



ORIGINAL ARTICLE

## Analysis of childhood leukemia mortality trends in Brazil, from 1980 to 2010<sup>☆,☆☆</sup>



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### KEYWORDS

Infant mortality;  
Leukemia;  
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### Abstract

**Objective:** Leukemias comprise the most common group of cancers in children and adolescents. Studies conducted in other countries and Brazil have observed a decrease in their mortality. This study aimed to evaluate the trend of mortality from leukemia in children under 19 years of age in Brazil, from 1980 to 2010.

**Methods:** This was an ecological study, using retrospective time series data from the Mortality Information System, from 1980 to 2010. Calculations of mortality rates were performed, including gross, gender-specific, and age-based. For trend analysis, linear and semi-log regression models were used. The significance level was 5%.

**Results:** Mortality rates for lymphoid and myeloid leukemias presented a growth trend, with the exception of lymphoid leukemia among children under 4 years of age (percentage decrease: 1.21% annually), while in the sub-group "Other types of leukemia", a downward trend was observed. Overall, mortality from leukemia tended to increase for boys and girls, especially in the age groups 10-14 years (annual percentage increase of 1.23% for males and 1.28% for females) and 15-19 years (annual percentage increase of 1.40% for males and 1.62% for females).  
**Conclusions:** The results for leukemia generally corroborate the results of other similar studies. A detailed analysis by subgroup of leukemia, age, and gender revealed no trends shown in other studies, thus indicating special requirements for each variable in the analysis.

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**PALAVRAS-CHAVE**

Mortalidade infantil;  
Leucemia;  
Modelos lineares;  
Criança;  
Adolescente

**Análise da tendência da mortalidade por leucemias infantojuvenis no Brasil, de 1980 até 2010****Resumo**

**Objetivo:** As leucemias compreendem o grupo mais frequente de neoplasias em crianças e adolescentes. Estudos conduzidos em outros países e no Brasil evidenciam, diminuição de sua mortalidade e aumento da sobrevida. O objetivo do estudo é conhecer a tendência de mortalidade por leucemia em menores de 19 anos de idade no Brasil de 1980 a 2010.

**Métodos:** Trata-se de estudo ecológico, retrospectivo de série temporal com dados extraídos do Sistema de Informação sobre Mortalidade, no período de 1980 a 2010. Realizados cálculos das taxas de mortalidade brutas e específicas por sexo e faixa etária. Para a análise de tendência utilizou-se modelos de regressão semilogarítmicos e lineares. Adotado nível de significância de 5%.

**Resultados:** As taxas de mortalidade por leucemias linfoides e mieloides apresentam tendência de crescimento com exceção das leucemias linfoides entre meninos menores de 4 anos de idade (queda percentual 1,21% ao ano), enquanto no subgrupo denominado "Outros tipos de leucemias" observa-se tendência de queda. De forma global, a mortalidade por leucemias tende a aumentar para meninos e meninas, principalmente nas faixas etárias de 10 a 14 anos (aumento percentual anual de 1,23% para meninos e 1,28% para meninas) e 15 a 19 anos (aumento percentual anual de 1,40% para meninos e 1,62% para meninas).

**Conclusões:** Os resultados para leucemias de forma geral corroboram com resultados de outros estudos similares. A análise minuciosa por subgrupo de leucemia, faixa etária e sexo revelou tendências não mostradas em outros estudos, indicando assim necessidades especiais na análise de cada variável.

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**Introduction**

Neoplasms have become important in the epidemiological scenario, as they represent one of the leading causes of death of in the 1 to 19 years age group in Brazil, second only to external causes, in 2010, despite the rarity of childhood cancer when compared to adults.<sup>1</sup>

In children, tumors are usually categorized into 12 specialty groups, according to the Third Edition of the International Classification of Childhood Cancer (ICCC). Leukemias constitute Group I, which comprises the subgroups: acute lymphocytic leukemia; acute myeloid leukemia; and chronic myeloproliferative disorders, including chronic myeloid leukemia and unspecified or combined types. Chronic lymphocytic leukemia is extremely rare in children and was therefore included in the subgroup of acute lymphocytic leukemia, the predominant type of leukemia in children, without affecting the incidence rates in this subgroup.<sup>2</sup>

Acute lymphoblastic leukemia represents the majority of cases among the diagnostic groups of lymphocytic leukemias (99%), so that the diagnosis group of ICCC becomes synonymous with acute lymphocytic leukemia. Likewise, acute nonlymphocytic leukemias are referred to as acute myeloid leukemia (representing 69%) and chronic myeloid leukemia, with 6-7% representation in its group.<sup>3</sup>

Leukemias have the highest incidence rates among childhood tumors in Brazil and worldwide. In a study conducted in the United States, of all neoplasms, leukemias showed a frequency of 26.3%. In Brazil, they were also the most

prevalent in 20 population-based cancer registries, with a median percentage of 29%, with the highest incidence occurring in the age group 1-4 years, with a median percentage of 31.6%. Leukemia was the leading cause of death among cancers in children and adolescents (1-18 years) from 2001 to 2005 in Brazil, with 1,897 deaths in females and 2,539 deaths in males.<sup>4</sup>

The present study aimed to assess the trend of mortality from childhood leukemia in Brazil from 1980 to 2010.

**Methods**

This is an ecological, retrospective, time-series study based on secondary data. The analysis included cases of death due to leukemia in children up to 19 years of age (inclusive), which occurred in Brazil and were recorded in the Mortality Information System (SIM) in the period of 1980-2010. Data were obtained from the website of the Department of Informatics of the Unified Health System (DATASUS)<sup>1</sup> of the Ministry of Health.

The categorization used was based on the International Classification of Diseases,<sup>5</sup> ninth and tenth revisions, ICD-9 (used from 1980 to 1995) and ICD-10 (used from 1996 to 2010), as they were the classifications used during the studied period.

The study considered deaths from leukemia those classified by codes 204 (lymphocytic leukemia), 205 (myeloid leukemia), 206 (monocytic leukemia), 207 (other specified leukemias), 208 (leukemia of unspecified cell type) in

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