qattan, Ameerah, et al. "Socioeconomic determinants of smoking in the Kingdom of Saudi Arabia." *International Journal of Environmental Research and Public Health,* Vol. 18, No. 11, 2021, p. 5665.

[26] Cruz, Charles S. Dela, Lynn T. Tanoue, and Richard A. Matthay. "Lung cancer: Epidemiology, etiology, and prevention." *Clinics in Chest Medicine,* Vol. 32, No. 4, 2011, pp. 605-44.

[27] Pelosof, Lorraine, et al. "Proportion of never-smoker non-small cell lung cancer patients at three diverse institutions." *JNCI: Journal of the National Cancer Institute,* Vol. 109, No. 7, 2017.

[28] Brownson, Ross C., Jian C. Chang, and James R. Davis. "Gender and histologic type variations in smoking-related risk of lung cancer." *Epidemiology,* Vol. 3, No. 1, 1992, pp. 61-64.

[29] McDuffie, Helen H., David J. Klaassen, and James A. Dosman. "Female-male differences in patients with primary lung cancer." *Cancer,* Vol. 59, No. 10, 1987, pp. 1825-30.

[30] Risch, Harvey A., et al. "Are female smokers at higher risk for lung cancer than male smokers? A case-control analysis by histologic type." *American Journal of Epidemiology,* Vol. 138, No. 5, 1993, pp. 281-93.