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LUNG AND BRONCHIAL CANCER: CLINICAL-EPIDEMIOLOGICAL ANALYSIS IN THE CITY OF CASCAVEL, PARANÁ, FROM 2012 TO 2022

CÂNCER DE PULMÃO E BRÔNQUIOS: ANÁLISE CLÍNICO-EPIDEMIOLÓGICA NO MUNICÍPIO DE CASCAVEL, PARANÁ, NO PERÍODO DE 2012 A 2022

CÁNCER DE PULMÓN Y BRONQUIOS: ANÁLISIS CLÍNICO-EPIDEMIOLÓGICO EN EL MUNICIPIO DE CASCAVEL, PARANÁ, EN EL PERÍODO DE 2012 A 2022

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ABSTRACT: **Introduction:** Lung and bronchus cancers are significant public health issues worldwide, accounting for one of the leading causes of cancer mortality worldwide. **Objective:** The goal of this study is to describe the epidemiology of lung and bronchus cancer cases in the municipality of Cascavel, Paraná, from 2012 to 2022. **Methods:** This is a descriptive, quantitative, and retrospective study conducted in the municipality of Cascavel, based on data from Hospital Cancer Registries. Cases of bronchus and lung cancer (category C34 of the International Classification of Diseases - ICD 10) from the ten-year period between 2012 and 2022 were included. **Results:** The final sample comprised 1,151 patients with lung and bronchus cancer. There was a prevalence of males (61.4%), whites (70.6%), and individuals aged between 60 and 69 years (34.6%). Regarding staging, 55.8% were categorized as stage IV. A total of 501 deaths (53.1%) were recorded during the period. **Conclusion:** The data presented provide essential information for formulating public health policies and clinical practices aimed at reducing the incidence, diagnosing early, and effectively treating lung cancer.

Keywords: Lung cancer. Adenocarcinoma. Epidemiology.

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RESUMO: **Introdução:** Os cânceres de pulmão e brônquios são problemas de saúde pública de extrema relevância em todo o mundo, sendo responsáveis por uma das principais causas de mortalidade por câncer no mundo. **Objetivo:** O objetivo deste estudo é descrever a epidemiologia dos casos de câncer de pulmão e brônquios no município de Cascavel, Paraná, de 2012 a 2022. **Métodos:** Trata-se de um estudo descritivo, quantitativo e retrospectivo realizado no município de Cascavel, com base em dados dos Registros Hospitalares de Câncer. Foram incluídos casos de câncer de brônquios e pulmão (categoria C34 da Classificação Internacional de Doenças - CID 10) do período de dez anos, entre 2012 e 2022. **Resultados:** A amostra final foi composta por 1.151 pacientes com câncer de pulmão e brônquios. Houve prevalência de homens (61,4%), brancos (70,6%) e indivíduos com idade entre 60 e 69 anos (34,6%). Quanto ao estadiamento, 55,8% foram categorizados como estádio IV. Foram registrados 501 óbitos (53,1%) no período. **Conclusão:** Os dados apresentados fornecem informações essenciais para a formulação de políticas de saúde pública e práticas clínicas voltadas à redução da incidência, diagnóstico precoce e tratamento eficaz do câncer de pulmão.

Palavras-chave: Câncer de pulmão. Adenocarcinoma. Epidemiologia.

RESUMEN: **Introducción:** Los cánceres de pulmón y bronquios son problemas de salud pública de extrema relevancia en todo el mundo, siendo responsables de una de las principales causas de mortalidad por cáncer a nivel mundial. **Objetivo:** El objetivo de este estudio es describir la epidemiología de los casos de cáncer de pulmón y bronquios en el municipio de Cascavel, Paraná, entre 2012 y 2022. **Métodos:** Se trata de un estudio descriptivo, cuantitativo y retrospectivo realizado en el municipio de Cascavel, basado en datos de los Registros Hospitalarios de Cáncer. Se incluyeron casos de cáncer de bronquios y pulmón (categoría C34 de la Clasificación Internacional de Enfermedades - CIE 10) del período de diez años, entre 2012 y 2022. **Resultados:** La muestra final estuvo compuesta por 1.151 pacientes con cáncer de pulmón y bronquios. Hubo prevalencia de hombres (61,4%), blancos (70,6%) y personas con edades entre 60 y 69 años (34,6%). En cuanto a la estadificación, el 55,8% fueron categorizados en estadio IV. Se registraron 501 muertes (53,1%) en el período. **Conclusión:** Los datos presentados proporcionan información esencial para la formulación de políticas de salud pública y prácticas clínicas orientadas a la reducción de la incidencia, diagnóstico precoz y tratamiento eficaz del cáncer de pulmón.

Palabras clave: Cáncer de pulmón. Adenocarcinoma. Epidemiología.

INTRODUCTION

Lung and bronchial cancer is a significant global public health issue and a leading cause of cancer-related deaths worldwide. Lung cancer is the most common type of malignant tumor, that has been increasingly affecting people worldwide. It is estimated that 13% of all new cancer cases are lung cancer (ARAUJO et al., 2018). In Brazil, it is the cancer with the highest mortality rate, responsible for 14,715 deaths in 2000 (GOLDMAN; AUSIELLO, 2005), (ALLEMANI et al., 2015).

Studies that examine the occurrence, diagnosis, and outcomes of lung cancer have identified notable differences among various population groups. For instance, analysis using data obtained from the national inpatient sample has shown that African Americans, Asians, and Pacific Islanders have a higher likelihood of all-cause mortality compared to whites. These findings underscore the existence of racial and ethnic inequalities in the development of lung cancer (DESAI et al., 2022). Such disparities highlight the need for a broader and more equitable approach to tackling this disease, considering not only clinical factors but also social and demographic factors.

In addition to observed disparities, understanding lung cancer epidemiology is crucial for prevention, early diagnosis, and treatment strategies. Epidemiological studies have demonstrated a direct association between smoking and the development of lung cancer, with up to 90% of cases attributed to smoking (THANDRA et al., 2021). Moreover, other environmental exposures, such as air pollution, exposure to occupational carcinogens, and family history, also contribute to the development of this disease (ALBERG; GUPTA; AKONDE, 2023). This complexity of risk factors highlights the need for multifaceted, preventative approaches to reduce the incidence and impact of lung cancer.

Recent developments in the study of the connection between pre-existing lung conditions and the risk of lung cancer have highlighted new avenues for research and intervention. For instance, research suggests that there may be a link between bronchiectasis and a greater likelihood of developing lung cancer, particularly in individuals who have chronic obstructive pulmonary disease (COPD) (KIM, 2022). These findings emphasize the importance of surveillance and appropriate management of chronic lung conditions as a component of lung cancer prevention and control plans. To summarize, a comprehensive clinical-epidemiological analysis is crucial to understanding the intricacy of this disease and establishing practical measures to minimize its worldwide impact.

Considering the gap in regional epidemiological data about lung and bronchial cancer, this study aims to describe and analyze the epidemiology and incidence of this disease, over a 10-year period (2012 to 2022) in Cascavel, Paraná. The data collected will provide valuable insights for healthcare professionals, and expand understanding of the long-term consequences of smoking and other factors associated with lung cancer.

METHODS

This is a descriptive, quantitative, and retrospective study, carried out in the city of Cascavel, based on data from Hospital Cancer Records (RHC). The RHC consistently gathers information on the incidence, mortality, and quality of medical and hospital care provided to patients with cancer.

The data was collected from the Integrator Module of Hospital Cancer Records (RHC Integrator) available on the website (https://irhc.inca.gov.br). Data was accessed through the TabNet platform of the Unified Health System (DATASUS). Data included cases of bronchial and lung cancer (category C34 of the International Classification of Diseases — ICD 10) between 2012 and 2022. Both analytical and non-analytical cases were analyzed. Analytical cases, the main focus of RHC, are those who come to the hospital without a cancer diagnosis or have been diagnosed but have not received prior treatment for the disease.

The following variables were analyzed: age group, race/color, level of education, histological type, staging (TNM – Classification of Malignant Tumours), first treatment received, and disease status at the end of the first treatment received. After data collection, a descriptive analysis of the studied population was carried out using the absolute and relative frequency of the selected variables. Data were also analyzed using the chi-square test with a significance level of 0.05. The statistical program R (R Coreteam, 2015) was used for analysis.

The National Cancer Institute (Instituto Nacional de Câncer – INCA) provides a public database without patient identification, so submitting the project to the Research Ethics Committee (CEP) was unnecessary. Therefore, using this data did not involve any confidentiality or privacy issues that would require ethical review.

RESULTS AND DISCUSSION

The study included 1,151 patients who were diagnosed with lung and bronchial cancer in the municipality of Cascavel, Paraná, between 2012 and 2022. Out of these patients, 690 (59.9%) received treatment at CEONC hospital (Centro de Oncologia de Cascavel - Hospital do Câncer), while the remaining 461 patients (40.1%) were treated at UOPECCAN (União Oeste Paranaense de Estudos e Combate ao Câncer).

The sociodemographic data of patients diagnosed with lung and bronchial cancer in Cascavel, Paraná, are presented in Table 1. The data shows a higher incidence of this type of cancer in men compared to women (X-squared = 60.095, df = 1, P-value <0.0001). Regarding age

group, individuals between 60 and 69 years old were the most affected, followed by individuals between 70 and 79 years old and 50 to 59 years old (X-squared

= 898.49, df = 6, P-value < 0.0001). According to Thandra *et al.* (2021), there is a higher prevalence of lung cancer in men than in women. They also found a positive association between advanced age and the development of this disease. Additionally, this type of cancer in aged patients can be related to longer exposure to tobacco smoking, which is a main factor for lung cancer (PATEL; CHAUHAN; SHAH, 2022).

This data emphasizes the significance of detecting and diagnosing lung cancer early. Bronchoscopy has been identified as a valuable tool in this regard, with a significant diagnostic yield of 69.9% in the study conducted by Patel *et al* (2022). However, it is important to note that advanced pathological stages are frequently present at the time of lung cancer diagnosis, particularly in elderly patients, men, and smokers (DESAI et al., 2022); (PATEL; CHAUHAN; SHAH, 2022). This underscores the necessity for more effective screening and early diagnosis strategies, as emphasized by Desai *et al.* (2022), who revealed racial and gender disparities in lung cancer mortality, stressing the significance of personalized prevention and treatment approaches. In this context, our data reveal that individuals of white ethnicity accounted for over 70% of cases, followed by brown ethnicity, with 23.7% (X-squared = 2129.3, df = 4, P-value < 0.0001). Desai *et al.* (2022) brought attention to the racial disparities in lung cancer mortality in the United States. Their study showed that African Americans, Asians, and Pacific Islanders have higher mortality rates compared to whites. While these findings pertain to a specific population, they offer valuable insights into the importance of considering demographic characteristics when analyzing lung cancer incidence and mortality rates (DESAI et al., 2022).

Moreover, the relationship between demographic information and risk factors linked to lung cancer emphasizes the intricate nature of this disease and the necessity for a comprehensive approach to prevention and treatment. For instance, studies demonstrate a connection between bronchiectasis and a heightened risk of developing lung cancer, especially in patients with bronchiectasis and chronic obstructive pulmonary disease (COPD) (KIM, 2022). These discoveries underscore the importance of taking into account not only traditional risk factors such as smoking but also underlying respiratory conditions when evaluating individual risk of lung cancer. Therefore, in analyzing the demographic data of the Cascavel sample, it is crucial to incorporate an understanding of the specific risk factors and clinical

characteristics associated with lung cancer to guide personalized prevention and intervention strategies.

Finally, the data shows that people with lower levels of education had a higher prevalence of lung and bronchial cancer (Table 1). Incomplete Elementary Education had the highest rate at 34.2%, followed by Complete Elementary Education at 29.5%, and No formal education at 23.5% (X-squared = 762.09, df = 5, P-value < 0.0001). The high proportion of individuals with incomplete primary education and the significant presence of agricultural workers as the most common occupation highlight the importance of considering socioeconomic factors in the epidemiology of lung cancer. Desai *et al.* (2022) observed racial and gender disparities in lung cancer mortality, indicating the influence of social determinants of health. The correlation between low levels of education and occupations associated with environmental exposures, such as agriculture, may suggest a possible link between socioeconomic factors and risks of developing lung cancer in Cascavel.

Additionally, examining the connections between demographic information and lung cancer risk factors can offer further insights into the disease's epidemiology in the region. Studies conducted by Patel et al. (2022) and Choudhary et al. (2020) emphasize the significant role of smoking and exposure to environmental pollutants in the development of lung cancer. The high number of cases among agricultural workers may be linked to their exposure to carcinogens in the workplace, such as pesticides and dust. This underscores the importance of implementing specific occupational health interventions and primary prevention. Therefore, it is crucial to consider knowledge about lung cancer risk factors when interpreting demographic and occupational data to develop targeted prevention and intervention strategies, particularly for vulnerable populations like rural workers with lower levels of education.

Table 1 Sociodemographic data of patients diagnosed with lung and bronchial cancer in Cascavel, Paraná (2012 to 2022)

Variable	*Subvariable*	*(n)*	*(%)*	*P-value*
Gender	Male	707	61.4%	<0.0001
	Female	444	38.6%	
Age range	15 to 29	6	0.5%	<0.0001
	30 to 39	17	1.5%	
	40 to 49	69	6.0%	
	50 to 59	274	23.8%	

	60 to 69	398	34.6%	
	70 to 79	302	26.2%	
	80 years and older	85	7.4%	
Color/Race	White	813	70.6%	<0.0001
	Brown/Mixed Race	273	23.7%	
	Black	31	2.7%	
	Yellow/Asian	12	1.0%	
	Indigenous/Native American	1	0.1%	
	Not included	21	1.8%	
Education levels	No formal education	270	23.5%	<0.0001
	Incomplete Elementary Education	394	34.2%	
	Complete Elementary Education	339	29.5%	
	High School	81	7.0%	
	Incomplete Higher Education	9	0.8%	
	Completed Higher Education	25	2.2%	
	Not included	33	2.9%	

Source: INCA/RHC (Hospital Cancer Records), 2024.

Data related to lifestyle habits (i.e., smoking and alcohol consumption), as well as the history of malignancy in the family, are presented in Table 2. The statistical analysis only included patients who reported a positive or negative history. Data shows that lung and bronchial cancer were more prevalent among former smokers (39.2%) and active smokers (32.9%) than in non-smokers (15.4%) (X-squared = 120.22, df = 2, P-value < 0.0001). The data supports the findings of several studies that emphasize smoking as the primary risk factor for developing lung cancer (YURKOVA; MERABISHVILI, 2022); (MILLER; CAGLE, 2018). Additionally, the high number of former smokers underscores the importance of smoking cessation programs to lessen the impact of lung cancer. Desai *et al.* (2022) discussed this in relation to efforts to reduce differences in disease occurrence and mortality rates among various demographic groups. Regarding alcohol consumption (Table 2), individuals who consumed alcohol, including former alcoholics, had a lower incidence of lung and bronchial cancer (11.1% and 15.9%, respectively) compared to non-alcoholic (51.2%) (X-squared = 422.65, df = 2, P-value < 0.0001). However, it was observed that former drinkers had a higher incidence of cancer than active drinkers when they were compared separately (X-squared = 9.7267, df = 1, p-value = 0.001816). These findings suggest that long-term alcohol consumption

may increase the risk of developing lung and bronchial cancer.

The familiar history of cancer was also evaluated (Table 2). Although the prevalence of lung and bronchial cancer was higher in patients with a positive history (41.5%) than those with a negative history (39.4%), no statistical differences were observed (X-squared = 0.61803, df = 1, P-value = 0.4318). Thandra *et al.* (2021) showed a 1.7- fold increase in the risk of developing cancer among first-degree relatives. While our data do not demonstrate statistical variances, these findings underscore the importance of evaluating family history as part of the screening strategy and identifying individuals with a higher predisposition to developing the disease, particularly in the context of efforts to screen for lung cancer in high-risk groups (BARTA; POWELL; WISNIVESKY, 2019).

Table 2 Data on lifestyles and family cancer history of patients diagnosed with lung and bronchial cancer in Cascavel, Paraná (2012 to 2022)

Variable	*Subvariable*	*(n)*	*(%)*	*P-value*
Smoking	Smoker	379	32.9%	<0.0001
	Former smoker	451	39.2%	
	Non-smoking	177	15.4%	
	Not included	144	12.5%	
Alcoholism	Alcoholic	128	11.1%	<0.0001
	Former alcoholic	183	15.9%	
	Non-alcoholic	589	51.2%	
	Not included	251	21.8%	
Family history	Positive history	478	41.5%	0.4318
	Negative history	454	39.4%	
	Not included	219	19.0%	

Source: INCA/RHC (Hospital Cancer Records), 2024.

Regarding the specific primary location of lung and bronchial tumors (Table 3), it was noted that the most common lesions were found in the upper lobe (28.6%), followed by the lower lobe (16.4%) (X-squared = 412.18, df = 4, P-value < 0.0001). The most common histological type of lung and bronchial cancer is adenocarcinoma, accounting for over 40% of cases, followed by squamous cell carcinoma, which accounts for 28.4% of cases (X-squared = 1971.3,

df = 6, P-value < 0.0001) (Table 3).

Data analysis reveals a significant association between tumor location and the prognosis of lung adenocarcinoma (ADC). Central ADC (CT-ADC) exhibits more malignant features and shorter survival compared to peripheral ADC (PT-ADC) (WANG, C. et al., 2023). These findings emphasize the significance of considering tumor location in developing treatment strategies and predicting patient outcomes. Additionally, the surgical resection rate is critical for prognosis, as lower resection rates correlate with poorer outcomes in CT-ADC. Conversely, a high rate of surgery can substantially enhance patient survival. These findings underscore the necessity for a personalized approach in managing ADC, considering not only the clinical characteristics of the tumor but also the potential coexistence with preexisting lung conditions, such as interstitial lung disease and chronic obstructive pulmonary disease (COPD), which can negatively affect prognosis and necessitate additional care during treatment (WANG, C. et al., 2023).

Table 3 Data related to the detailed primary location and histological type of lung and bronchial cancer in Cascavel, Paraná (2012 - 2022)

Primary location	***(n)***	***(%)***	***P-value***
Superior lobe	330	28.7%	
Inferior lobe	189	16.4%	
Main bronchus	89	7.7%	
			<0.0001
Middle lobe	50	4.3%	
Superimposed lung injury	46	4.0%	
Not specified	447	38.8%	
Histological type	***(n)***	***(%)***	***P-value***
Adenocarcinoma, no specifications	502	43.6%	<0.0001
Squamous cell carcinoma	327	28.4%	
Small cell carcinoma	99	8.6%	
Carcinoma, no specifications	41	3.6%	
Undifferentiated carcinoma	37	3.2%	
Large cell carcinoma	25	2.2%	
Neuroendocrine carcinoma	24	2.1%	
Bronchioloalveolar adenocarcinoma	16	1.4%	
Anaplastic carcinoma	11	1.0%	

Source: INCA/RHC (Hospital Cancer Records), 2024.

As mentioned above, adenocarcinoma is the most prevalent histological type of lung and bronchial cancer (Table 3). These findings align with previous research that highlights adenocarcinoma as the most common type of lung cancer, particularly among smokers (CHOUDHARY et al., 2020); (PATEL; CHAUHAN; SHAH, 2022). Therefore, the rising incidence of adenocarcinoma in recent decades, especially in smokers, reflects a global trend observed in various regions (BHASKAR et al., 2018). This connection between smoking and the increased incidence of adenocarcinoma underscores the significance of tobacco control measures in preventing lung cancer.

Another relevant aspect is the correlation between the histological type of lung cancer and demographic factors, such as gender and age (ZHANG et al., 2023). The predominance of adenocarcinoma in young and middle-aged male patients underscores the complexity of the interactions among genetic, behavioral, and environmental factors in the development of lung cancer. Furthermore, the link between squamous cell carcinoma and smoking emphasizes the importance of smoking cessation efforts in reducing the global burden of lung cancer (YURKOVA; MERABISHVILI, 2022).

Data analysis showed that most patients had advanced-stage lung cancer, with stage IV being the most common (55.8%), followed by stage IIIA (21.3%) (X-squared = 2663.5, df = 8, P-value < 0.0001) (Table 4). These findings support the literature, which indicates that numerous cases of lung cancer are diagnosed at advanced stages, adversely affecting treatment options and patient survival (CHOUDHARY et al., 2020); (MILLER; CAGLE, 2018); (PATEL; CHAUHAN; SHAH, 2022). The link between advanced-stage lung cancer and late diagnosis is often attributed to the absence of specific symptoms in the early stages of the disease, highlighting the importance of awareness and screening programs for early detection (ALBERG; GUPTA; AKONDE, 2023); (THANDRA et al., 2021).

Additionally, data concerning the initial treatment received by patients can offer crucial insights into the therapeutic strategies employed in managing lung cancer. Recognizing preferred treatment options can assist in evaluating the effectiveness of available therapies and pinpointing gaps in healthcare delivery (BHASKAR et al., 2018); (WANG, Z. et al, 2019). Nevertheless, it is important to acknowledge that therapeutic choices may be shaped by various factors, such as the disease stage, the tumor's genetic profile, the patient's comorbidities, and personal preferences (WANG, C. et al., 2023). Consequently, a

multidisciplinary and personalized approach is vital to enhance clinical outcomes and the quality of life for patients with lung cancer (BARTA; POWELL; WISNIVESKY, 2019); (WANG, C. et al., 2023).

In this study, most patients received palliative chemotherapy as their initial treatment (33.1%), followed by a combination of chemotherapy and radiotherapy (24.2%) (X-squared = 583.72, df = 6, P-value < 0.0001) (Table 4). These results highlight the importance of chemotherapy as a standard treatment method for managing lung cancer, especially in the later stages of the disease. This conclusion is consistent with earlier studies that demonstrate the prevalence of advanced lung cancer at diagnosis, which often limits treatment options and negatively affects patient survival (CHOUDHARY et al., 2020); (MILLER; CAGLE, 2018); (PATEL; CHAUHAN; SHAH, 2022).

Table 4 Data related to staging and first treatment received of lung and bronchial cancer in Cascavel, Paraná (2012 - 2022).

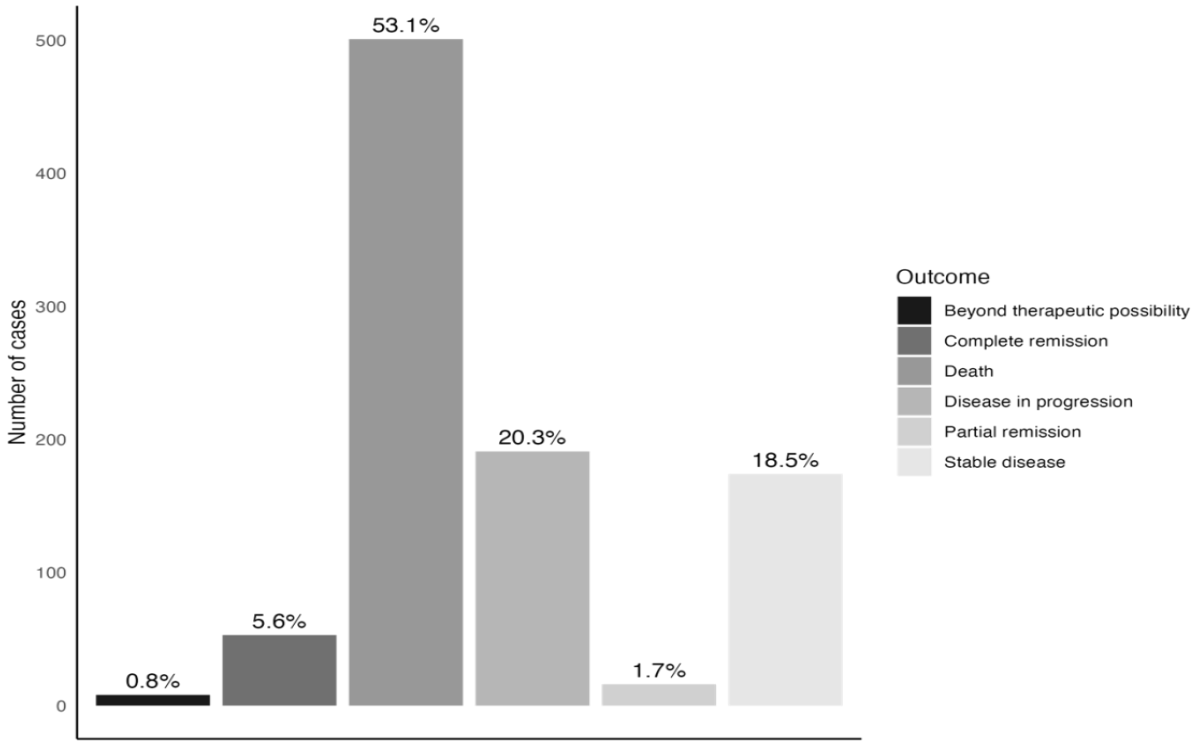
Staging	***(n)***	***(%)***	***P-value***
IA	28	2.4%	
IB	13	1.1%	
IIA	42	3.6%	
IIB	33	2.9%	
IIIA	245	21.3%	<0.0001
IIIB	104	9.0%	
IV	642	55.8%	
88	17	1.5%	
99	27	2.3%	
First treatment received	***(n)***	***(%)***	***P-value***
Palliative chemotherapy	371	33.1%	
Chemotherapy + Radiotherapy	271	24.2%	
Surgery + Chemotherapy	182	16.2%	
Surgery + Chemotherapy + Radiotherapy	124	11.1%	<0.0001
Surgery	104	9.3%	
Radiotherapy	45	4.0%	
Surgery + Radiotherapy	24	2.1%	

88: Not applicable; 99: No information

Source: INCA/RHC (Hospital Cancer Records), 2024.

Data regarding the outcome after the first treatment received is shown in Figure 1. The data reveal that 53.1% (n = 501) progressed to death, and 20.3% (n = 191) were classified as having progressive (i.e., active) disease (X-squared = 1098.7, df = 5, P-value < 0.0001). The presented data demonstrate a concerning mortality rate associated with lung cancer. This high mortality rate aligns with the existing literature, which highlights lung cancer as one of the leading causes of cancer deaths worldwide (WÉBER et al., 2023). The predominance of adenocarcinoma as the most common histological type observed in smoking patients (CHOUDHARY et al., 2020) may correlate with the increased incidence of this subtype, particularly among smokers (PATEL; CHAUHAN; SHAH, 2022). Furthermore, the association between bronchiectasis and an increased risk of developing lung cancer emphasizes the importance of considering comorbidities and preexisting lung conditions when assessing disease progression (KIM, 2022).

Figure 1 Data on disease outcomes after the first treatment in patients diagnosed with lung and bronchial cancer in Cascavel, Paraná, from 2012 to 2022.



Source: INCA/RHC (Hospital Cancer Records), 2024

CONCLUSION

This study demonstrated that patients diagnosed with lung and bronchus cancer were predominantly male, white, aged between 60 and 69 years, with incomplete elementary

education, and mostly ex-smokers. The upper lobe of the lung was the most affected region, with adenocarcinoma being the most common histological type. Most patients were classified as stage IV at the time of diagnosis and received palliative chemotherapy as their initial treatment. Mortality rates were considered high.

Given the data presented, it is evident that lung cancer is a disease with a high mortality rate, underscored by the concerning proportion of patients who progressed to death. These figures emphasize the urgent need for effective prevention, early diagnosis, and treatment strategies to enhance clinical outcomes and lessen the impact of this devastating disease. Demographic analysis showed significant associations between sex, age group, and lung cancer incidence, highlighting the importance of considering these factors when implementing screening programs and preventive interventions.

The prevalence of smoking among lung cancer patients underscores the need for integrated approaches that tackle behavioral risk factors. Analyzing treatments and clinical outcomes for lung cancer patients reveals a high occurrence of advanced stages of the disease at diagnosis, which often restricts therapeutic options and contributes to the elevated mortality rate observed. Strategies such as palliative chemotherapy and combination chemotherapy with radiotherapy have become standard in managing advanced lung cancer, highlighting the necessity of interventions that enhance treatment efficacy and improve patient quality of life.

Thus, the data presented offer crucial information for developing public health policies and clinical practices designed to lower the incidence, enable early diagnosis, and ensure effective treatment of lung cancer.

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