REFACS

Lung cancer mortality: profile and trends after the Anti-Smoking Law

Mortalidade por câncer de pulmão: perfil e tendências após a vigência da Lei Antifumo

Mortalidad por cáncer de pulmón: perfil y tendencias tras la entrada en vigor de la Ley Antitabaco

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This study aimed to describe the profile of mortality from lung, trachea and bronchial cancer in the State of São Paulo, and to design an essay on the initial effects of the Anti-Smoking Law on mortality patterns. It is a descriptive, quantitative study that included mortality from this neoplasm (C33-34) in the period between 2001-2008 and 2010-2017, extracted from the Mortality Information System. Variations in mortality before and after this Law were verified through mortality rates and mortality distributions according to: race, education and marital status. 88,887 deaths from tracheal, bronchial and lung cancer were registered in the state of São Paulo, of which 38,671 (43.51%) were before the Anti-Smoking Law and 50,216 (56.49%) were after the Law. In the years studied, there was an increase in the number/death rate, mainly in females. In the comparison before/after the Law, there was a decrease in deaths in: males, those under 50 years old, whites, singles and those with an educational level between 4-7 years. The growth of deaths in the female population reveals its recent adherence to smoking, exposing the need for public policies for its control with greater resolution potential. The importance of guaranteeing relevant legislation, as well as public policies aimed at prevention and control of smoking, especially at the most vulnerable groups, is emphasized.
Descriptors: Lung neoplasms; Mortality; Legislation.

Este estudo teve como objetivo descrever o perfil da mortalidade por câncer de pulmão, traqueia e brônquios, no Estado de São Paulo, e desenhar um ensaio sobre os efeitos iniciais da Lei Antifumo sobre os padrões de mortalidade. Estudo descritivo, quantitativo, que englobou a mortalidade por esta neoplasia (C33-34) no período entre 2001-2008 e 2010-2017, extraídos do Sistema de Informação de Mortalidade. As variações da mortalidade anterior e posterior à Lei foram verificadas por meio das taxas de mortalidade e das distribuições da mortalidade segundo: raça, escolaridade e estado civil. Foram registrados no Estado de São Paulo 88.887 óbitos por câncer de traqueia, brônquios e pulmão, sendo 38.671 (43,51%) antes da Lei Antifumo e 50.216 (56,49%) posterior a Lei. Nos anos estudados, houve crescimento no número/taxa de óbitos, principalmente no sexo feminino. Na comparação antes/após a Lei houve diminuição de mortes no: sexo masculino, menores de 50 anos, brancos, solteiros e escolaridade entre 4-7 anos. O crescimento dos óbitos na população feminina revela sua recente adesão ao tabagismo, expondo a necessidade de políticas públicas para seu controle com maior potencial resolutivo. Ressalta-se a importância de garantia de Legislação pertinente, bem como, de Políticas Públicas direcionadas a prevenção e controle do tabagismo, principalmente aos grupos de maior vulnerabilidade.
Descritores: Neoplasias pulmonares; Mortalidade; Legislação.

Este estudio tuvo como objetivo describir el perfil de mortalidad por cáncer de pulmón, tráquea y bronquios en el Estado de São Paulo y diseñar un ensayo sobre los efectos iniciales de la Ley Antitabaco acerca de los patrones de mortalidad. Se trata de un estudio descriptivo y cuantitativo que estudió la mortalidad por esta neoplasia (C33-34) en el periodo comprendido entre 2001-2008 y 2010-2017, extraído del Sistema de Información de Mortalidad. Las variaciones de la mortalidad antes y después de la Ley se verificaron mediante las tasas de mortalidad y las distribuciones de la mortalidad según la raza, la escolaridad y el estado civil. Hubo 88.887 muertes por cáncer de tráquea, bronquios y pulmones en el Estado de São Paulo, 38.671 (43,51%) antes de la Ley Antitabaco y 50.216 (56,49%) después de la Ley. En los años estudiados, se produjo un aumento del número/tasa de muertes, especialmente en las mujeres. En la comparación antes/después de la Ley hubo una disminución de las muertes en: hombres, menores de 50 años, blancos, solteros y con escolaridad entre 4-7 años. El crecimiento de las muertes en la población femenina revela su reciente adhesión al tabaquismo, exponiendo la necesidad de políticas públicas para un control con mayor potencial resolutivo. Hay que destacar la importancia de asegurar una Legislación pertinente, así como Políticas Públicas dirigidas a la prevención y control del tabaquismo, especialmente para los grupos más vulnerables.
Descriptores: Neoplasias pulmonares; Mortalidad; Legislación.

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INTRODUCTION

The contemporary lifestyle associated with new habits, urbanization and population aging are the main factors that justify the higher incidence of cancer in the world[1]. In this scenario, lung cancer occupies a prominent place, both in incidence and in mortality, so that in 2018 it was the most frequent, for both sexes (11.6% of the total of new cases) and the main cause of death by cancer (18.4%)[1].

In Brazil, the *Instituto Nacional do Câncer - INCA* (National Cancer Institute), estimates for each year of the 2020-2022 triennium, 30,200 new cases of lung cancer (17,760 in men and 12,440 in women)[2]. These values correspond to an estimated risk of 16.99 new cases for every 100 thousand men and 11.56 for every 100 thousand women[2].

In lung cancer, continued exposure to risk factors external to the body is the main cause of its incidence, with smoking being the most relevant among them. It is estimated that, by 2020, the fraction attributable to the population of the lung cancer burden related to smoking in Brazil will be 83.3% in men and 64.8% in women[3].

In addition to smoking, the smoking burden and the age at which the habit started are equally relevant to the morbidity and mortality of lung cancer, thus, individuals who started smoking earlier and who consume larger quantities of cigarettes are more at risk[4].

The elimination of smoking would be the factor with the greatest impact in reducing the incidence of lung cancer and, aiming at promoting health in the country, since the end of the 1980s, the Ministry of Health has been articulating it through INCA, a set of actions that make up the National Tobacco Control Program (PNCT)[5].

Over the years, Brazilian anti-smoking policies have been guided by higher prices and taxes; prohibition on the use of cigarettes in a private or public space; creation of Law 9,294/96 which restricted advertising, and banned smoking in aircraft and other public transport vehicles and Federal Law 12,546/2011, which prohibited the consumption of cigarettes and related items in public and private collective use[5]. This Law followed the rules already applied in some states, including the state of São Paulo (Law 13,541/2009)[6], however, with the application of heavier fines for owners of establishments that disrespect it.

As smoking is one of the main modifiable risk factors for lung cancer and Brazil is a reference in prevention and control policies for its use, it is extremely important to assess whether these government efforts are impacting on the prevalence of use, and this can be indirectly assessed through the impact on lung cancer mortality.

Given the above, this study aimed to describe the profile of mortality from lung, trachea and bronchial cancer in the state of São Paulo and to design an essay on the initial effects of the Anti-Smoking Law on mortality patterns.

METHOD

Descriptive, analytical, quantitative study that assessed mortality from tracheal, bronchial and lung cancer in the state of São Paulo, from 2001 to 2008 and 2010 to 2017, that is, seven years before and seven years after the Law was instituted Anti-smoking (May 7, 2009)[6].

The data were extracted from the Mortality Information System (MIS) made available by the data tab (TABNET) of the São Paulo State Department of Health and the data collection and processing process from September to December 2018.

Deaths whose basic cause was cancer of the trachea, bronchi and lung were selected, identified by the codes C33 (malignant neoplasm of trachea) and C34 (malignant neoplasm of bronchus and lung) of the International Statistical Classification of Diseases and Related Health Problems - 10th Revision (ICD 10).

The data were initially analyzed by the number of deaths and death rate per 100,000 inhabitants, before and after the Anti-Smoking Law. Death rates were standardized by age group and gender using the direct or fixed basis method, considering the population of Brazil

in 2010 (Census) as a reference. Simple linear regression models were estimated between rates and years (before and after the Anti-Smoking Law came into effect).

To analyze whether the proportion of deaths due to tracheal, bronchial and lung cancer before and after the Anti-Smoking Law, the differences between the variables of gender, age group, race, educational level and marital status are presented, using the chi-square test. square for grip. The analyzes were performed using the R Core Team[7] program, with a 5% significance level.

The MIS data are disclosed and made available on the TABNET, therefore, they are in the public domain and do not allow knowledge of the identity of the victims whose records are in the analyzed banks. Thus, this study was dispensed by the Research Ethics Committee of Faculdade São Leopoldo Mandic (Protocol 2019/081).

RESULTS

During the years of study, 88,887 deaths from tracheal, bronchial and lung cancer were registered in the state of São Paulo, 38,671 (43.51%) before the Anti-Smoking Law and 50,216 (56.49%) after the Law.

Both in absolute numbers and in relation to mortality rates, considering both gender and age, an increase was observed both before and after the Law (p <0.05) (Table 1).

Table 1. Number and rate of deaths (per 100,000 inhabitants) due to lung, trachea and bronchial cancer in the state of São Paulo before and after the Anti-Smoking Law came into effect. São Paulo, 2018.

Year Before the Law	Number of deaths	Rate (per 100.000)
2001	4296	11.42
2002	4396	11.51
2003	4658	12.03
2004	4711	12.01
2005	4768	11.79
2006	5070	12.35
2007	5314	12.75
2008	5448	13.28
Linear regression		
Linear coefficient	-327985.96	-464.16
Angular coefficient	166.04	0.2376
R²	0.9691	0.8523
p-value	0.0001	0.0015
After the law		
2010	5605	13.58
2011	5734	13.79
2012	5935	14.16
2013	6206	14.21
2014	6411	14.56
2015	6686	15.06
2016	6866	15.34
2017	6756	14.98
Linear regression		
Linear coefficient	-379710.69	-479.33
Angular coefficient	192.56	0.2452
R²	0.9554	0.9052
p-value	0.0002	0.0006

Source: Sistema de Informações sobre Mortalidade (SIM), 2018.

In the percentages of variation in the number of deaths in relation to the previous year and in relation to the year of the beginning of the study (2001), it is noted that only in 2017 there was a decrease in relation to the previous year, with a decrease of 1.6% in deaths. In the other years, there was an increase in mortality. In 2017, the number of deaths from lung cancer, trachea and bronchi was 57.2% higher than in 2001 (Table 2).

Table 2. Variation in the number of deaths from lung, tracheal and bronchial cancer in the state of São Paulo, in relation to the previous year and to the year 2001. São Paulo, 2018.

Year	Variation in relation to the previous year	Variation in relation to 2001
2002	2.3%	2.3%
2003	6.0%	8.4%
2004	1.1%	9.6%
2005	1.3%	11.0%
2006	6.3%	18.0%
2007	4.8%	23.6%
2008	2.5%	26.8%
2010	2.9%	30.4%
2011	2.3%	33.4%
2012	3.5%	38.1%
2013	4.5%	44.4%
2014	3.3%	49.2%
2015	4.3%	55.6%
2016	2.6%	59.7%
2017	-.,6%	57.2%

Source: Sistema de Informações sobre Mortalidade (SIM), 2018.

In the death rates according to gender and age group, for males, there was a trend of significant decrease in rates for the age groups <49 years and 60 to 69 years, before and after the Law (p <0.05) . The 50 to 59 age group, on the other hand, showed a decreasing rate after the Anti-Smoking Law came into force (p <0.05). For females, it was observed that, before the Law, there was an increase in rates in the age group <49 years (p <0.05), but after the Law, the rate was stabilized (p> 0.05). Still in females, there was a significant increase in the rate, both before and after the Law, in the range of 60 to 69 years (Table 3).

Regarding the non-standardized and standardized rates by gender and by age group, there was a significant increase in both, over the years, both before and after the Law (table 4).

Table 3. Death rate (deaths per 100,000 inhabitants) due to lung, trachea and bronchial cancer in the state of São Paulo before and after the Anti-Smoking Law was in force, depending on gender and age group. São Paulo, 2018.

Year	Male (years)					Female (years)				
	<49	50-59	60-69	70-79	≥ 80	<49	50-59	60-69	70-79	≥ 80
Before the Law										
2001	1.63	33.17	114.33	209.65	210.85	0.98	16.71	31.66	60.54	78.94
2002	1.68	37.58	107.39	206.28	247.98	1.03	15.92	33.73	55.56	81.99
2003	1.57	38.77	113.70	213.14	238.18	1.14	17.89	33.40	66.57	88.60
2004	1.62	37.39	109.30	204.42	262.13	1.20	17.66	35.78	64.99	100.18
2005	1.55	37.42	101.25	200.56	263.64	1.25	17.23	36.53	68.52	98.37
2006	1.40	39.75	99.21	215.71	287.11	1.25	22.04	37.10	71.10	108.85
2007	1.43	32.89	88.81	185.09	223.87	1.23	16.26	39.36	67.28	95.64
2008	1.50	33.93	95.71	188.27	198.19	1.31	17.71	39.74	65.06	86.52
Linear regression										
Linear coefficient	66.93	398.13	6660.34	6210.66	1694.04	-86.88	-476.77	-2268.31	-2496.99	-4208.94
Angular coefficient	-0.03	-0.18	-3.27	-3.00	-0.72	0.04	0.25	1.15	1.28	2.15
R^2	0.6577	0.0279	0.7888	0.4362	0.0036	0.8679	0.1010	0.9651	0.4127	0.2702
p-value	0.0146	0.6928	0.0032	0.0746	0.8882	0.0008	0.4431	<0.0001	0.0859	0.1867
After the Law										
2010	1.22	32.50	86.88	160.31	229.37	1.14	19.45	41.29	62.91	89.34
2011	1.28	30.77	80.95	172.78	230.22	1.22	21.76	38.71	70.73	91.71
2012	1.30	31.35	88.95	169.02	234.78	1.31	20.30	43.84	71.88	90.17
2013	1.23	29.00	78.79	176.87	234.81	1.22	21.36	40.09	67.25	93.52
2014	1.14	29.02	82.02	163.73	210.92	1.16	22.05	43.20	71.37	92.45
2015	1.17	26.97	77.13	164.00	218.04	1.13	23.07	47.49	69.76	101.33
2016	1.21	26.15	79.96	160.91	231.74	1.24	20.59	44.73	71.68	93.13
2017	1.04	23.97	73.86	151.21	216.08	1.00	19.26	46.76	68.56	94.57
Linear regression										
Linear coefficient	51.30	2328.18	3156.93	3790.35	4049.96	36.65	-22.65	-1933.08	-938.92	-1731.34
Angular coefficient	-0.02	-1.14	-1.53	-1.80	-1.90	-0.02	0.02	0.98	0.50	0.91
R^2	0.5430	0.9476	0.5742	0.3033	0.2502	0.2153	0.0016	0.6015	0.1634	0.3634
p-value	0.0370	<0.0001	0.0294	0.1572	0.2068	0.2468	0.9246	0.0237	0.3206	0.1137

Source: Sistema de Informações sobre Mortalidade (SIM), 2018.

Table 4. Death rates (deaths per 100,000 inhabitants) due to lung, trachea and bronchial cancer in the state of São Paulo before and after the Anti-Smoking Law came into effect. São Paulo, 2018.

Year	Rates (deaths by 100.00 habitantes)			
	Non-standardized	Standardized by gender	Standardized by age group	Standardized by gender and age group
Before the Law				
2001	11.42	11.39	14.57	14.50
2002	11.51	11.48	14.76	14.68
2003	12.03	12.00	15.44	15.36
2004	12.01	11.98	15.45	15.37
2005	11.79	11.76	15.22	15.14
2006	12.35	12.32	16.03	15.95
2007	12.75	12.75	14.07	14.02
2008	13.28	13.28	14.23	14.19
Linear regression				
Linear coefficient	-464.16	-472.78	117.34	108.68
Angular coefficient	0.24	0.24	-0.05	-0.05
R^2	0.8523	0.8508	0.0342	0.0299
p-value	0.0011	0.0011	0.6609	0.6824
After the Law				
2010	13.58	13.58	13.58	13.58
2011	13.79	13.79	13.79	13.79
2012	14.16	14.16	14.18	14.17
2013	14.21	14.18	13.70	13.69
2014	14.56	14.53	13.63	13.61
2015	15.06	15.03	13.69	13.67
2016	15.34	15.31	13.55	13.52
2017	14.98	14.95	12.81	12.78
Linear regression				
Linear coefficient	-479.33	-468.56	208.49	218.07
Angular coefficient	0.25	0.24	-0.10	-0.10
R^2	0.9052	0.9014	0.3871	0.4112
p-value	0.0003	0.0003	0.0995	0.0866

Source: Sistema de Informações sobre Mortalidade (SIM), 2018.

There was a significant association ($p < 0.05$) in the distribution of cases of death before and after the Law for gender, age group, race, educational level and marital status (Table 5). Before the Law came into effect, 66.7% of deaths occurred in males, after the Law this percentage was 59.4%. There was also a significant decrease ($p < 0.05$) in the proportion of deaths among people under 50 years of age, from 9.2% to 6.3% of the total. Whites also showed a decrease in the proportion of deaths, from 84.2% to 78.2% of the total ($p < 0.05$). There was a decrease in the proportion of deaths in the schooling range between 4 and 7 years, from 30.7% to 24.8% ($p < 0.05$). The proportion of deaths among singles also decreased after the Law came into effect, from 25.7% to 15.1% ($p < 0.05$).

Table 5. Frequency (%) of deaths from lung, trachea and bronchial cancer in the state of São Paulo, for the categories of variables analyzed, before the Anti-Smoking Law - 2001 to 2008 and after the Anti-Smoking Law - 2010 to 2017. Paulo, 2018.

Variable	Category	Time		p-value
		Before the Anti-Smoking Law	After the Anti-Smoking Law	
Gender	Male	25793 (66.7%)	29847(59.4%)	<0.0001
	Female	12877 (33.3%)	20369 (40.6%)	
Age	< 50 years	3552 (9.2%)	3142 (6.3%)	<0.0001
	50-60 years	7150 (18.5%)	9604 (19.1%)	
	60-70 years	11129 (28.8%)	14938 (29.8%)	
	70-80 years	11534 (29.8%)	13939 (27.8%)	
	≥ 80 years	5296 (13.7%)	8576 (17.1%)	
Race	White	31933 (84.2%)	37805 (78.2%)	<0.0001
	Black	1568 (4.1%)	2343 (4.8%)	
	Asian	706 (1.9%)	848 (1.8%)	
	Parda	3722 (9.8%)	7346 (15.2%)	
	Native	14 (0.0%)	18 (0.0%)	
Educational Level (in years)	Up to 3 years	9880 (42.0%)	16627 (42.3%)	<0.0001
	4 - 7 years	7223 (30.7%)	9745 (24.8%)	
	8 or more years	6417 (27.3%)	12905 (32.9%)	
Marital Status	Single	9673 (25.7%)	7288 (15.1%)	<0.0001
	Married/civil union	18885 (50.2%)	25801 (53.5%)	
	Widowed	6744 (17.9%)	10195 (21.1%)	
	Separated	2313 (6.1%)	4935 (10.2%)	

Source: Sistema de Informações sobre Mortalidade (SIM), 2018.

DISCUSSION

Lung cancer is responsible for one in five deaths worldwide (19.4% of all cancer deaths) and is the leading cause of cancer death in men in 87 countries and in women in 26 countries[8] and is closely linked smoking[9].

In Brazil, the prevalence of smoking is on the decline, 2006 (15.6%)[10], 2014 (10.8%)[10] and 2018 (9.3%)[11]; the impact of the Anti-Smoking Law has already been observed in acute situations, such as acute myocardial infarction and stroke[12]. Such a decline has shown evidence that the effect of these actions is beginning to translate into numbers in the graphs on the incidence of cancer and other diseases[13], however, such changes in the indicators, in the state of São Paulo, have not yet reflected in mortality, since the data in this study showed an upward trend in mortality, regardless of the implementation of the legislation.

In a study of time series aggregates, carried out in Bahia, from 1980 to 2011, there was also an increase in mortality rates for both genders, however it is noteworthy that such data were obtained before the Federal Law (2011)[14]. The increase in deaths over time can be attributed, albeit partially, to the proportional growth and aging of the population, in addition, the long latency period (approximately 30 years) between exposure to tobacco and the occurrence of death, causes the impact caused by the decline in the prevalence of smoking on mortality is delayed[15].

In the differentiation by gender, there was a significant decrease in mortality among men under 69 years old, and in the age groups of under 49 years old and 60 to 69 years old this decrease had already been noticed before the Law. Although a higher prevalence of mortality

among males, there was a significant drop in percentages, compared to the two periods studied (before and after the Law).

In a time trend study on the prevalence of smoking and cancer, conducted in Brazil and regions, it was observed that among Brazilian men, mortality from lung cancer has been decreasing since 1980 for those aged 30 to 49 years, since the end of the 1980s for those aged 50 to 59 years old and since 1995[16] for those aged 60 to 69. Data from a study carried out in Brazil, from 1996 to 2011, revealed a decreasing trend in male mortality in all regions, although still with higher rates than women, so that differences in smoking in the past impact mortality indicators, which are even more significant among men[17].

Regarding the female gender, it was observed that, before the Law, there was an increase in the rates in the age group <49 years, but the rate was stabilized after the Law; there was significant increase for the age group from 60 to 69 years regardless of Law, and there was an increase in mortality for the other age groups (comparison 2001-2017, even without statistical significance. Regarding the percentage of deaths, although even lower than in males, there was a significant increase in mortality among women.

Such data are similar to other studies. In a time series study carried out from 2000 to 2015 in 19 metropolitan regions and inland regions of 14 Brazilian states, although mortality from lung cancer was higher in men, a trend of average annual growth of mortality rates in women prevailed, observed in 20 of the 33 units evaluated[15]; in the study carried out in Brazil and regions there was also an increase in death rates among women, especially in the South and Southeast regions[17]; in Bahia during the years of study (1996-2011), there was an increase in female mortality rates for all ages, being more expressive in women over 50 years of age[14].

In turn, in a study carried out from 1979 to 2003, throughout Brazil and in the five regions, lung cancer mortality in the entire period increased by 29% among men and by 86% among women and the coefficients had statistically significant increase in both periods (1988-1995 and 1996-2003)[18]. It is noteworthy that the trend of increasing mortality for females was also reported in Ecuador, another country in South America[19]. The situation observed is a reflection of the increase in the number of women who smoke since the 1960-1970[16]; in past times, smoking was a male cultural habit.

With regard to age, the highest percentage of deaths was concentrated in the age groups over 50 years old, such data are similar to those of other studies[17,18]. In a study carried out in the city of São Paulo, there was a significant increase in mortality rates over age, especially over 50 years. Age explains 96% of lung cancer mortality in the studied period (2005-2014)[20].

The impact of mortality among older individuals is related to the physiological vulnerability inherent to age[20], with the chronic burden of the disease, and because this type of cancer is directly related to chronic exposure to tobacco, that is, the maintenance of rates high mortality in older populations is also due to past smoking experience[17].

In this study, attention is drawn to the decrease in the percentage of deaths among those under 50 years of age, especially after the Law, it is emphasized that this group is more susceptible to government intervention actions for the control of smoking[20-21].

In educational level, a higher mortality rate was observed in individuals with less years of schooling (up to 3 years). According to the Tobacco Control study in Brazil, smoking has a prevalence of 1.5 to 2 times higher among Brazilians who have little or no education, compared to those with more years of study[22]. This indicator was also confirmed in a survey carried out in the city of São Paulo with 5,155 participants with a higher prevalence among the illiterate (13.9%)[23] and in a study conducted with data from the 2008-2009 *Pesquisa de Orçamento Familiar* - POF (Family Budget Survey), which revealed that, among individuals between 18 and 30 years old who reached only elementary school, 50.9% were smokers[24].

Thus, since smoking is the main modifiable risk factor for the morbidity and mortality of this cancer, the higher mortality rate in this population is justified.

In the United States, the mortality rates for all cancers combined is 25% higher among blacks compared to whites, and for lung cancer, in Georgia, the calculation of the mortality/incidence ratio is 0.793 among blacks and 0.770 among whites (RR: 1.029)[25]. In this study, the mortality risk was not calculated, but the prevalence among the total deaths, which was higher among whites, however, an important drop in this percentage stands out after the Law was in force, which may be related to greater access opportunities guidelines in favor of smoking cessation.

A study comparing the prevalence of smokers considering two population surveys 2008 (*Pesquisa Nacional de Amostra de Domicílios* - PNAD) and 2013 (Pesquisa Nacional de Saúde - PNS) revealed that: whites (16.0% -13.0%), blacks (22.6% -17.7%), *pardos* (20.0% -16.1%). Although there is a reduction in the prevalence of smoking in the studied periods, it is still greater among blacks and browns[26].

In this study, after the Law came into force, death among singles was the one that showed the most significant fall, so that married individuals or those with a stable union were the ones with the highest percentage of deaths. This data differs from a study carried out in the United States on the impact of marital status on the survival of cancer patients, including lung cancer, where it was observed that regardless of cancer, married individuals are less likely to die from their disease and highlight the potentially significant impact that social support can have on cancer detection, treatment and survival[27].

CONCLUSION

Mortality from lung cancer in the state of São Paulo is on an increasing trend, given that it is more expressive among women. The prevalence of deaths is higher among male individuals, in the age groups above 50 years, among married people and in individuals with low education.

10 years after the enactment of the Anti-Smoking Law in the state of São Paulo and although there is a decrease in the prevalence of smoking, no changes in the lung cancer mortality indicators have yet been observed, such fact may be related to the long latency period of the disease.

Time series studies, evaluating a longer period of time after the implementation of the Anti-Smoking Law, should be encouraged in order to assess the impact on the mortality of lung cancer and other chronic conditions where smoking is the greatest modifiable risk factor.

This study has limitations because it is based on secondary data from the Mortality Information System (MIS), as problems often occur in data quality, such as deficiency in filling in some fields of the death certificate and coding, but in in the case of mortality data, it is one of the safest, universal sources, with relatively good coverage and reliability, which does not preclude the analysis of the data obtained here.

The importance of guaranteeing relevant legislation, as well as public policies aimed at the prevention and control of smoking, especially at the most vulnerable groups, is emphasized.

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