



HODGKIN'S LYMPHOMA: CLINICAL AND EPIDEMIOLOGICAL ASPECTS IN THE HEALTHCARE MACROREGIONS OF MINAS GERAIS, BRAZIL

*Linfoma de Hodgkin: aspectos clínicos e epidemiológicos nas macrorregiões de saúde de Minas
Gerais*

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Abstract: Objective: To analyze the epidemiological profile of patients affected by Hodgkin's lymphoma in Minas Gerais, Brazil. **Methodology:** This is a quantitative, transversal and descriptive epidemiological study, in which secondary data were evaluated from patients with Hodgkin's lymphoma attended in healthcare services in the state of Minas Gerais from 2008 to 2017. **Results:** From 2008 to 2017 there was an increase of 190% in the number of hospitalizations, with predominance in the age group of 15 to 29 years (31.85%), in males (56.3%), in the brown race (45.12%) followed by the white race (33.24%), and a higher prevalence in the South Macroregion (37.6). Regarding the admissions, 48.47% were private and 20.00% in the public system. The mortality rate decreased from 9.19 in 2008 to 4.89 in 2017, but changed little in the age extremes. **Conclusion:** HL is present throughout Minas Gerais with a predominance in the South, Center, and Western Macroregions. Despite the increase in prevalence during the period, there was a decrease in the mortality rate in the age groups of higher involvement, mainly due to the advances in treatment. New studies are required due to the scarcity of data about this disease, which hinders its diagnosis and early treatment.

Keywords: Hodgkin's Disease; Epidemiology; Hospitalization.

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Resumo: Objetivo: Analisar o perfil epidemiológico de paciente acometidos com Linfoma de Hodgkin em Minas Gerais no período de 2008 a 2017. **Metodologia:** Trata-se um estudo epidemiológico quantitativo, transversal e descritivo, no qual se avaliou dados secundários de pacientes portadores de linfoma de Hodgkin internados em serviços de saúde no estado de Minas Gerais durante o período de 2008 a 2017. **Resultados:** No período de 2008 a 2017 houve um aumento de 190% no número de internações, havendo um predomínio entre os 15 e 29 anos (31,85%), no sexo masculino (56,3%), na cor/raça parda (45,12%) seguida pela cor/raça branca (33,24%) e uma maior prevalência na macrorregião sul (37,6). A respeito das internações, (48,47%) foram em regime privado e (20%) em regime público. A taxa de mortalidade diminuiu de (9,19) em 2008 para (4,89) em 2017, mas sofreu pouca alteração nos extremos de idade. **Conclusão:** A LH está presente em todo território mineiro com predomínio nas macrorregiões sul, centro e oeste. Apesar do aumento da prevalência durante o período compreendido, houve diminuição da taxa de mortalidade nas faixas etárias de maior acometimento, principalmente devido aos avanços no tratamento. São necessários novos estudos tendo em vista a escassez de dados sobre a doença, o que por sua vez dificulta o diagnóstico e tratamento precoce.

Palavras-chave: Doença de Hodgkin; Epidemiologia; Hospitalização.

INTRODUCTION

Hodgkin's Lymphoma (HL) is a neoplasm from the lymphatic system, i.e., occurring in the lymph nodes. In this disease there is an uncontrolled multiplication of lymphocyte B cells from the germinal center of the ganglion, resulting in the development of tumors. The neoplastic cells of this process are called Reed-Sternberg cells.¹⁻²

This is a rare neoplasm, more common in young adults, since it affects mainly patients between 15 and 30 years, with a peak at 55 years. For 2018 there is an estimate of 2,530 new cases, 1,480 in men and 1,050 in women (INCA, 2018), with this disease being demonstrably more frequent in male, which is also an adverse factor for the advanced disease.³

The World Health Organization (WHO) classifies HL in two histological types: Nodular Lymphocyte Predominant Hodgkin Lymphoma (NLPHL) and Classical Hodgkin's Lymphoma (CHL). This latter is even subdivided in other four types: Nodular Sclerosing (NE), 70%; Mixed Cellularity (MC), Lymphocyte Rich; and Lymphocyte Depleted, with CHL being responsible for 95% of the LH cases.³

The most common symptoms are painless cervical lymphadenopathy in the upper thorax, axillary, abdominal, and in the groin lymph nodes, besides non-specific symptoms such as fever, cough, night sweats, weight loss, itching, and asthenia. The staging of the disease is indicated by the number, size, and location of the lymph nodes affected together with the hepatosplenomegaly.⁴

Hodgkin's lymphoma is a disease with good prognosis in 75% of the cases, with good chances of cure. However, 25% of the cases presented recurrences or death in the first 15 years post-treatment.

A great number of these patients die due to the treatment, like in other neoplasms, that often result in cardiovascular failure. Even if some of them live for more than 15 years, they still present a high mortality rate due to subsequent neoplasms.^{2,5}

Despite being rare, HL has been affecting an increasing number of people with increasingly worse outcomes, being considered an extremely relevant disease for public health, although the data about it are still scarce. This study is relevant because it aims to discuss the prevalence of Hodgkin's Lymphoma in Minas Gerais, its increase in the recent years, and the public costs related to this disease, in order to improve its epidemiological profile, favoring its early diagnostic and resulting in better intervention by the healthcare professionals before the early symptoms of the patients.

The goal of the present is to analyze the epidemiological profile of patients with Hodgkin's Lymphoma in Minas Gerais from 2008 to 2017.

METHODOLOGY

This is a quantitative, cross-sectional, and descriptive epidemiological study, that assessed secondary from patients with Hodgkin's lymphoma admitted in public and private facilities in the state of Minas Gerais from 2008 to 2017.

Data were collected from the Department of Informatics of the Unified Health System (Sistema Único de Saúde, DATASUS), part of the Hospital Information System (Sistema de Informações Hospitalares, SIH/SUS), in the site (<http://www.datasus.gov.br>), accessed in February and March, 2018. The variables analyzed in this study were: color/race, gender, type of system, and age group (lower than 1 and higher than 80 years), disease expenses, average admittance time, mortality rate, and num-

ber of deaths.

The data were analyzed and managed in this study using the Excel software (Microsoft Office 2013), version 15.0. Since the data analyzed in this work are public domain, the submission of this project to the Committee on Ethics in Research was not required.

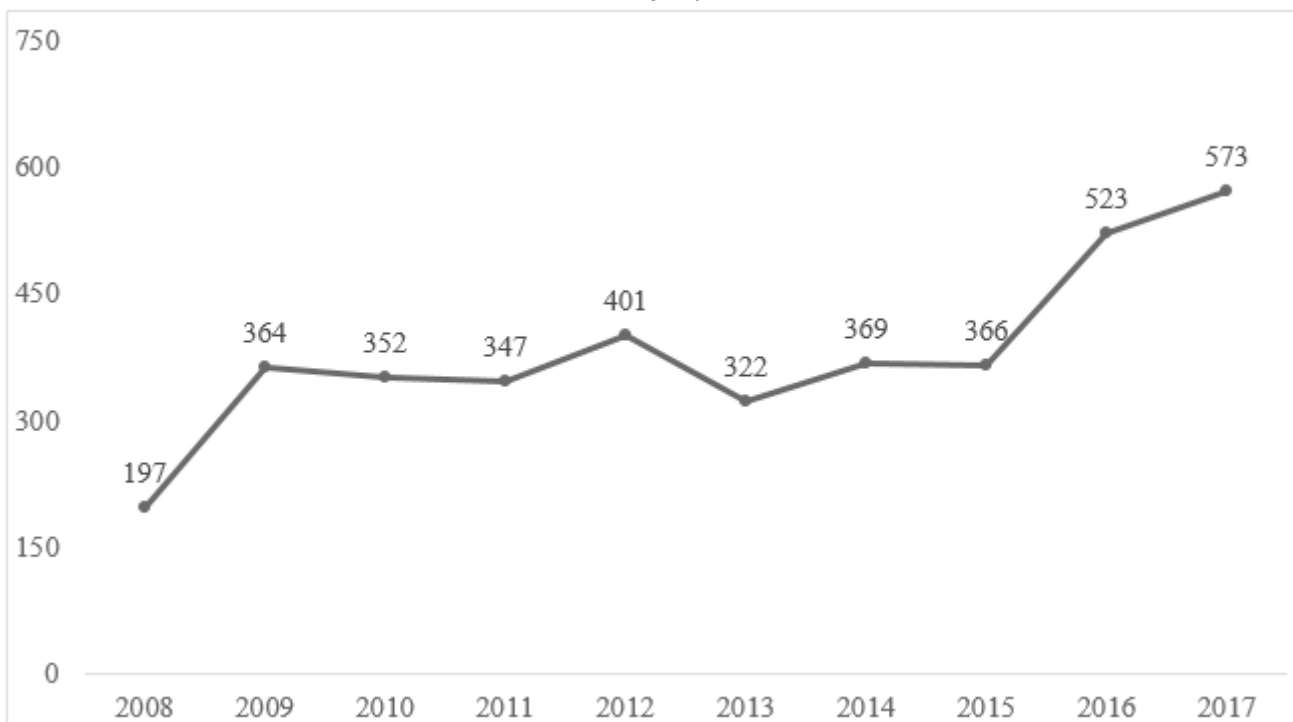
RESULTS

Based on the data from SIH/SUS, 3,814 admissions for Hodgkin's lymphoma in Minas Gerais

were recorded from 2008 to 2017, with an average of 346.72 cases per year.

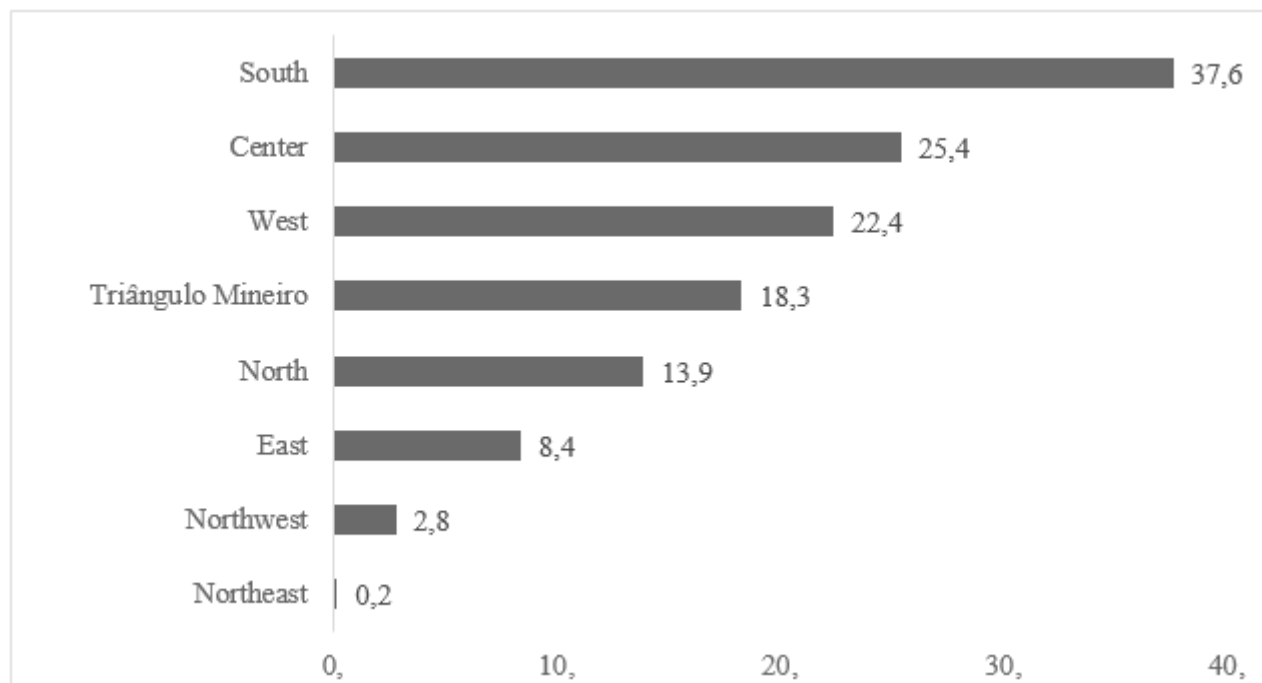
The number of admissions varied a lot in the analyzed period, with increases and decreases between the years. However, from 2015 to 2016, there was a significant increase, from 366 to 523 admissions, an increase of 42.89%. This number continued to grow in 2017, with 573 admissions, representing the year with the highest number of hospitalization. Thus, in the 10-year period there was a 190% increase in the number of admissions, from 197 in 2008 to 573 in 2017 (Figure 1).

Figure 1 - Number of hospitalizations for Hodgkin's lymphoma in Minas Gerais, from 2008 to 2017.



Source: Hospital Information System of SUS - SIH / SUS.

The macroregion with the highest prevalence of admissions was the South region, with 37.6 hospitalizations per 100,000 inhabitants, followed by the Center (25.4 admissions/100,000 inhabitants) and the West regions (22.4 admissions/100,000 inhabitants). The region with the lowest prevalence of admissions was the Northeast, with 0.2 admissions per 100,000 inhabitants (Figure 2).

Figure 2 - Prevalence of Hodgkin's lymphoma hospitalizations according to the macroregions of Minas Gerais, from 2008 to 2017.

Source: Hospital Information System of SUS - SIH / SUS.

The age of the hospitalized patients varied from less than 1 year to more than 80 years, and the most prevalent age group was the one with 15 to 29 years, amounting to 1,214 cases (31.85%), followed by the group with 30 to 39 years, that presented 704 cases (18.45%).

Regarding sex, there is a slight prevalence in men, with 2,147 cases (56.29%). In both sexes the most affected age group was from 15 to 29 years (31.85%), followed by individuals with 30 to 39 years (18.45%). The number of admissions in women was higher than men only in the age group of 30 to 39 years, with 354 cases (50.3%) (Table 1).

Table 1 - Socio-demographic and clinical data of patients with Hodgkin's lymphoma in Minas Gerais, Brazil, between 2008 and 2017.

Variables	n	%
Sex		
Female	1,667	43.7%
Male	2,147	56.3%

Continuation of Table 1

Variables	n	%
Race/color		
White	1,268	33.24 %
Black	230	6.03%
Brown	1,721	45.12%
Yellow	15	0.40%
Indigenous	3	0.08%
Without data	577	15.13%
Age group		
0 to 14 years	363	9.52%
15 to 29 years	1,214	31.85%
30 to 39 years	704	18.45%
40 to 49 years	477	12.50%
50 years and over	1,056	27.68%
Type of attendance		
Elective	597	15.65%
Urgency	3,217	84.35%

Continuation of Table 1

Variables	n	%
Sector		
Public	763	20.00%
Private	1,849	48.47%
Ignored	1,202	31.53%
Expenses due to HL		
Public	R\$	45.68%
Private	R\$	21.70%
Ignored	R\$	32.62%

The brown and white races were significantly more affected, representing 78.36% of the cases, with 1,721 (45.12%) and 1268 (33.24%) cases, respectively (Table 1).

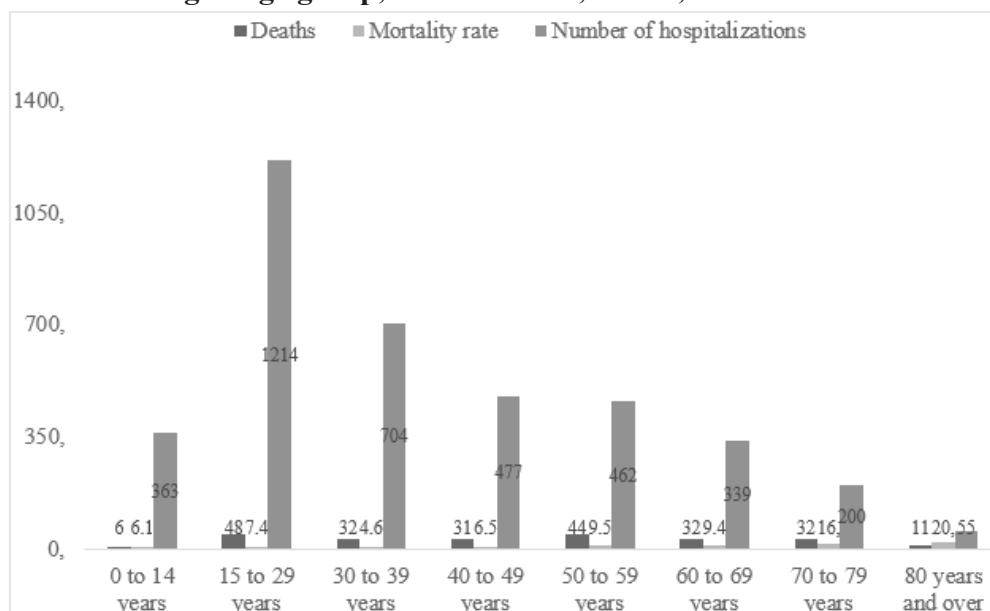
Among the 3,814 hospitalizations, 1,849 (48.47%) occurred in the private sector e 763 (20.00%) in the public sector, with 1,202 patients (31.53%) without reported data. Among the 1,849 admissions in the private sector, 307 were elective hospitalizations (16.6%) and 1,542 urgency ones (83.4%). In the public sector, by its turn, 184 admissions were elective (24.11%) and 579 urgency ones (75.89%) (Table 1).

The total expenses with this pathology in the period were R\$ 10,276,379.13, with the highest costs in the public sector (45.68%) compared to the private scheme (21.70%). The year with the highest costs was 2008 with R\$ 1,437,351.41, corresponding to 14% of the expenses from 2008 to 2017, and in 2017 the expenses amounted to R\$ 1,112,938.81 (10.83%) (Table 1).

The average hospital admission time in this period was of 7.4 days, with the highest average in the private sector, 11.2 days, and in the public sector of 6.8 days. The year with the highest average hospitalization time was 2007 (12.8 days), followed by 2008 (12.4 days), with a fall along the period, with an average of 6.3 days in 2017.

In this 10-year period, 236 deaths were recorded due to HL, which represents 6.18% of the admissions. Among these, 60.16% were recorded in men. The age group with the highest number of deaths was the one with 50 to 59 years, with 44 cases (18.64%), and the age group with the lowest number of deaths was the one with 0 to 14 years, with 2.54% of the cases (Figure 3). The largest number of deaths was observed in 2016 (14.83%), followed by 2017, with 28 deaths (11.86%).

Figure 3 - Deaths, mortality rate and number of hospitalizations for Hodgkin's lymphoma according to age group, Minas Gerais, Brazil, from 2008 to 2017.



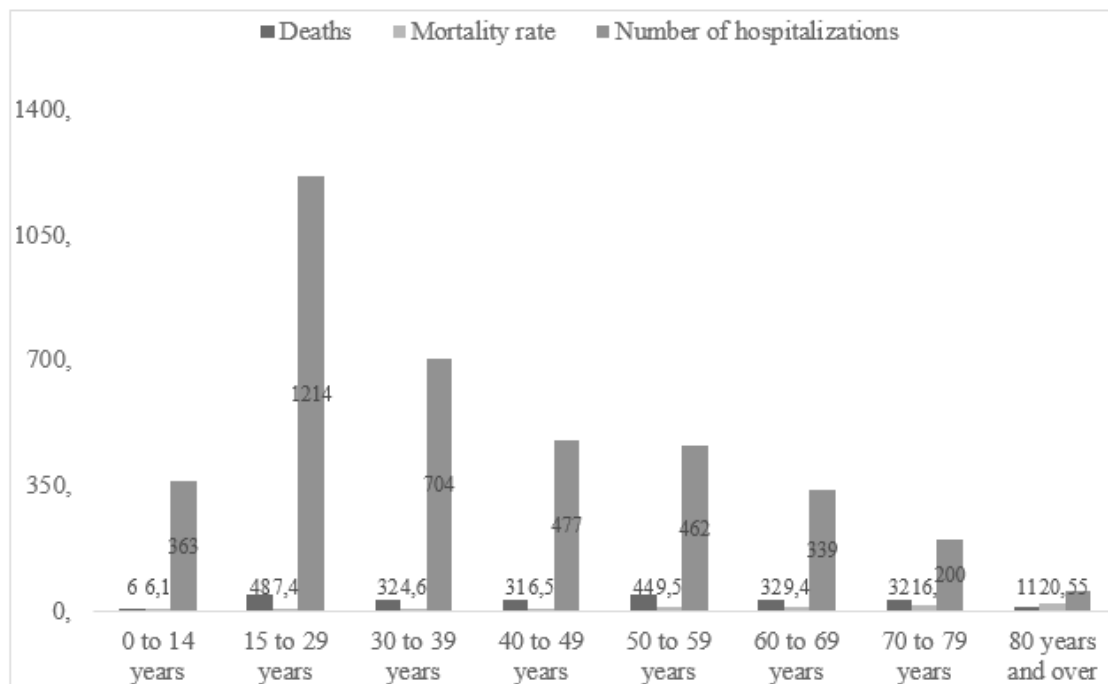
Source: Hospital Information System of SUS - SIH / SUS.

The mortality rate went down significantly from 2008 (9.19) to 2017 (4.89), with 2017 being below the average rate of this period (6.19). The age groups of 70 to 79 years and at least 80 years presented the highest mortality rates, with 16.00 and 20.00, respectively (Figure 3). The mortality rate was 15% higher in men (6.61) than women (5.64), and in 2017 the mortality rate in men was almost the double of the one recorded in women, 6.04 and 3.64, respectively.

Analyzing the rate mortality across the different macroregions, the highest mortality is recorded in the Northeast region, with a rate of 50, and the lowest in the West Region, with 4.41 (Figure 4).

Regarding the number of deaths, the macroregion with the highest number was the Center Region, with 115 deaths, and the one with the lowest number was the Northeast Region, with just 1 death, representing 48.72% and 0.42% of the total, respectively (Figure 4).

Figure 4 - Deaths, mortality rate, and number of hospitalizations for Hodgkin's lymphoma according to age group, Minas Gerais, Brazil, from 2008 to 2017.



Source: Hospital Information System of SUS - SIH / SUS.

DISCUSSION

A total of 2,530 new HL cases are expected in 2018 (BRASIL, 2018). This increasing trend of admissions is present in the analyzed data, showing that from 2015 to 2017 there was a significant increase of hospitalizations in the state of Minas Gerais, reaching 573 in 2017. Nonetheless, the mor-

tality rate was reduced in 70% from 2008 to 2017, a value higher than the reduction of 60% reported by INCA, mainly due to the advances in treatment and early diagnose (BRASIL, 2018). The occurrence of HL in both sexes shows a predominance of men, with 1,480 cases, with women presenting 1,050 cases⁶. In the state of Minas Gerais, 56.29% of the hospitalizations are also recorded for men.

Since this disease presents a complex eti-

ology, immunocompromised individuals are more likely to develop this pathology. Therefore, individuals that are HIV positive, that present autoimmune diseases and those submitted transplants and immunosuppressive therapy are considered a risk group, being more likely to develop HL. The hereditary factors for this pathology have been identified, and so the diagnostic of the disease makes it more likely that some family member might develop it (INCA, 2015). Other risk factors reported are: exposure to radiation and contact with pesticides¹.

In an epidemiological review carried out in the United States a bimodal distribution of this disease was observed, with the highest frequencies being recorded in the age group between 15 and 34 years and in the one over 50 years. This study also noted that, in childhood, the pathology was more frequent in boys younger than 10 years (85%). In elderly, the ratio was 2:1 of men to women. In adult young patients the distribution of the illness between the sexes was more equitable⁷. Compared to the secondary health data in the present investigation, the admissions resulting from HL have confirmed the prevalence of the age group between 15 and 29 years. The study has also shown that this distribution is almost equal in both sexes, but with a higher predominance in men.

Investigations performed in patients with HL, recorded in the Center of Oncological Studies and Investigations of Minas Gerais (Centro de Estudos e Pesquisas Oncológicas de Minas Gerais - CEOMG) have shown a higher prevalence of HL in the white population, with 60% of the evaluated group³. In the present study the highest number of cases was found in brown peoples, followed by white ones.

The distribution of type and expenses with medical hospitalizations due to HL have shown a marked difference, since the study showed that 48.47% of the patients preferred to be attended in

the private sector, but that the public sector concentrates 45.68% of the total expenses related to the pathology. This demonstrates that the increase in the number of patients with HL results in the quality loss of public healthcare of the services provided in the public sector, due to the high expenses with these patients.

Analyzing the distribution of this pathology along the macroregions of the state of Minas Gerais, the most prevalent is the South and the one with the least incidence is the Northeast. However, Northeast presents the highest mortality rate of the state, exhibiting a lack the public policies related to the treatment of the HL patients. The South, concentrating the highest prevalence, also presents a low mortality rate, demonstrating the high quality of the provided healthcare services.

In an epidemiological study performed in women with HL in the north of Minas Gerais in 2008-2016, most of the admitted patients belonged to the age group of 20-29 years (32.17%), followed by the group with 15-19 years (19.13%), in accordance with the data presented in this study. Further, the decrease of the mortality due to the disease was recorded, since from the total amount of cases from 2008 to 2016, 4.35% of the individuals died due to Hodgkin's disease⁸. Despite the low mortality, this investigation observed an increase in the number of deaths in 2016 (the highest number of deaths), followed by a slight decrease in 2017 (the second highest number of deaths). Such fact was recorded due to the increase in the incidence of this pathology, despite the fall of the mortality rate. However, in the edges of the age group distribution the mortality group remained high.

The early diagnostic and treatment are important for the reduction of the mortality rate. In the HL the diagnostic is made mainly through the biopsy of the peripheral lymph nodes, recommended when the disease is suspected due to the presence

of some suggestive symptoms, such as significant weight loss, fever, sweating, and itching, despite the presence of lymphadenomegalies and signs of spleen and liver involvement⁹.

For some authors, the best treatment for HL in the early stages is radiotherapy alone, and the worst prognosis would be related to a chemotherapy associated to radiotherapy¹⁰. However, in 2000, the ABVD regimen, which consists in the association of adriamicyn, bleomycin, vinblastine, and dacarbazine, started to be regarded as the gold standard for the treatment of the disease. This treatment is better because it presents lower gonadal toxicity and a lower number of secondary leukemia cases. Thus, the polychemotherapy regimen associated or not to radiotherapy, presented a better response for the treatment of the disease, reaching about 75% of cure, including cases of advanced stage disease³.

CONCLUSION

Based on the analyses of the described data, this investigation shows that the number of patients with HL is increasing, with highest prevalence in the most recent years in 2016 and 2017. This pathology is found in all the state of Minas Gerais, with the highest concentration in the South, Center, and West macroregions, and the lowest in the Northeast. However, the highest mortality rate was recorded in the Northeast region, which points out to a challenge in the early diagnostic and treatment of HL in this region. In general, the mortality rate in the state of Minas Gerais decreased along the years.

The present study presented similarities in the distribution among sexes and races with those reported in the scientific literature. The prevalence of HL occurs in men, and is concentrated in the age group of 15 to 29 years. The study also shows an in-

crease in the number of admissions in the last three years, which reinforces the importance of a better understanding about this disease.

A preference for the treatment in the private sector by the population was also observed, with almost 50% of the recorded cases. However, the expenses were inversely proportional to this preference, with the highest costs being recorded in the public scheme.

This study also noted a lack of investigations related to HL. This fact hinders the knowledge about this pathology, which contributes to keep constant the mortality rate of the disease, to hamper the early diagnostic, and the choice of the best treatment options. There is also a need to implement the proper public policies both for the diagnostic and for the treatment of HL, in order to reduce the death numbers related to HL and its incidence.

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