HOSPITALIZATIONS FOR CHILDHOOD CANCER IN THE NORTH OF MINAS GERAIS STATE, BRAZIL, BETWEEN 2008 AND 2015 BASED ON THE DATASUS

Paula Araújo Lima[1],
Wanessa Rodrigues de Queiroz[2],
Fernanda Cardoso Rocha[3],
Isabela Barbosa Cruz[4],
Jannayne Lúcia Câmara Dias[5],
Gregório Ribeiro de Andrade Neto[6],
Tadeu Nunes Ferreira[7]

Abstract: Objective: To describe the hospitalizations due to childhood cancer in the North of Minas Gerais state, Brazil, from 2008 to 2015, based on data from the Department of Informatics of the Unified Health System (DATASUS). **Method:** This is a descriptive epidemiological study, with data collected from DATASUS, accessed in March/April 2016. The collected data were all cases of hospitalizations for cancer/leukemia in children under 14 years in the northern region of Minas Gerais, from 2008 to 2015. Since DATASUS is a public domain databank, this work did not have to be submitted to the Committee on Ethics in Research**. Results**: There were 2,020 cancer hospitalizations of children from 0 to 14 years old in the North of Minas Gerais state, regardless of the type of neoplasm and gender. Among them 1,916 took place in the municipality of Montes Claros, which accounted for 94.8% of the total, with 54% (1,094) males and 46% (926) females. In terms of the nature of attendance, 86.4% of the total was represented by urgent attendances, while elective ones amounted to 13.6%. Public healthcare attendances accounted for 5.4% of the total. This varied according to the healthcare system, since the reference institutions also provide services by the SUS, either being private or philanthropic. **Conclusion:** This study might assist health managers in decision-making when dealing with issues related to the number of beds available for this type of patients. It might also contribute to the development and elaboration of hypotheses, based on epidemiological studies that might be used by hospital institutions referenced for child oncological treatment, therefore providing a better healthcare assistance.

Keywords: Hospitalization; Neoplasms; Children; Epidemiology.

Autor para correspondência: Fernanda Cardoso Rocha
E-mail: nandac.rocha@hotmail.com

[1] Enfermeira. Faculdade de Saúde Ibituruna (FASI). Montes Claros-MG.
[2] Enfermeira. Faculdade de Saúde Ibituruna (FASI). Montes Claros-MG.
[3] Psicóloga. Faculdades de Saúde Ibituruna (FASI). Montes Claros-MG. Especialista em Psicologia Hospitalar. Especialista em Metodologia e Didática do Ensino Superior pela Universidade Estadual de Montes Claros (UNIMONTES). Especialista em Psico-onclogia. Especialista em Saúde da Famíliapelas Faculdades Unidas do Norte (FUNORTE). Montes Claros-MG.
[4] Enfermeira. Faculdades Unidas do Norte (FUNORTE). Montes Claros-MG.
[5] Enfermeira. Docente do curso de Enfermagem pelas Faculdades Unidas do Norte (FUNORTE). Especialista em Enfermagem do Trabalho. Montes Claros-MG.
[6] Enfermeiro. Docente do curso de Enfermagem pelas Faculdades Unidas do Norte (FUNORTE). Especialista em Saúde da Família. Especialista em Urgência e Emergência. Montes Claros-MG.
[7] Enfermeiro. Docente do curso de Enfermagem da Universidade Estadual de Montes Claros. Mestrando em biotecnologia.

INTRODUCTION

Cancer is a pathological process that results in the uncontrolled proliferation of abnormalb cells that experience genetic mutations in their DNA.[1]

In the child-youth population cancer is comprised by a set of rare pathologies with not-well established causes, being related to hereditary or genetic factors, contrary to adults that, in most cases, present some risk fators.[2]

Child cancer was a chronic and deadly disease. In the recent years, studies have shown that 70 to 80% of the cases presented an increase in the potential of cure due to new therapeutic processes. Currently, there is an estimate that 1 in 250 adults is a survivor of childhood cancer.[1]

The most important neoplasms in childhood are leukemia, tumors of the central nervous system, and lymphomas, occurring in general in children with less than 15 years due to the great progress and detail of the clinical studies, breakthrough technologies, and multidisciplinary treatment. This latter one was performed along the whole assistance, focusing on the humanization of the patient and his family, resulting in good perspectives for the prognostic.[3]

Leukemia is a type of cancer common in the childhood, with the Acute Lymphocytic Leukemia (ALL) predominating in children from 0 to 14 years.[4]

Pediatric cancer is a great concern of public health, representing the second cause of mortality in the age group of 1 to 19 years, after the deaths by accidents and violence. It represents about 2% of all malignant neoplasms and in Brazil there is an estimate of 9,000 new cancer cases per year in children and teenagers.[5,6]

The epidemiological studies are used to assess the quality of the services and to create new strategies in programs of cancer control in public health. The incidence, prevalence, mortality, and survival rates are important quality indicators in the health system,[7] being important to improve planning, assistance, diagnostic, and treatment of the patients.[8] The characterization of the number of cancer pediatric hospitalizations has been little addressed in investigations and, therefore, led us to investigate the

records of childhood cancer admissions in the north of Minas Gerais state from 2008 to 2015.[9]

METHODOLOGY

This is an epidemiological descriptive study. The data were collected from the Department of Informatics of the Unified Health System (DATASUS) at the site http://www.datasus.gov.br, that was accessed in March/April 2016. The target of this study was all hospital admissions by cancer/leukemia in patients with less than 14 years from the northern region of the Minas Gerais state from 2008 to 2015.

The most important variables for the present study were: place of residence, Health Macroregion, municipality, year of attendance, nature of attendance, type of hospital institution, chapter II of CID 10, children with less than 14 years, and sex. Twelve data tables were created in order to describe the information recorded about the hospital admissions for children neoplasm in the north of Minas Gerais - Montes Claros, which were filed during the this work to avoid the loss or double use of the same data.

At first, a general databank of the hospitalizations from 2008 to 2015 was obtained, regardless of the type of neoplasm and sex, in the north of Minas Gerais. A second databank was created from the collected data specifying the nature of the hospitalization, and the type of institution (public or private). Then, a third databank was yielded to compare the general data of the city of Montes Claros using all the variables. Finally, a fourth databank was generated using the CID 10 morbidity variable for leukemia, since it is an important neoplasm in children with less than 14 years. This databank was created using the general data (all the variables) from the north of Minas Gerais and also from the city of Montes Claros, an important center of pediatric oncological treatment. The databank was organized using the EpiInfo 6 software for tabulation and later descriptive and exploratory analyses. The software Excel 2011 was used for new data rearrangement and for chart set up in the comparative analyses.

The authorization of the Committee on Ethics in Research was not required since this is an investigation based on a public domain databank

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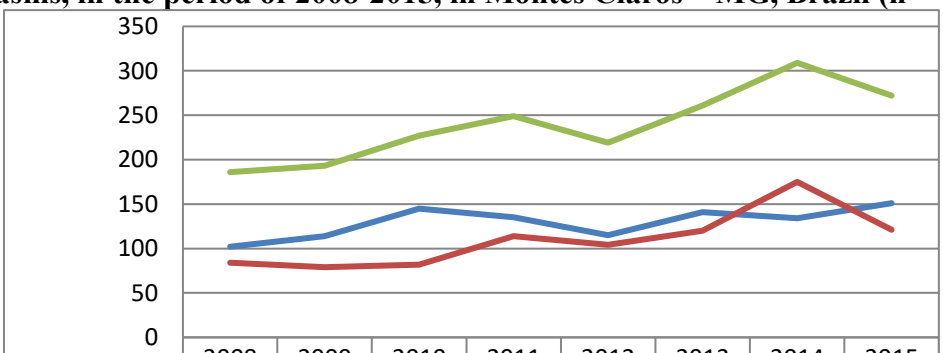
RESULTS AND DISCUSSION

The Northern Health Macroregion in Minas Gerais is composed by 89 municipalities. Montes Claros is the most important municipality in the region, with an expressive population of 361,915 of inhabitants.[10]

A total of 2,020 hospitalizations of children of both sexes between 0 and 14 years due to neoplasm occurred between 2008 and 2015, in the Northern Health Macroregion, Minas Gerais, regardless of the type of neoplasm, with 1,916 of these admissions taking place in the municipality of Montes Claros. In this period, there was no significant variation in the number of admissions along the years. The Northern Health Macroregion recorded the highest number of admissions (314) in 2014, and the lowest in 2009 (206).

In the studied period, Montes Claros combined 94.8% of the total admissions. Among them 54% (1,094) were males and 46% (926) females (Chart 1). During the same period, 35.1% (710) of the admissions were classified as leukemia, a type of cancer especially common in the age group between 0 to 14 years, with 57.4% (408) males and 42.6% (302) females (Chart 2).

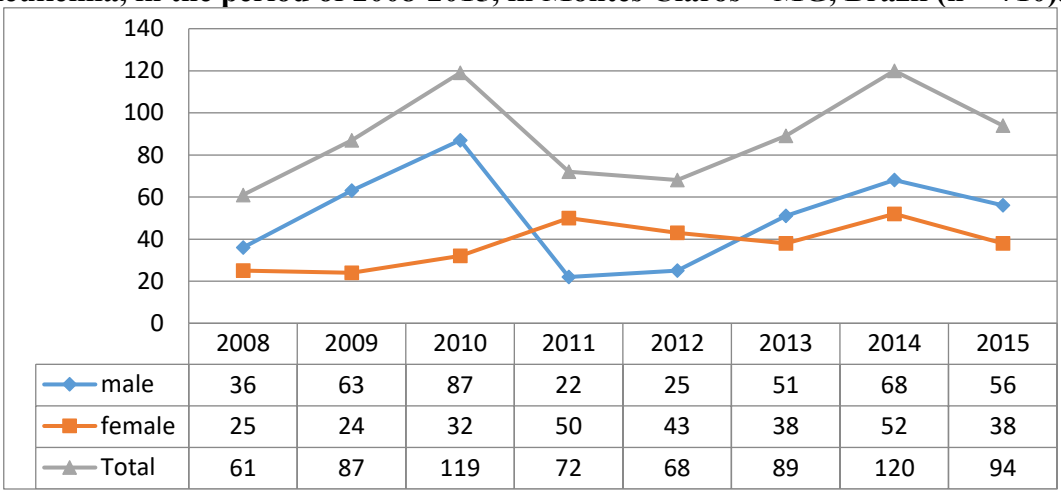
Chart 1 - Hospitalizations of children of both sexes between 0 and 14 years, due to neoplasms, in the period of 2008-2015, in Montes Claros – MG, Brazil (n = 1916).



	2008	2009	2010	2011	2012	2013	2014	2015
male	102	114	145	135	115	141	134	151
female	84	79	82	114	104	120	175	121
total	186	193	227	249	219	261	309	272

Source: www.datasus.gov.br, downloaded in April 2016, elaborated from the raw data.

Chart 2-Hospitalizations of children of both sexes between 0 and 14 years, due to leukemia, in the period of 2008-2015, in Montes Claros – MG, Brazil (n = 710).



	2008	2009	2010	2011	2012	2013	2014	2015
male	36	63	87	22	25	51	68	56
female	25	24	32	50	43	38	52	38
Total	61	87	119	72	68	89	120	94

Source: www.datasus.gov.br, downloaded in April 2016, elaborated from the raw data.

A total of 2,020 hospitalizations of children between 0 and 14 years due to neoplasm was recorded in the north of Minas Gerais. Among them 54% were males and 46% females. A similar study was published in 2015, conducted in the pediatric admission unit of a school hospital in Londrina-PR, linked to the State University of Londrina, showed an admission rate of 52.2% for males and 47.8% for females. These numbers are comparable to those recorded in the present study, although in different places and regions.[2]

Leukemia represented to 20% of the cancer hospitalization cases for children in the city of Londrina-PR, being responsible, in most of the populations, for 25% to 35% of all the pediatric malignant neoplasms.[2] According to the present study the number of hospitalizations for leukemia in the municipality of Montes Claros represent 35% of the admissions of children between 0 and 14 years that occurred in the north of Minas Gerais.

The Oncological Assistance expansion plan approved by the Brazilian Health Ministry in 2000 aims to expand the capacity of the oncological service network provided by SUS through the implementation of Oncological High Complexity Centers, assuring the integral assistance of the patients. Many High Complexity Assistance Units in Oncology (UNACON) were opened in Brazil, among them one in the municipality of Montes Claros, that provides this service since 2003.[5]

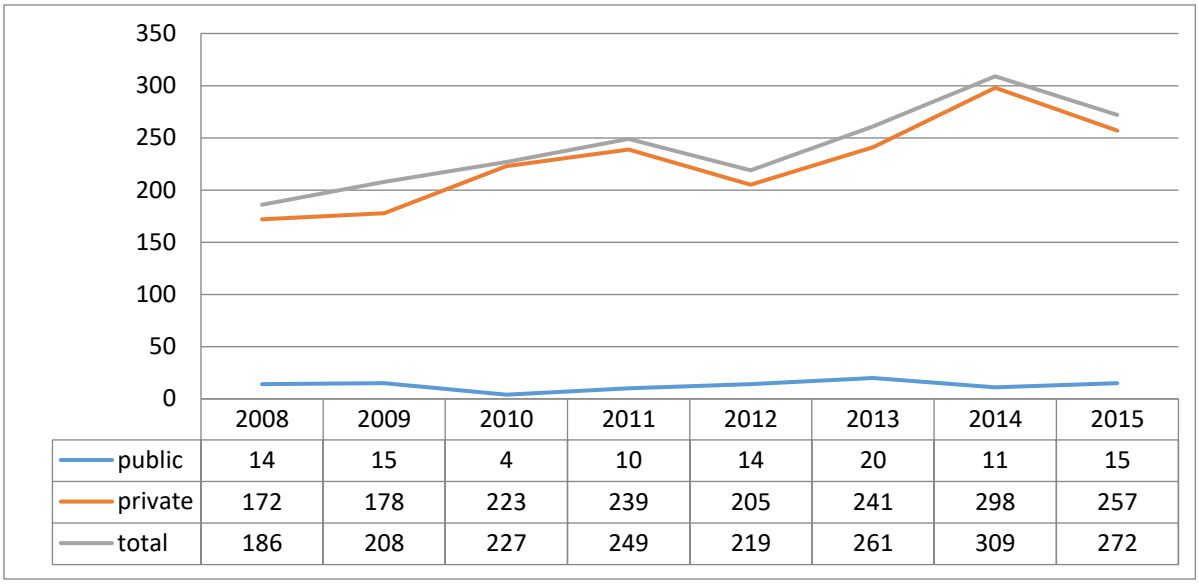
The Unified Health System (SUS) was created in Brazil in 1988 and its basic tenet is to assure the public access of healthcare to all citizens. Most of the facilities, including public, private, and university hospitals take part in the SUS as the result of several financial agreements.[9]

In the municipality of Montes Claros the oncological treatment is provided by two facilities. One of them is High Complexity Assistance Unit in Nutritional Therapy and Oncology (UNACON I) that provides children oncological services, being a reference unit in the cancer treatment in the Minas Gerais state. The other facility is a philanthropic institution that is also one of the major references for cancer treatment in the north of Minas Gerais. Both institutions provide public and private attendance, which explains the low incidence of admissions in the public sector, with 1556 of the attendances taking place in the private sector and 193 of the admissions occurring in the public sector.

In the municipality of Montes Claros, regarding the type of the attendance, 94.6% (1,813) of the oncopediatric patients were treated by the private sector. Public attendances represented 5.4% (103) of the total, differing from the nature of the institutions, since the reference facilities provide health services through the SUS, being either private or philanthropic (Chart 3).

Since 1920, in Brazil, the fight against cancer is shared by the public and private sectors. As soon as the treatment costs became too expensive the government actions started to be intermittent, increasing the search for private services.[1]

Chart 3 - Hospitalizations of children of both sexes between 0 and 14 years, due to neoplasms, in the period of 2008-2015, in Montes Claros – MG, Brazil, according to the type of facility (n = 1931).



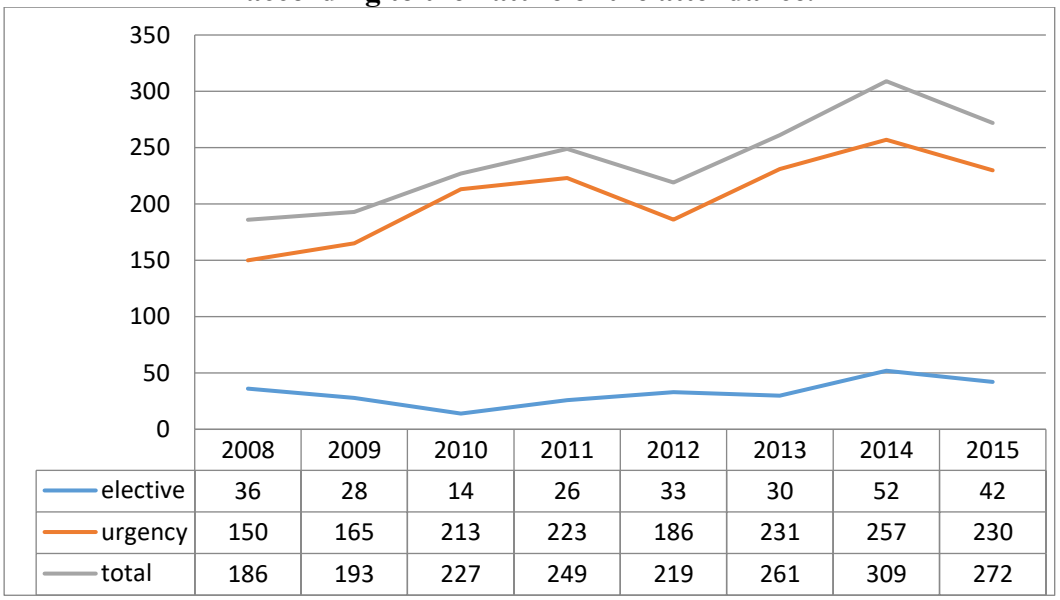
	2008	2009	2010	2011	2012	2013	2014	2015
public	14	15	4	10	14	20	11	15
private	172	178	223	239	205	241	298	257
total	186	208	227	249	219	261	309	272

Source: www.datasus.gov.br, data downloaded in April 2016, elaborated from the raw data.

Currently, most of the oncological treatment might be done without of hospitalization, this option being reserved to cases in which chemotherapy is required or in cases in which the following symptoms appear: fever, bleeding, paleness, fatigue, and pain. They are very frequent during the treatment, resulting in an increase in the number of urgent admissions. Based on this fact, we observe that the number of elective hospitalizations is related to the daily routine of neoplasm treatment, as well as to admissions to perform chemotherapy and radiotherapy as their major oncological treatment, covered by their private healthcare services.[5] A total of Regarding the nature of the service a total of 1,655 urgent attendances was performed, representing 86.4% of the total number. The elective attendances represented 261 cases, which represents 13.6% (Chart 4).

Chart 4- Hospitalizations of children of both sexes between 0 and 14 years, due to

neoplasms, in the period of 2008-2015, in Montes Claros – MG (n = 1916), according to the nature of the attendance.



	2008	2009	2010	2011	2012	2013	2014	2015
elective	36	28	14	26	33	30	52	42
urgency	150	165	213	223	186	231	257	230
total	186	193	227	249	219	261	309	272

Source: www.datasus.gov.br, data downloaded in April 2016, elaborated from the raw data.

As in other parts of the world, the profile of the diseases in Brazil is changing, with infectious and parasitic diseases being replaced by pathologies of circulatory system and neoplasms, which might also be explained by the increase of life expectancy of the population.[12] However, the mortality rates have shown a decline for children as a result of the significant advances related to secondary prevention and treatment technology.[13]

CONCLUSION

The results of the present investigation allowed the description of the number of hospitalizations per year in children with 0 to 14 years, checking the distribution by sex, type of facility (public or private) and nature of the attendance in the north of Minas Gerais, with an emphasis in the municipality of Montes Claros, that is a reference in oncological treatment. This study might assist health managers in decision-making when dealing with issues related to the number of beds available for this type of patients. It might also contribute to the development and

elaboration of hypotheses, based on epidemiological studies that might be used by hospital institutions referenced for child oncological treatment, therefore providing a better healthcare assistance.

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