



ANÁLISE EPIDEMIOLÓGICA DE NEOPLASIA DE ESTÔMAGO EM HOMENS NO BRASIL: 2008-2017

Epidemiological analysis of stomach cancer in men in Brazil: 2008-2017

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Abstract: Objective: to describe the clinical, epidemiological and sociodemographic profile of cancer patients, attended by a support institution in the north of Minas Gerais. **Methodology:** a cross-sectional, descriptive and quantitative study based on the analysis of 449 medical records of patients diagnosed with cancer attended by a support institution in the north of Minas Gerais, in the year 2015 and 2016. For the data collection, an instrument containing clinical, epidemiological and sociodemographic variables was used. Data were analyzed by descriptive statistics. **Results:** the majority of the patients were male (n=298; 66,4%), elderly (n=225; 50,1%), mean age 60.3 years, and standard deviation of 14.2, being the minimum age of 18 years and the maximum of 93 years. As for the municipality of origin, 381 (84,9%) came from small municipalities of Minas Gerais. The most prevalent neoplasia was head and neck (n=94; 20,9%). Considering sex, prostate cancer was the most frequent (n=78; 26,2%) in men, whereas in women it was breast cancer (n=35; 23,2%). The most commonly used therapy was the association of radiotherapy and chemotherapy, representing 158 people (35,2%). **Conclusion:** the characterization of the clinical, epidemiological and sociodemographic profile of cancer patients is fundamental since the changes accompany the health / disease process that varies according to the region, the individual, in equivalence to their vulnerability. Results of this research suggest new studies for not achieving association of diseases with their respective risk factors.

Keywords: Epidemiology; Neoplasms; Risk factors; Health Profile.

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Resumo: Objetivo: descrever o perfil clínico, epidemiológico e sociodemográfico dos pacientes com câncer, atendidos por uma instituição de apoio do norte de Minas Gerais. **Metodologia:** estudo transversal, descritivo e quantitativo elaborado por meio de análise de 449 prontuários de pacientes com diagnóstico de câncer, atendidos por uma instituição de apoio do norte de Minas, do ano de 2015 e 2016. Para o levantamento dos dados utilizou-se um instrumento contendo variáveis clínicas, epidemiológicas e sociodemográficas. Os dados foram analisados por estatística descritiva. **Resultados:** a maioria dos pacientes era do sexo masculino (n=298; 66,4%), idosos (n=225; 50,1%), com média de idade, 60,3 anos e desvio-padrão de 14,2, sendo a idade mínima de 18 anos e a máxima de 93 anos. Quanto ao município de origem 381(84,9%) eram oriundos de pequenos municípios de Minas Gerais. A neoplasia mais prevalente foi o de cabeça e pescoço (n=94; 20,9%). Considerando o sexo, o câncer de próstata foi o que apresentou maior frequência (n=78; 26,2%) nos homens, já nas mulheres foi o câncer de mama (n=35; 23,2%). A terapêutica mais utilizada pelos pacientes foi associação de radioterapia e quimioterapia, representando 158 pessoas (35,2%). **Conclusão:** a caracterização do perfil clínico, epidemiológico e sociodemográfico dos pacientes oncológicos é fundamental visto que as mudanças acompanham o processo saúde/doença que varia de acordo com a região, o indivíduo, em equivalência a sua vulnerabilidade. Resultados dessa pesquisa sugerem novos estudos por não alcançar associação das doenças com seus respectivos fatores de risco.

Palavras-chave: Epidemiologia; Neoplasias; Fatores de Risco; Perfil de Saúde.

INTRODUCTION

Cancer is the appearance of a conglomerate of malignant cells which, with the passing of time, result in the emergence and development of a tumor. When the process is initiated in the gastric mucosa, the tumor arising is the gastric cancer is the fourth most frequent cancer and the second leading cause of cancer death in the world.^{1,2} In Brazil, gastric cancer is among the first three causes of cancer death in males and the third leading cause of cancer death in both genders.³ The incidence is higher among men, in a proportion of 2:1, being more frequent between 50 and 70 years, with peak at around 70 years in both sexes. Despite its incidence has decreased with the passing of the years, not only in Brazil, but in the whole world, still occupies the first placements in several countries and regions in Brazil.⁴

Among the risk factors it is important to mention smoking, infection by the bacterium *H. pylori*, low-income populations, workers in industries of coal and nickel, diet with high sodium content, consumption of foods containing nitrosamines and

benzopyrene. First degree relatives of individuals with gastric cancer have two to three times more likely to develop the disease. The identification of these risk factors and the early diagnosis presents an improvement in the prognosis of patients.⁵

Gastric cancer is a process of multiple steps that, clinically, can manifest itself as gastritis, ulcers, gastric atrophy, intestinal metaplasia, dysplasia and, finally, as a malignant neoplasm. These conditions tend to be sequential and occur over a period of many years, as a result of exposure to a variety of endogenous and exogenous factors. The main consequences of the action of these factors are the somatic mutations, as in oncogenes and tumor suppressor genes, which confer selective advantages to cell proliferation.⁶

Gastritis is the most frequent injury that affects the stomach and is defined as an inflammation of the gastric mucosa. In chronic gastritis, injuries ranging from superficial inflammatory process, until the atrophy of the epithelium, which is evidenced by the significant loss of glandular structures and is sometimes associated with intestinal metaplasia.

Approximately 10% of patients with gastric atrophy develop squamous cell carcinoma in a period of 15 years, therefore, considered pre-malignant lesion. The prognosis of gastric cancer is extremely poor, with survival rates of 5 years between 5% to 15%. This fact is a consequence of the diagnosis in most cases, to be carried out in the advanced stages and this disease shows recurrence rate close to 80.⁶

The disease evolves in most cases with characteristic symptoms such as burning pain in the epigastric region, medium to high intensity in advanced cases, associated with the postprandial vomiting, nausea, fever in some cases and weight loss. As there are no specific symptoms of stomach cancer, some signs such as loss of appetite, fatigue, bloating, persistent abdominal discomfort, in addition to the cited above, may indicate a benign disease or even a stomach tumor. Hematemesis occurs in approximately 10 to 15% of the cases of stomach cancer, moreover melena can also arise.^{4,5}

Before the epidemiological evidence demonstrating the high prevalence and incidence of stomach cancer in Brazil and by the high lethality as well as the variable prognostic, it is necessary a greater approach on the subject in search of more objectively compare the

prevalence of gastric cancer in different Brazilian regions. Such importance arises from the need to create campaigns to combat and early diagnosis in the most affected regions and to improve the reception of patients by local services. Given this scenario, it becomes important to analyze the epidemiological aspects of malignant stomach neoplasm in different regions of Brazil.

METHODOLOGY

It is a descriptive epidemiological study and quantitative type design, whose data were obtained by means of a query to the database of SIH-SUS (Hospital Information System of Sistema Único de Saúde), at the address <http://datasus.saude.gov.br/informacoes-de-saude/tabnet> provided by the Department of Information Technology of the Healthcare System (DATASUS). Data were collected from January of 2008 to December of 2017 on hospital admissions due to stomach malignant neoplasm in Brazil, related to: age, race, prevalence by macroregion, amount spent and mortality rate.

The tabulation of records of SIH/SUS for the research included the

following variables: age, sex, year of hospitalization, race, character, expenditures, deaths and mortality rate. The data were organized in spreadsheets of the software Microsoft Excel® and passed through a descriptive statistical treatment, being calculated the prevalence, mortality rate and number of hospitalizations for stomach malignant neoplasm and presented in the form of tables and graphs. For the calculations of prevalence, it was used the IBGE sense in 2010 for the male population of the respective health regions.

RESULTS

The frequency of hospitalizations due to gastric cancer, by age, in Brazil, presented a total of 139,082 hospitalizations, being considered the greatest number of hospitalizations in the period studied. 30.4% were in the age range 60 to 69 years, followed by the age range from 50 to 59 (23.7%). From 70 to 79 years there was a slight decline in the number of hospitalizations with 26.4%.

In relation to the most affected

race/ethnicity, it has been observed in a general way in Brazil and in the South and Southeast regions, a higher prevalence of malignant stomach neoplasm in whites (43.3%, 80% and 47.5%, respectively). However, in the North, Northeast and Midwest, the prevalence of the disease is higher in brown races (64.3%, 55.4% and 30.2%, respectively).

As to the number of admissions in accordance with the regime, 48.2% were in private hospitals and 24.9% in public. However, 26.9% of these data were ignored. Concerning the elective or urgency admission character, the greatest number of hospitalizations was by urgency (64.6%).

Regarding the public spending, it is seen that the private sector is responsible for most of the spending. The total amount spent in the period was 321 million reais, 51.5% of that value was originated by the private sector and 26.6% in the public sector, being that 28.7% were ignored. This pattern was not observed in the Northern region, which in addition to being the region with lower revenue, expenses in the public sector (67.3%) stood out to the private sector.

It is worth noting also that the Northeast region, even having a low prevalence of hospitalizations, had the total expenses similar to the southern region which holds the highest rate in the country. The Southeastern region has concentrated the majority of spending, being that the total revenues had a similar result to the sum of the other four regions of the country. The Northeast and South regions had similar

public and private spending, close to 40 million in the private sector and 10 million in the public. The Central region had lower spending. The Southeast region presented the largest expense in both the private and in public sector, totaling more than 150 million. In the north the private sector was responsible for only 309 thousand reais and the public 9 million (Table 1).

Table 1: Sociodemographic and clinical data of men hospitalized for malignant stomach neoplasm in different regions in Brazil, 2008 to 2017.

Variables	Regions in Brazil				
	North	Northeast	Center-West	Southeast	South
Age range					
0-9	110	84	25	74	78
10-19	59	115	23	93	58
20-29	189	514	120	505	240
30-39	395	1399	386	2064	862
40-49	919	3239	988	6636	3281
50-59	1724	5939	1985	15672	7672
60-69	2012	7211	2364	20663	10044
70-79	1278	5452	1660	15508	7238
≤80	421	1808	569	5350	2056
Color/Race					
White	326	2171	884	31592	25260
Black	106	854	125	4451	1045
Brown	4569	14264	2453	19677	1936
Yellow	112	646	64	643	163
Indian	14	03	07	35	21
Ignored	1980	7823	4587	10167	4104
Character					
Elective	3131	11824	2272	22621	9349
Urgency	3977	13936	5847	43944	22180
Regime					
Public	5122	5556	2294	17662	4017
Private	115	12840	3662	32383	18056
Ignored	1870	7365	2164	16520	9456
Spending					
Public	9,067,862.84	11,139,435.85	3,264,286.17	36,386,207.45	9,171,439.76
Private	309,379.14	37,898,038.22	8,287,547.26	74,811,481.30	39,537,126.47
Ignored	4,091,649.49	21,857,057.42	4,556,878.34	39,337,595.33	21,339,142.15

Source: Ministry of Health - Hospital Information System of SUS (SIH/SUS)

In the period from 2008 to 2017

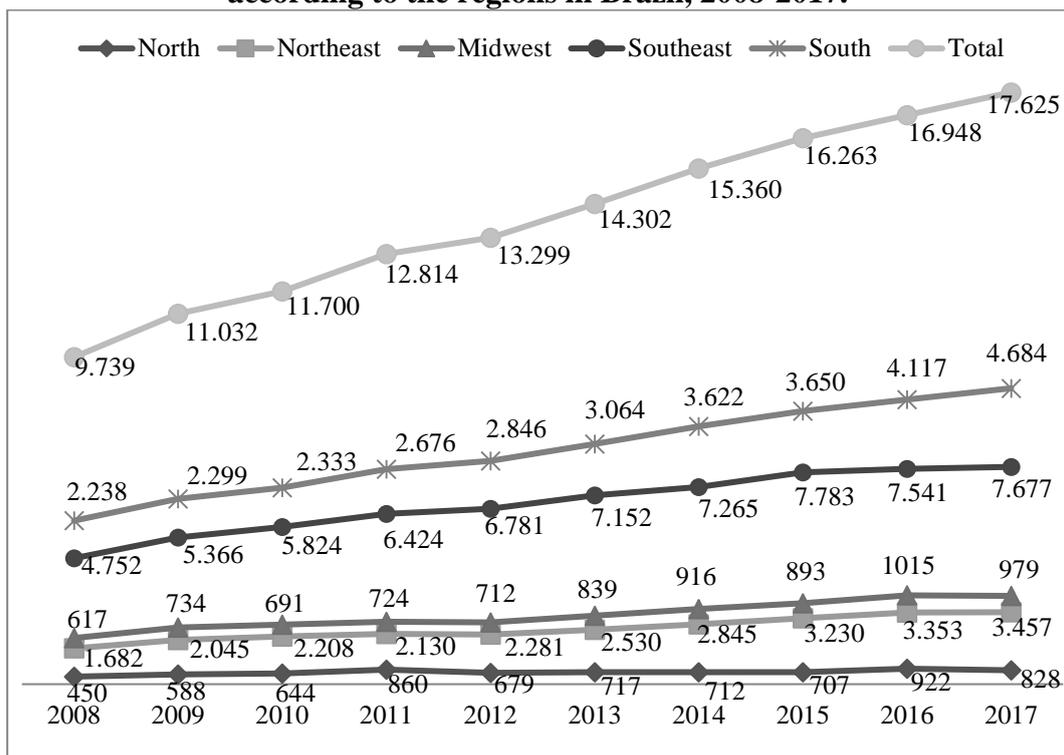
139,082 cases of hospitalizations were

registered due to malignant stomach neoplasm in males, in Brazil, ranging from 9,739 to 17,625, with an average of 13,908 admissions per year. It was observed an increasing trend in the number of hospital admissions over the period examined, in all the Brazilian regions. The region that presented the greatest number of hospitalizations was

the Southeastern region $n=66.565$ (47.86%) and the lowest number was the Northern region $n=7.107$ (5.10%).

In Brazil, in 10 years of study, the number of hospitalizations increased by approximately 81%, being more expressive in the regions South (115.3%), Northeast (105.5%) and North (105.1%) (Figure 1).

Figure 1: Number of hospitalizations due to malignant stomach neoplasm in men, according to the regions in Brazil, 2008-2017.



Source: Ministry of Health - Hospital Information System of SUS (SIH/SUS)

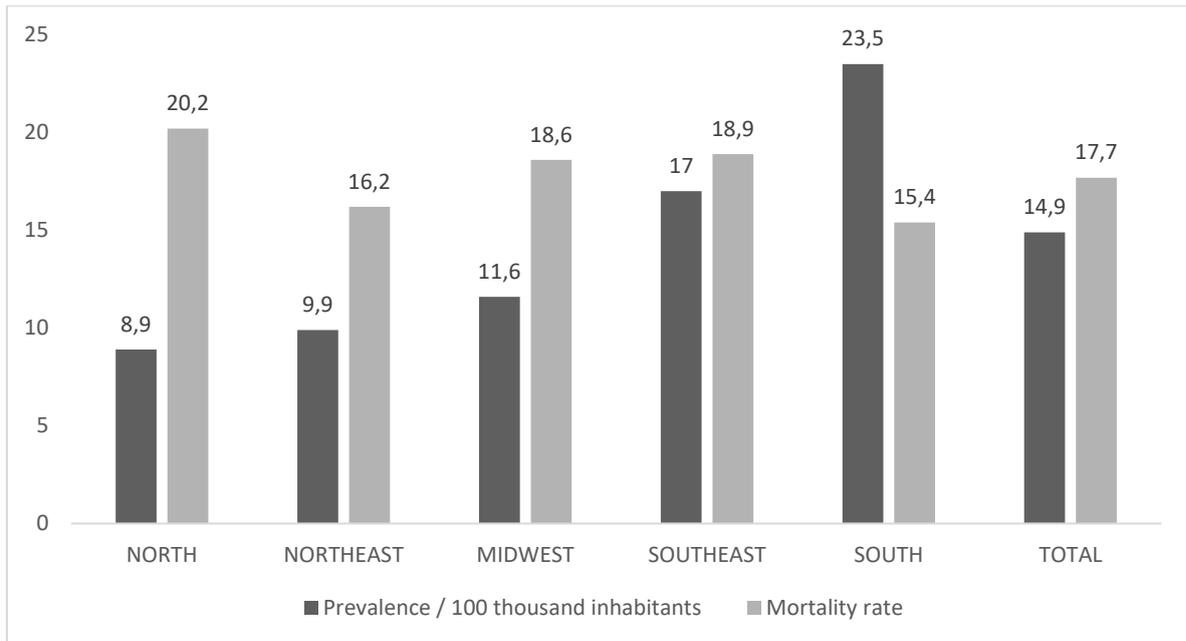
Upon analyzing the prevalence of this disease by regions of health, it was observed an average record of approximately 14.9 cases per one

hundred thousand inhabitants. The region with the highest prevalence of hospitalizations was the South (23.5 cases), and with the lowest number was

the North (8.9 cases). However, concerning the mortality rate, the region with the highest prevalence of hospitalizations was the South (23.5),

but showed the lowest mortality rate (15.4), the Northern region the lowest prevalence rate (8.9) and the highest mortality rate (20.2) (Figure 2).

Figure 2: Number of hospitalizations and mortality rate due to malignant stomach neoplasm in men, according to the regions in Brazil, 2008 to 2017.

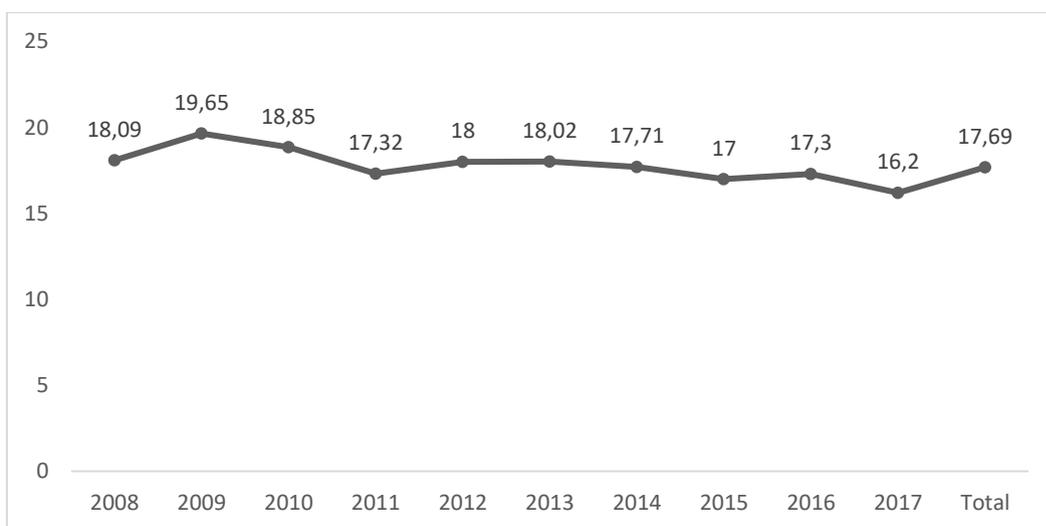


Source: Ministry of Health - Hospital Information System of SUS (SIH/SUS)

In the year 2008 the mortality rate was 18.09%, and in 2009 reached the highest rate among the years surveyed (19.65%). Since then there was a slight drop in the year of 2010 reaching 18.85% until reached a rate of 17.32%

in the year 2011. From 2012 to 2016 it remained almost constant. In 2017 the lowest mortality rate occurred in the period studied, showing a reduction of 3.45% (Figure 3).

Figure 3: Mortality rate due to malignant stomach neoplasm in men according to the year. Brazil, 2008 to 2017.

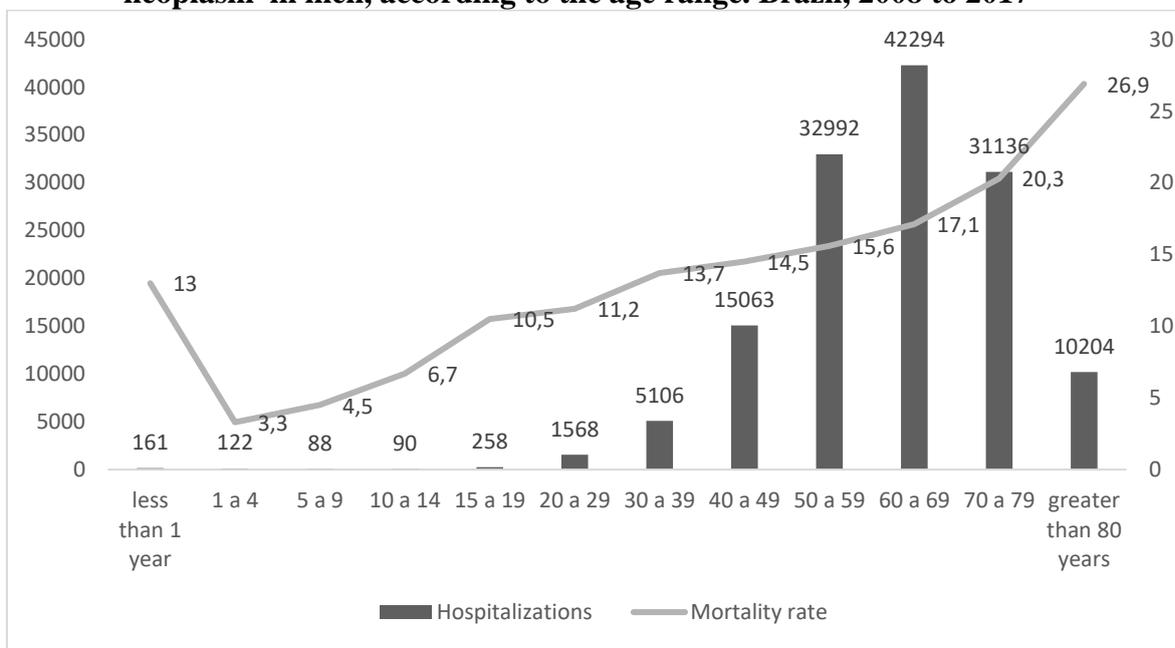


Source: Ministry of Health - Hospital Information System of SUS (SIH/SUS)

The number of hospitalizations due to malignant stomach neoplasm in Brazil, has gradually increased from the age range from 20 to 29 years, reaching a peak in patients aged 60 to 69 years, and reduction in the number of cases in the age ranges above 70 years. However, the mortality rate despite the

increase progressively from 1 year of age, is more expressive in the age ranges above 80 years (26.9%) and 70 to 79 (20.3%). Regarding younger people (under the age of 39 years, the number of hospitalizations was low (Figure 4).

Figure 4: Number of hospitalizations and mortality rate due to malignant stomach neoplasm in men, according to the age range. Brazil, 2008 to 2017



.Source: Ministry of Health - Hospital Information System of SUS (SIH/SUS)

DISCUSSION

Carcinogenesis is a highly complex process which inherited risk factors and environmental factors such as diet, smoking, occupation, exposure to radiation and chemical agents participate.⁷

Having in view that smoking and alcoholism are more common in men, the higher prevalence of gastric cancer in the male population is justified. Once among the risk factors for mortality due to cancer are the habits and life style

such as the consumption of alcohol and tobacco. Besides the excessive consumption of salt and poor nutrition in fiber and nutrients. On the other hand, regular consumption of fruits and vegetables is considered a protective factor for this type of cancer.⁸

Regarding hospitalizations according to age group, in this study the results corroborate with the literature, which shows a higher frequency from 50 years of age, being a rare occurrence before the age of thirty years.

Approximately 65% of patients diagnosed with gastric cancer are over 50 years old (INCA, 2015).⁴ Revision study reported that the average age at diagnosis of gastric cancer is 60 years.⁹ In spite of considerable numbers of hospitalizations for this neoplasm are found in different age groups, with greater representation from the second decade of life.¹⁰

It is assumed that *H. pylori* infection is acquired mainly in childhood and when not treated can persist for years and probably for life, a fact that predisposes the development of the disease in adults.^{11,12}

These data are relevant, since studies have demonstrated that the duration of infection is directly related to the development of associated pathologies, particularly the peptic ulcer disease and gastric carcinoma.¹²

Among the many factors associated with the genesis of the disease, the ingestion of large concentrations of substances, such as salt, carbohydrates and alcohol, leads to the appearance of lesions on the stomach mucosa, which can evolve to a tumor.¹¹ Another substance that presents a risk to the cancer formation

is the tar, present in tobacco smoke and barbecue meat due to the burning of coal, a very common practice in the Southern region. In this region of the country, it is tradition the barbecue at weekends and on commemorative dates, increasing the consumption of meat and cold cuts prepared with nitrites and nitrates (additives used in conservation), substances that pose risks for the development of the disease, because when metabolized in the body are converted into nitrosamines, considered carcinogenic.¹³

Rio Grande do Sul is a state that has the average consumption of beef greater than the national average.¹⁴ Within this perspective, the above-mentioned studies endorse the data found in this study that the South region is home to the largest prevalence of hospitalizations for gastric cancer. The prevalence of this disease differs from region to region depending on the cultural habits and sex.¹⁵

Another interesting fact, revealed in this study was the high prevalence of the disease hospitalizations in the Southeastern region, in addition to the southern region. This fact can be explained once that the two regions

have higher socioeconomic level, a large population and have a greater number of available health services, therefore a greater chance of finding, which results in a higher prevalence of cancer.

As for the prevalence of hospitalization, the Northern region has a low prevalence/100 thousand inhabitants, but a high mortality rate, similar to the results of research carried out on the basis of estimates of the global burden of disease in Brazil.¹⁶ The results of studies that related gastric cancer and food consumption showed that in the Northern region this disease occupies the second place, fact which can be related to the region eating habits, such as the conservation of fish and meat in the brine.¹⁷ In addition, another risk factor is the consumption of alcoholic drink and cigarettes, a fact observed mainly in the South and Northeast.¹⁷

The relationship between the neoplasms of the gastrointestinal and nutritional factors in Brazil showed a higher number of cases of gastric cancer in individuals who consume small amount of fresh fruits and vegetables daily.¹⁸ This fact may be considered negative, because these foods are sources of vitamins A and C, important antioxidants, being regarded as

protective factors in relation to gastric cancer once that they prevent oxidative stress.^{8,19}

Regarding the mortality rate, the year 2009 showed the highest rate, and remained constant until the year 2016 and then showed a fall. This decrease was also observed in other regions as in Volta Redonda, RJ, Brazil, as well as in Japan and the United States.^{15,20,21,22,23} This situation may be the result of the best hygienic and sanitary control of food and improving the quality of the diet.¹⁹

In Brazil, in the period from 1980 to 2006, there was a significant reduction of stomach cancer mortality in males. However, the rates were considered high when compared to other countries.²⁴

In relation to expenditures, there was a considerable spending, especially in the southeastern region in the private health system. This fact can be explained by the greater possibility of access to diagnostic methods and the large number of people affected by the disease in this region of the country.

It was observed in this study that the greatest number of hospitalizations occurred in character of urgency. This may be due to the person's clinical conditions; the disease can be in more advanced stages.

As to the regime of hospitalizations, when comparing the public with the private sector, it was realized that the private sector has a higher number of hospitalizations, this situation can be explained by its greater rapidity in the diagnoses and greater resources for treatments.²⁵

This study points to the need for more research on this disease, given the high number of hospitalizations and high spending. Although the mortality rate for this neoplasm has shown a downward trend, it still requires a lot of attention, since it is still considered one of the types of cancer that most often leads to death in the world.

The studies of raw data through the Hospital Information System of Sistema Único did not allow to perform denser analyzes of the variables investigated, only restricting the description of the same, without investigation of other risk factors. It is emphasized the importance of further research for the early establishment of its diagnosis in an attempt to improve the quality of life of the individual and the promotion of healthy habits focused on primary prevention, in an attempt to reduce the number of cases and

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hospitalizations.

CONCLUSION

The rate of hospitalizations for stomach cancer during the analyzed period showed an increase in the prevalence of hospital admissions in all regions of Brazil, especially in the South. The mortality rate presented variation with a fall in the year 2011 and with minor variations from that date. In addition, it was noted that the age range from 50 to 69 years concentrated the greatest numbers of hospitalizations. The financial expenditures were higher in the Southeast with predominance in the private health system. The results also indicate important clinical elements to be investigated in further studies with the aim of improving health policies for the control of this disease.

Declaration of Conflict of Interests:

There is no conflict of interests. The authors participated in all stages of preparation of this study and declared no conflict of interest. There was no financial support.

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