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Epidemiological profile of prostate cancer mortality and access to hospital care in Brazilian regions - an ecological study

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Abstract

Introduction: Due to the high incidence and mortality rates that cancer has, the World Health Organization (WHO) defines it as a public health problem and points out that there are approximately 10 million people affected by cancer, the estimate for the year 2020 will be 16 million of sick individuals.One of the most frequent neoplasms in the world, Prostate Cancer (CaP) (1.1 million), occupies 4th place, being behind only lung cancer (1.8 million), breast (1.7 million), and intestine (1.4 million). In the year 2012, approximately 1,112,000 new global cases of CaP were registered, with about 307,000 deaths.

Objective: To analyze the epidemiological profile of mortality from prostate cancer and the access of patients to health among Brazilian regions.

Methods: Ecological study based on secondary data from between the years 2000 and 2015. Mortality, hospitalization, and population were collected at the DATASUS. The variables were related to the epidemiological profile of CaP among Brazilian regions, stratified by the number of hospitalizations, of deaths, admission fee, mortality rate, and age group (40 to 79 years). The study looks at a time trend and gains access to health and mortality using regression models.

Results: The northern showed a greater decrease in cases from 40-59 years (β: -1,800; -0.46). Southeast, with a small reduction only between 40 and 44 years old (β: -0.345 and p: 0.665). Northeast, South, and Center-West regions did not express a drop in the hospitalization rate, with the greatest growth between 65 and 69 years old (β: 7,862; 11,346; and p> 0.05). The Midwest had the greatest increase between 55 and 59 years (β: 3,660, p: 0.098), followed by 65 to 69 years (β: 3,491, p: 0.314). Mortality rates indicated a reduction in the Southeast (β: - 0.440) and South (β: -0.361).

Conclusion: This study found an association with various environmental and economic cultures in each Brazilian region, being an important resource for the development of health services and their access to the population.

Keywords: prostate cancer, epidemiology, mortality, hospitalization.

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Authors summary

Why was this study done?
Prostate cancer is the most prevalent neoplasm in Brazilian men. Between 2018 and 2019, there were 68 thousand new cases, which could double the number of deaths by the year 20251. Brazil is a country where the inequality between regions is notorious, not only in income distribution but also in access to health, a relationship that directly affects access to the diagnosis and treatment of prostate cancer, which is one of the most serious morbidities among men, as well as one of the main causes of death, representing a serious public health problem, in this context, data stratified by age or Brazilian administrative region needs to be studied with more emphasis so that some gaps are answered.

What did the researchers do and find?
To analyze the epidemiological profile of access to health and mortality from prostate cancer among Brazilian regions during the period from 2000 to 2015, it was used in the Informatics Department of the Unified Health System (DATASUS - www.datasus.gov.br), free access system, which contains health information for states and municipalities. The results of this research show that the North region had a greater drop in the rate of hospitalizations between 2000 and 2015, and, according to the Human Development Atlas, in 2010, the region reached the HDI of 0.677. In relation to mortality rates, the main regions of the country that indicated a reduction were the Southeast and the South, which dissipated the HDI of 0.766 and 0.754 in 2010. In highlight, observing the Northeast, this was a single region that did not result in the reduction of mortality in any age group in the period studied, which had an HDI of 0.663 in 2010. This variation in the HDI between Brazilian regions explains the differences related to access to health services, as well as in the distribution of income, quality, and living conditions of Brazilians.

What do these findings mean?
With the data found, it is possible to characterize Brazilian regions based on hospitalization and mortality rates so that the health service reaches this population according to their needs. In addition, it is of fundamental importance to increase public health policies aimed at the most vulnerable regions, increase investment in primary care, ease of access, diagnosis, and early treatment. This will reduce social differences and consequently reduce disparities in prostate cancer mortality in Brazil.

INTRODUCTION

Due to the high incidence and mortality rates that cancer has, the World Health Organization (WHO) defines it as a public health problem and points out that there are approximately 10 million people affected by cancer, the estimate for the year 2020 will be 16 million of sick individuals[1-3].

One of the most frequent neoplasms in the world, Prostate Cancer (CaP) (1.1 million), occupies 4th place, being behind only lung cancer (1.8 million), breast (1.7 million), and intestine (1.4 million). In the year 2012, approximately 1,112,000 new global cases of CaP were registered, with about 307,000 deaths[4,5].

According to the National Institute of Cancer (INCA), between the years 2018 and 2019, the CaP is the most prevalent neoplasm in Brazilian men, with 68000 new cases. Even Brazil being the holder of the lowest mortality rate per CaP among Latin American countries, the tendency of this rate is to increase, doubling the number of deaths by the year 2025[1,4,5].

The estimated risk of CaP in the year 2005 was 51 new cases in every 100,000 men, being the most frequent type of cancer in all Brazilian regions (North: 20/100000; Northeast: 34/100000; Midwest: 46/100000; Southeast: 63/100000 and South: 69/100000). These neoplasms have a morbimortality profile that has been oscillating during all these years; however, the average survival rate for developing countries (41%) is still below the world rate (58%)[6].

Thus, it is notorious inequality between the regions of Brazil, not only in income distribution but also in access to health. This relationship directly affects the access to the diagnosis and treatment of prostate cancer, which is one of the most incidents of morbidities among men, as well as one of the main causes of death, representing a serious public health problem. In this context, data stratified by age and by Brazilian administrative region need to be studied with more emphasis to be answered some gaps.

Therefore, the study presented here becomes relevant to the point of tracing the profile of CaP in Brazil, a country that holds a high rate of social vulnerability and profound regional differences, analyzing the epidemiological profile of access to health and mortality by Prostate cancer among Brazilian regions.

METHODS

Study Design

Ecological population-based study, which had as study population Brazilian males diagnosed with prostate cancer among those from 2000 to 2015 years, stratified by the administrative regions. The Temporal tendency of prostate cancer was addressed.

Although some divergences, having a family history of the disease generally indicated that the screening must start at 45 years of age; with no cases in the family, it must start at 55 years of age[7]. However, in recent years, CaP has had a higher incidence in younger men, and from that, this study addressed the age groups from 40 years of age and brought more updated information from these new cases.

Study Population and Eligibility Criteria

In the present research were used the variables related to the epidemiological profile of prostate cancer among the regions, listed below:

1. Number of hospital admissions;
2. Number of deaths;
3. Hospital Admissions rate;
4. Mortality rate;
5. Age group (40 to 79 years);
6. Brazilian administrative regions.

Data Collection

The data source used in this study was the

Department of Informatics of the Unified Health System (DATASUS-www.datasus.gov.br), a free access system, which contains health information related to states and municipalities[8]. The systems used are as follows:

I. Mortality Information System-SIM: where the collection of deaths from prostate cancer was done, following the steps ahead: I) vital statistics; II) Mortality 1996 to 2016, by ICD-10; III) General mortality; IV) Geographic scope. From these steps, the selected variables were: I) region; II) year (2000 to 2015); III) Category ICD-10 (C61 – Malignant neoplasm of the prostate) IV) detailed age range (from 40 to 79 years, divided into age groups of 5 in 5 years).

II. Hospital Information System – SIH: where the search for hospital admissions for prostate cancer was performed. Following the steps below: I) epidemiology and morbidities; II) hospital morbidity of the SUS (SIH/SUS); III) general, by place of residence-from 2008-General, by place of residence-from 1995 to 2007; IV) geographic scope. Selecting the variables: I) regions; II) ICD Chapter – 10 (neoplasms); III) Sex; IV) age group 2.

III. Brazilian Institute of Geography and Statistics-IBGE: data on the resident population were acquired by census projections, available on the DATASUS website: I) demographic and socioeconomic; II) resident population; III) Census (1980, 1991, 2000 and 2010), Count (1996), according to age group, gender, and home situation; IV) geographic scope.

Data Analysis

For quantitative variables, the mortality was studied (Shapiro-Wilk test) and presented in the format of mean and standard deviation.

To assess the tendency of access to health and mortality from prostate cancer in the period studied, regression models were used (regression model used $y = \beta0 + \beta1 * x$). The variables were allocated as follows I) dependent variable; II) the rates of hospitalization and mortality due to prostate cancer (dependent variables-Y) and time (independent variable-X) expressed in the study by the years 2000 to 2015.

Finally, the trend with standardized national rates was also estimated for each location and age group, with a confidence level of 95%, and the statistical program Data Analysis and Statistical Software for Professionals (Stata) version 11.0® were used.

Ethical and Legal Aspects of the Research

The research used secondary with free access data that does not expose the identity and safety of its participants. Thus, the study did not have to be registered or evaluated by the CEP/CONEP system as determinate the resolution of item I to V of art. 1 of Law 510, of April 07, 2016.

RESULTS

To obtain the objective of this study and better clarity of the data obtained, tables 1 and 2 show the characteristics of hospital admissions and deaths for CaP and linear regression of hospital admissions and mortality from prostate cancer between the years 2000 and 2015 in the male population studied.

Table 1 showed that hospital admissions in the North, Northeast, Southeast, South, and Midwest regions had higher averages between 60 and 64 years of age (mean 837.19; 5009.81; 12884.50; 6547.94; 1722.25, respectively). The lowest averages of hospital admissions were in most regions between the ages of 40 to 44 years, and only the North had the lowest mean, from 471.31 between 75 to 79 years of age. In the case of deaths, all regions had higher values between 75 and 79 years of age, and the ages of 40 to 44 years, reported the lowest average of deaths, varying from 1.38 in the Midwest region to 6.75 in the southeast region.

Table 1: Characterization of hospital admissions and prostate cancer deaths between 2000 and 2015.

Regions	Hospital Admission		Deaths	
North	Average (SD)	Minimum - Maximum	Average (SD)	Minimum - Maximum
40 - 44	501.19 (136.25)	264.00 - 751.00	1.19 (1.52)	0.00 - 5.00
45 - 49	581.88 (143.31)	279.00 - 795.00	3.25 (2.44)	0.00 - 9.00
50 - 54	657.88 (154.84)	307.00 - 875.00	7.81 (3.02)	3.00 - 13.00
55 – 59	748.63 (172.42)	370.00 - 919.00	19.63 (6.81)	12.00 - 32.00
60 - 64	837.19 (220.50)	375.00 - 1186.00	34.94 (11.21)	19.00 - 53.00
65 - 69	817.5 (205.06)	371.00 - 1106.00	57.19 (17.42)	29.00 - 97.00
70 - 74	687.25 (181.92)	312.00 - 1012.00	82.38 (29.58)	45.00 - 134.00
75 – 79	471.31 (133.50)	202.00 - 679.00	99.63 (37.34)	45.00 - 158.00
Northeast				
40 - 44	2270.88 (475.88)	1141.00 - 2743.00	4.25 (3.02)	0.00 - 9.00
45 - 49	2826.50 (714.96)	1382.00 - 3936.00	12.19 (4.40)	5.00 - 22.00
50 - 54	3513.31 (993.31)	1735.00 - 5293.00	35.00 (10.94)	22.00 - 60.00
55 – 59	4190.56 (1173.78)	2031.00 - 6028.00	82.38 (25.11)	41.00 - 123.00
60 - 64	4809.13 (1379.79)	2310.00 - 7044.00	171.13 (52.37)	95.00 - 245.00

Continuation - Table 1: Characterization of hospital admissions and prostate cancer deaths between 2000 and 2015.

Regions	Hospital Admission		Deaths	
	Average (SD)	Minimum - Maximum	Average (SD)	Minimum - Maximum
65 - 69	5009.81 (1357.58)	2398.00 - 7358.00	285.06 (83.52)	154.00 – 396.00
70 - 74	4395.00 (1067.96)	2364.00 - 6038.00	431.13 (122.50)	246.00 – 613.00
75 – 79	3309.50 (762.17)	1805.00 - 4840.00	537.44 (153.05)	258.00 – 781.00
Southeast				
40 - 44	4821.75 (629.51)	3534.00 - 5666.00	6.75 (2.52)	3.00 - 12.00
45 - 49	7070.50 (1053.60)	4836.00 - 8350.00	22.88 (4.79)	16.00 - 34.00
50 - 54	9779.81 (2244.11)	5632.00 - 12998.00	69.44 (10.61)	53.00 - 85.00
55 – 59	11840.19 (3648.10)	6083.00 - 17854.00	174.31 (17.77)	137.00 - 210.00
60 - 64	12884.50 (4079.39)	6948.00 - 20680.00	346.44 (35.88)	288.00 - 404.00
65 - 69	12579.75 (3468.08)	7159.00 - 19382.00	587.13 (37.24)	509.00 - 648.00
70 - 74	10655.00 (2639.13)	6240.00 - 15512.00	855.31 (67.68)	732.00 - 978.00
75 – 79	7693.69 (2094.86)	3949.00 - 11184.00	1055.94 (111.59)	780.00 - 1175.00
South				
40 - 44	2576.94 (321.85)	1732.00 - 2871.00	2.56 (1.59)	0.00 - 6.00
45 - 49	3744.38 (664.45)	2210.00 - 4731.00	8.63 (1.93)	5.00 - 12.00
50 - 54	5049.56 (1193.31)	2786.00 - 7118.00	23.75 (4.19)	16.00 - 32.00
55 – 59	6076.69 (1731.14)	3124.00 - 9092.00	64.56 (8.33)	47.00 - 82.00
60 - 64	6547.94 (1967.73)	3415.00 - 10372.00	130.56 (14.38)	104.00 - 153.00
65 - 69	6483.38 (1786.18)	3266.00 - 9624.00	238.13 (25.34)	194.00 - 290.00
70 - 74	5315.13 (1426.03)	2716.00 - 8136.00	356.69 (41.01)	273.00 - 418.00
75 – 79	3680.56 (1134.73)	1711.00 - 5944.00	428.75 (61.64)	324.00 - 516.00
Midwest				
40 - 44	764.69 (139.73)	421.00 - 929.00	1.38 (1.09)	0.00 - 4.00
45 - 49	1025.13 (236.55)	473.00 - 1287.00	3.31 (1.84)	1.00 - 7.00
50 - 54	1291.94 (348.23)	588.00 - 1885.00	9.81 (4.23)	2.00 - 18.00
55 – 59	1564.81 (429.83)	685.00 - 2245.00	24.94 (8.19)	8.00 - 43.00
60 - 64	1722.25 (433.86)	819.00 - 2460.00	51.69 (11.03)	35.00 - 74.00
65 - 69	1672.75 (413.33)	731.00 - 2218.00	91.06 (17.51)	65.00 - 123.00
70 - 74	1405.00 (359.87)	626.00 - 1958.00	127.75 (27.65)	91.00 - 212.00
75 – 79	971.44 (273.38)	385.00 - 1435.00	147.88 (35.97)	92.00 - 212.00

SD: Standard Deviation

Source: Sistema de Informação Hospitalar (SIH / SUS) e Sistema de Informação de Mortalidade (SIM / SUS). Dados disponibilizados pelo Departamento de Informática do Sistema Nacional de Saúde (DATASUS-www.datasus.gov.br). Ministério da Saúde. Brasil.

Table 2 presents information on the linear regression of hospital admissions, highlighting the North region, which showed a greater decrease in cases from 40 years (β:-1.800) to 59 years of age (β:-0.46), and an increase in other age groups, where the most impacting of them were between 70 and 74 years, presenting β: 2.038 and P: 0.393. Next is the Southeast, which had a small reduction only between 40 to 44 years of age presenting β:-0.345 and P: 0.665, the other ages had an elevation of this rate, the age between 65 to 69 years had a higher increase, which points to β: 8.698, with $P > 0.05$. The Northeast, South, and Midwest did not express a decrease in the hospitalization rate, with the highest growth between 65 and 69 years of age (β: 7.862; 11.346, respectively), all showed $p > 0.05$. And the Midwest showed the highest increase between 55 and 59 years of age (β: 3.660, P: 0.098), following between 65 and 69 years (β: 3.491, P: 0.314).

In the case of mortality rates, the main regions of the country that indicated reduction were Southeast and South, showing an increase only between the age groups from 40 to 49 years (southeast) and 40 to 44 years of age (south). The North of Brazil had a decrease only between the ages of 40 to 44 years (β:-0.001) and 50 to 54 years (β:-0.039), the Midwest between 60 to 64 years (β:-0.059) and 65 to 69 years (β:-0.024), and the Northeast was the only region that did not present a reduction in mortality in any of the age groups.

Table 2: Linear regression of hospital admissions and mortality due to prostate cancer between 2000 and 2015

Regions	Hospital Admission			Mortality		
North	**B**	**p***	**r2**	**B**	**p***	**r2**
40 - 44	-1.80	0.161	0.14	- 0.001	0.469	0.04
45 - 49	- 0.86	0.537	0.03	0.024	0.219	0.11
50 - 54	- 0.87	0.555	0.03	- 0.039	0.212	0.11
55 – 59	- 0.46	0.760	0.01	0.021	0.707	0.01
60 - 64	0.13	0.963	0.01	0.183	0.001	0.56
65 - 69	1.41	0.589	0.02	0.359	0.002	0.52
70 - 74	2.04	0.393	0.05	0.858	0.001	0.72
75 – 79	1.66	0.395	0.05	1.292	0.001	0.77
Northeast						
40 - 44	0.91	0.339	0.07	0.006	0.386	0.05
45 - 49	2.62	0.019	0.34	0.014	0.136	0.15
50 - 54	4.23	0.003	0.49	0.045	0.003	0.47
55 – 59	5.69	0.001	0.55	0.124	0.001	0.54
60 - 64	7.64	0.000	0.60	0.320	0.001	0.00
65 - 69	7.86	0.001	0.56	0.550	0.001	0.65
70 - 74	6.48	0.004	0.45	0.935	0.001	0.83
75 – 79	5.04	0.003	0.49	1.366	0.001	0.76
Southeast						
40 - 44	- 0.35	0.665	0.01	0.001	0.882	0.88
45 - 49	0.93	0.326	0.07	0.004	0.384	0.06
50 - 54	3.88	0.004	0.46	- 0.019	0.110	0.17
55 – 59	7.37	0.000	0.71	- 0.113	0.001	0.82
60 - 64	8.38	0.000	0.60	- 0.220	0.001	0.85
65 - 69	8.70	0.000	0.60	- 0.375	0.001	0.82
70 - 74	8.29	0.000	0.65	- 0.316	0.001	0.62
75 – 79	5.96	0.000	0.62	- 0.440	0.001	0.69
South						
40 - 44	1.08	0.283	0.08	0.005	0.420	0.05
45 - 49	3.11	0.060	0.23	- 0.009	0.235	0.10
50 - 54	6.14	0.001	0.54	- 0.039	0.037	0.28
55 – 59	9.68	0.000	0.66	- 0.085	0.002	0.50
60 - 64	10.89	0.001	0.58	- 0.248	0.001	0.65
65 - 69	11.35	0.002	0.52	- 0.361	0.001	0.63
70 - 74	11.06	0.001	0.58	- 0.320	0.008	0.41
75 – 79	9.24	0.000	0.60	- 0.337	0.015	0.35
Midwest						
40 - 44	0.13	0.892	0.01	0.004	0.675	0.01
45 - 49	1.52	0.259	0.09	0.001	0.972	0.00
50 - 54	3.01	0.084	0.20	0.041	0.180	0.12
55 – 59	3.66	0.098	0.18	0.049	0.435	0.04
60 - 64	2.21	0.505	0.03	- 0.059	0.455	0.04
65 - 69	3.49	0.314	0.07	- 0.024	0.790	0.01
70 - 74	3.22	0.328	0.07	0.041	0.747	0.01
75 – 79	2.50	0.308	0.07	0.094	0.491	0.04

β: Regression value; r2: Predictive ability; Source: Sistema de Informação Hospitalar (SIH / SUS) e Sistema de Informação de Mortalidade (SIM/SUS). Dados disponibilizados pelo Departamento de Informática do Sistema Nacional de Saúde (DATASUS-www.datasus.gov.br). Ministério da Saúde. Brasil.

DISCUSSION

This study showed an increase in the hospitalization and mortality rate among Brazilian regions, except in the North of the country, which showed a reduction in the hospitalization rate between the ages of 40 to 59 years. One of the highlights is the Southeast and South, which had an important decrease in the mortality rate at almost all ages observed, the Southeast showed a reduction from 50 years to 79 years of age, and the South from 45 years to 79 years of age, between the years, studied.

Prostate cancer is directly related to countries with higher Human Development Indices (HDI); in addition, it has a positive correlation with the socioeconomic level of the housing area, which makes it one of the most incident9. The Human Development Report 2006 showed that the HDI of Brazil went from 0.788 in 2003 to 0.792 in 2004, and in 2010 reached 0.727[10].

The findings of this research show that the Northern region had a greater decrease in the hospitalization rate between 2000 and 2015, and according to the Atlas of Human Development, in 2010, the region reached an HDI of 0.667. Regarding mortality rates, the main regions of the country that indicated a reduction was Southeast and South, which presented HDI of 0.766 and 0.754 in 2010. In the spotlight, the Northeast was observed; this was the only region that did not present a reduction in mortality in any of the age groups during the period studied, which had a 0.663 HDI in 2010[11].

This variation in HDI between Brazilian regions explains the differences related to access to health services, as well as in the distribution of income, quality, and living conditions of Brazilians[12].

The Brazilian's life expectancy has also been increasing every year, and this may be related to the decrease in the mortality rate. According to the IBGE News Agency[13], between 2000 and 2015, life expectancy for Brazilian men went from 66.0 to 71.9 years, estimating that life expectancy for the year 2020 will be about 73 years old[3].

The Northeast is the only region in Brazil with a growth in the indicators studied, presenting a higher risk of developing the CaP. Thus preventive measures require greater increments to perform the desired reduction already achieved in other regions. Until 2025, reductions in rates of deaths from prostate cancer are expected, especially in the South and Southeast. However, poorly developed regions, such as the North and Northeast, will continue to have higher values[9], which according to the Agency International Cancer Research (IARC), will double the number of deaths due to CaP in Brazil[14].

In 2013, prostate cancer, according to Oliveira[15], predominated among men living in the Midwest, North, and Southeast regions, which disagrees with the results of the present study, where it shows that the main regions were Northeast, South, and Midwest, respectively.

When analyzing the Midwest region of Brazil, it found a positive increase in mortality due to CaP. The best diagnosis of this disease is associated with the greater provision of health care and resources to establish an effective diagnosis that requires structural improvements and easy access for the population, especially in the public sector, so that diagnosis and, therefore, treatment can be performed correctly and quickly[16].

According to Law No. 12,732 of November 22, 2012, it is the right of patients with malignant neoplasia to receive all necessary treatments free of charge by the Unified Health System (SUS)[17]. They are initiating treatment within up to 60 days from diagnosis in the pathological report. However, some studies claim that most men begin treatment between one and two years after diagnosis[18].

With this, it is necessary to emphasize that this study brings important and fundamental information to characterize the Brazilian regions based on hospitalization and mortality rates so that the health service can reach this population according to their needs. In addition, it is of fundamental importance to increase public health policies focused on the most vulnerable regions, increasing investment in primary care, ease of access, diagnosis, and early treatment. This will make social differences smaller and consequently decrease disparities in prostate cancer mortality in Brazil.

CONCLUSION

Prostate cancer among Brazilian regions during the period 2000 to 2015 presented important data for epidemiology on the health of the population, differentiating according to the age of each patient and the region where he lives. Thus being possible to analyze the epidemiological profile of access to health and mortality due to CaP in the country.

This neoplasm is a serious public health problem, and with this study, it was possible to detect its association with the cultural, environmental, and economic varieties existing in each Brazilian region, important characteristics for the development of health services, and their access to the population.

Author Contributions:

SSAA Outlined and conducted all stages of the study; LVAS Contributed to the results and analyzes of the research; FLAF Conducted and guided the writing of the study.

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Conflicts of Interest:

Not applicable.

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Resumo

Introdução: Devido às altas taxas de incidência e mortalidade que o câncer apresenta, a Organização Mundial da Saúde (OMS) define-o como um problema de saúde pública e aponta que existem aproximadamente 10 milhões de pessoas afetadas pelo câncer, a estimativa para o ano de 2020 será 16 milhões de doentes. Uma das neoplasias mais frequentes do mundo, o Câncer de Próstata (CaP) (1,1 milhão) ocupa a 4ª colocação, ficando atrás apenas do câncer de pulmão (1,8 milhão), mama (1,7 milhão) e intestino (1,4 milhões). No ano de 2012, foram registrados aproximadamente 1.112.000 novos casos globais de CaP, com cerca de 307.000 óbitos.

Objetivo: Analisar o perfil epidemiológico da mortalidade por câncer de próstata e o acesso de pacientes à saúde entre as regiões brasileiras.

Método: Estudo ecológico baseado em dados secundários entre os anos de 2000 e 2015. A mortalidade, hospitalização e população foram coletadas no DATASUS. As variáveis foram relacionadas ao perfil epidemiológico, entre as regiões brasileiras, estratificadas pelo número de internações; de mortes; taxa de admissão; taxa de mortalidade e faixa etária (40 a 79 anos). O estudo analisa uma tendência temporal e obtém acesso à saúde e mortalidade usando modelos de regressão.

Resultados: O Norte apresentou uma queda maior nos casos de 40 a 59 anos (β: -1,800; -0,46). Sudeste, com pequena redução apenas entre 40 e 44 anos (β: -0,345 e p: 0,665). As regiões Nordeste, Sul e Centro-Oeste não apresentaram queda na taxa de internação, com maior crescimento entre 65 e 69 anos (β: 7.862; 11.346; e p> 0,05). O Centro-Oeste teve o maior aumento entre 55 e 59 anos (β: 3.660, p: 0,098), seguido de 65 a 69 anos (β: 3.491, p: 0,314). As taxas de mortalidade indicaram redução no Sudeste (β: - 0,440) e Sul (β: -0,361).

Conclusão: Este estudo encontrou associação com várias culturas ambientais e econômicas em cada região brasileira, sendo um recurso importante para o desenvolvimento de serviços de saúde e seu acesso à população.

Palavras-chave: câncer de próstata, epidemiologia, mortalidade, hospitalização.