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ORIGINAL ARTICLE

Clinical-epidemiological profile of oncology patients admitted to a Pediatric Intensive Care Unit

Perfil clínico-epidemiológico de pacientes oncológicos internados em uma Unidade de Terapia Intensiva Pediátrica

Perfil clínico-epidemiológico de los pacientes con cáncer ingresados en una Unidad de Cuidados Intensivos Pediátricos

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ABSTRACT

Objective: To analyze the clinical-epidemiological profile of cancer patients admitted to a Pediatric Intensive Care Unit. **Methodology**: Quantitative, retrospective and cross-sectional study, carried out by collecting data provided by the clinical pharmacy of the Hospital Universitário Materno Infantil, of the Universidade Federal do Maranhão located in São Luís - MA. **Results**: The predominant types of childhood cancers were tumors of the central nervous system (77.5% of medical records). It was identified that there was a higher incidence of cancer in children up to five years old (40%) and a predominance in males (57.5%). In relation to the treatments identified, 50% used drug therapy associated with antibiotic therapy, it was found that 5% of these patients used chemotherapy. **Conclusion:** It was found that hospitalizations due to cancer in the central nervous system were frequent in the study and that the most affected population were male children and that the most affected age was up to five years of age.

DESCRIPTORS: Child; Epidemiology; Pediatric Intensive Care Unit; Oncology.

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RESUMO

Objetivo: Analisar o perfil clínico-epidemiológico de pacientes oncológicos internados em uma Unidade de Terapia Intensiva Pediátrica. **Metodologia:** Estudo quantitativo, retrospectivo e transversal, sendo executado a partir do levantamento dos dados fornecidos pela farmácia clínica do Hospital Universitário Materno Infantil, da Universidade Federal do Maranhão, localizada em São Luís - MA. **Resultados:** Os tipos de cânceres infanto-juvenis predominantes foram tumores do sistema nervoso central, (77,5% dos prontuários). Identificou-se que houve maior prevalência de câncer em crianças com até 5 anos de idade (40%) e predominância no sexo masculino (57,5%). Em relação aos tratamentos identificados, 50% fizeram terapia medicamentosa associado à antibioticoterapia, foi constatado que em 5% desses pacientes foi usado quimioterapia. **Conclusão:** Constata-se que as internações por câncer no sistema nervoso central foram frequentes no estudo e que a população mais acometida foram crianças do sexo masculino e que a idade mais afetada foi de até cinco anos de idade.

DESCRITORES: Neoplasia; Criança; Epidemiologia; Unidade de Terapia Intensiva Pediátrica; Oncologia Neoplasia.

RESUMEN

Objetivo: Analizar el perfil clínico-epidemiológico de los pacientes oncológicos ingresados en una Unidad de Cuidados Intensivos Pediátricos. **Metodología**: Estudio cuantitativo, retrospectivo y transversal, realizado mediante la recolección de datos proporcionados por la farmacia clínica del Hospital Universitário Materno Infantil, de la Universidad Federal de Maranhão, ubicado en São Luís - MA. **Resultados**: Los tipos de cánceres infantiles predominantes fueron los tumores del sistema nervioso central (77,5% de los registros médicos). Se identificó que hubo mayor incidencia de cáncer en niños de hasta 5 años (40%) y predominio en el sexo masculino (57,5%). En relación a los tratamientos identificados, el 50% utilizó terapia farmacológica asociada a la antibioterapia, se encontró que el 5% de estos pacientes utilizó quimioterapia. **Conclusión:** Parece que las hospitalizaciones por cáncer del sistema nervioso central fueron frecuentes en el estudio y que la población más afectada fueron los niños varones y que la edad más afectada fue hasta los cinco años.

DESCRIPTORES: Neoplasia; Niño; Epidemiología; Unidad de Cuidados Intensivos Pediátricos; Oncología.

INTRODUCTION

Childhood and youth cancer is a group of diseases that have in common the uncontrolled proliferation of abnormal cells and can occur anywhere in the body. The most frequent tumors in childhood and adolescence are leukemia (affecting white blood cells), those that affect the central nervous system and lymphomas (affecting the lymphatic system)[1–3].

Unlike cancer in adults, in children, the disease is not usually associated with external risk factors and the causes are undefined and difficult to prevent. Childhood cancer usually affects the cells of the blood system and the supporting tissues. Because they are predominantly embryonic in nature, tumors in children and adolescents consist of undifferentiated cells, which, in most cases, provides a better response to current treatments[4-6].

The World Health Organization's Global Cancer Observatory – WHO (GLOBOCAN) of incidence and mortality from cancer pointed out that in 2020, about 19.3 million new cases of cancer and 10 million deaths were observed. In addition, more than 15,000 new cases of cancer are diagnosed annually in children and adolescents, and about 1,960 cases result in deaths[7].

In Brazil, according to data released by the National Cancer Institute José Alencar Gomes da Silva (INCA), for the 2020-2022 triennium, cancer represented the first cause of death from disease among children and adolescents (between 0 and 19 years old), with an occurrence of about 8,460 cases of children and youth neoplasms. These values correspond to an estimated risk of 137.87 new cases per million in males and 139.04 per million in females[7,8].

As in developed countries, in the Brazilian reality, cancer already represents the first cause of death (8% of the total) by disease among children and adolescents from one to 19 years. In the last four decades, progress in the treatment of childhood and adolescence cancer has been extremely significant. Today, about 80% of children and adolescents affected by this pathology can be cured if diagnosed early and treated in specialized centers. Most of them will have good quality of life after proper treatment[8-11].

The percentage of childhood tumors in Brazil is 3%. There will therefore be 12,500 new cases of cancer among children and adolescents under 19 years old. The Southeast and Northeast regions presented the highest number of new cases, with 5,300 and 2,900, respectively, followed by the Midwest with 1,800, South with 1,300 and North with 1,200[12].

Children and adolescents diagnosed with neoplasms may require long-term hospitalization for tests and treatments, including chemotherapy, radiotherapy, surgery, and the use of various drugs that together create physical and psychological limitations. Situations that may end up leading to a great emotional impact, including in the family, since during cancer treatment, patients and their families have to deal with the emergence of sudden signs and symptoms, frequent visits to the hospital and major changes in their daily lives[13-15].

According to the study conducted in the Northern Region of Brazil[16], advances in clinical and biological diagnosis, use of risk-appropriate therapies and optimization of supportive care result in dramatic increases in the cure rates for children with cancer. Knowing the reality and context of a population, as well as data on the incidence and characteristics of cancer in the country or specific regions, can be a useful tool to plan and monitor health actions, resulting in positive impacts through preventive measures[16].

The study is justified due to the number of cancer patients admitted to a pediatric ICU service not specialized in oncology. Given the above, this research aimed to analyze the epidemiological clinical profile of oncologic patients hospitalized in a Pediatric Intensive Care Unit (UTIP), since these indicators

are important to serve as a basis for improving the patient's needs and ensuring better quality of medical service.

OBJECTIVE

To analyze the clinical-epidemiological profile of cancer patients admitted to a Pediatric Intensive Care Unit.

METHODOLOGY

This is a quantitative, retrospective and cross-sectional study, being performed from the survey of data provided by the clinical pharmacy. Based on the analysis of the medical records of pediatric patients hospitalized to obtain information about admissions for neoplasms, recorded in the database through software spreadsheet (Microsoft Excel®) of the Pediatric Intensive Care Unit - UTIP, from the Maternal and Child University Hospital (HUUMI), of the Federal University of Maranhão (UFMA) located in São Luís-MA, considered tertiary level and reference for the whole state.

The present study was carried out in the city of São Luís, located in the state of Maranhão. It occupies more than half of the island of Upaon-Açu, being limited with the municipalities of Paço do Lumiar, São José de Ribamar, Raposa and the Atlantic Ocean. Its area is 831.7 km 2, and of this total 157.56 km2 are in urban perimeter. The municipality is part of the middle Norte Maranhense and the Microregion da Aglomeração Urbana de São Luís, located in the north of the state of Maranhão.

HUUMI, operates in procedures of high complexity such as: Maternal and Child medical clinics and surgery; High-risk pregnancy; Specialized outpatient clinics; Pediatric sector; Immunization; and Infectious-parasitic diseases (IPD). The multidisciplinary team of UTIP includes doctors, nurses, nursing technicians, physiotherapists, psychologists, social workers, speech therapists, nutritionists and clinical pharmacists. The unit has 10 pediatric ICU beds and also presents neonatal ICU services, which has 20 neonatal ICU beds.

As for the inclusion criteria, pharmacotherapeutic accompaniments performed by clinical pharmacists of patients hospitalized in PICU during the periods from January 2017 to December 2018 were considered, identifying patients hospitalized and diagnosed with cancer who had age between 0 to 18 years incomplete. The sociodemographic variables were considered: gender, age, treatments used, outcome (discharge or death) and types of cancer (the International Classification of Childhood Cancer (ICCI) was used to group these diseases according to morphological type. Regarding the exclusion criteria, medical records with incomplete data, patients who were not diagnosed with neoplasms and patients hospitalized outside the established period were disregarded.

In total, 480 medical records (patients admitted to PICU and who received pharmacotherapeutic follow-up from the clinical pharmacy) were analyzed, which after considering the inclusion and exclusion selection criteria, were reduced to a total of 40 medical records. The collected data were organized and compiled through the program Microsoft Excel® 2013, and the results analyzed in a descriptive way from the observed differences between the obtained proportions.

The present study was submitted and approved by the Scientific Committee of the University Hospital/ COMIC-HUUFMA, according to the opinion n: 3.696.655 and CAAE:18314619.9.0000.5087, where it respects the guidelines and criteria of Resolution 466/12 of the National Health Council (CNS) that mentions the ethical precepts established in regard to ensuring the legitimacy of information, privacy and confidentiality of information when necessary, making the results of this research public, will be considered throughout the construction process of the project.

RESULTS

The types of childhood and youth cancers identified in this study were predominantly tumors of the central nervous system and intracranial and intraspinal neoplasms where 31 medical records analyzed , with a total of 77.5%, followed by the medical records that included the diagnosis of soft-tissue sarcoma and germ cell tumors comprising 7.5% (n=3) of the total of both cancers, the other representatives were: 2.5% (n=1) for lymphoid leukemia, 2.5% (n=1) for liver tumor and 2.5 (n=1) was not specified. The distribution of cancer types in oncological patients is shown in table 1.

Table 1. Distribution of cancer types in oncology patients admitted to a Pediatric Intensive Care Unit (PICU), period from 2017 to 2018, MA, 2022 (N=40).

Types of Cancer	(n=40)	%
Central nervous system tumors and intracranial and intraspinal neoplasms	31	77,5
Soft tissue MCS	3	7,5
Germ cells	3	7,5
Lymphoid leukemia	1	2,5
Liver tumor	1	2,5
Not specified	1	2,5

NOTE: MCS - Sarcomas.

According to the medical records analyzed, 8.3% (n=40) of patients admitted to PICU in the years

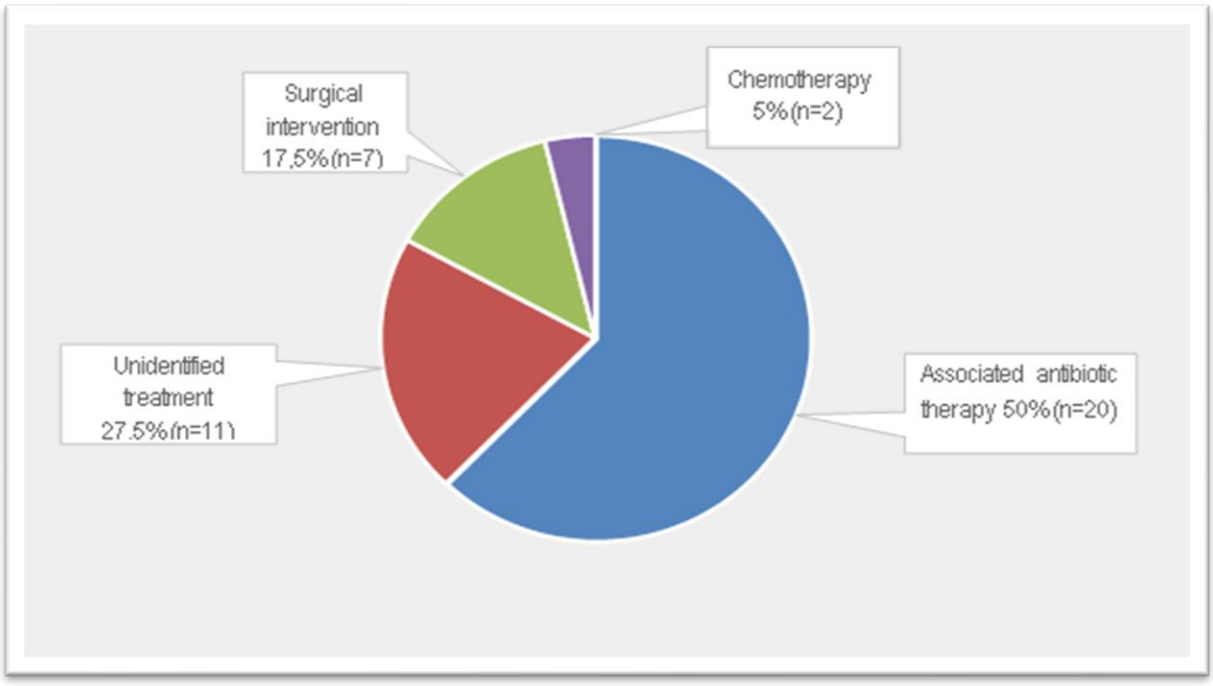
2017 to 2018 had confirmation of some type of cancer, 17.5% of these had undergone surgical intervention for tumors related to neoplasms. It was also found that there was a higher prevalence of cancer in children up to five years old (40%), and predominance in males (57.5%). The demographic characteristics of children are summarized in Table 2.

Table 2. Sociodemographic characteristics of the epidemiological clinical profile of pediatric oncology patients treated at the pediatric therapy unit of a public hospital in São Luís - MA, Brazil, 2022 (N=40)

Quantitative Variables	(n=40)	%
Age (years)		
≤ 1	6	15
2 and ≤ 5	15	40
6 and ≤ 9	8	20
10 and ≤ 12	4	10
Not informes	6	15
Gender		
Female	17	42,7
Male	23	57,5
Total	40	100

Regarding the types of treatment, it was identified that 50% (n=20) had drug treatment associated with antibiotic therapy and other drug therapies to treat other infections also existing. These are polymedicate patients, many used antibiotics restricted use because of bacterial or fungal infections. In 27.5% (n=11) of the medical records, the type of treatment used was not identified. Although it is not a specialized center for oncological treatment, it was found that 5% (n=2) of these patients used chemotherapy. It is noteworthy that in 17.5% (n=7) of the patients, besides drug therapies, they underwent surgical interventions. The characterization of types of treatment for pediatric oncology patients is demonstrated in Figure 1. The results also indicate that 57.5% (n=23) of the patients received discharge from PICU to the pediatric ward, while 10% (n=4) evolved to death. In addition, a predominance of deaths among male children was observed.

Figure 1. Characterization of the types of treatment of pediatric oncology patients treated in the pediatric therapy unit of a public hospital, in São Luis-MA, Brazil, 2022.



DISCUSSION

Cancer is one of the main causes of mortality in children and adolescents, and delayed diagnosis, inability to obtain an accurate diagnosis, unattainable treatment or abandonment are some of the causes that contribute to this outcome[18]. Hospitalizations due to malignant neoplasms have shown growth, especially in the population aged 0-19 years[19], and given the complexity of treatment and complications that may arise, a part of cancer patients will need support in a PPU[20].

In the present study, it is shown that CNS tumors and intracranial and intraspinal neoplasms had a higher prevalence in the studied population. Similar results were indicated in a study conducted between 2013 and 2020, identifying brain tumors as one of the major causes of mortality in childhood[21]. A similar study revealed that gliomas, especially glioblastomas, were the most frequent types of primary CNS tumors, affecting patients between 0 and 14 years old[22]. Corroborating with our results, researchers from the state of Goiás[23], evidenced in their work that the largest number of deaths in childhood is caused by CNS neoplasia, with mortality predominant among the age groups 1-4 years and 5-9 years. Our findings are consistent with studies conducted in other countries[24,25], in which they report a significant increase in CNS tumors in children and adolescents (0-19 years) and that this increase may be related to the greater accuracy in the diagnosis of this type of neoplasm.

The data presented here show a higher prevalence of cases in the male population, as well as in a study conducted in the state of Pernambuco that also showed a higher prevalence of diagnoses among boys, with 56.7% (n=55) of cases[21]. These findings are in line with the estimates of INCA researchers who expect 704,000 new cases of cancer, and 8,000 new cases of childhood cancer, for the three-year period 2023-2025 with a slight predominance of males[26]. Thus, with the emergence of new cases of cancer, an increase in mortality is also expected, mainly due to unequal access to diagnostic and treatment tools[27].

Infant and juvenile cancer mortality represents a major challenge for global public health, especially in developing countries[28]. A historical series from 1996 to 2017 showed that the cancer mortality rate in children and adolescents in Brazil was 8.07 deaths for males and 6.49 deaths for females per 100,000 inhabitants[29], other studies also evidenced the same trend[30,31]. In contrast to the results presented here, studies conducted in northeastern Brazil have identified that the distribution of cases of childhood cancer was higher among girls[17,23], these differences in prevalence may be related to different variables such as biological and genetic aspects, as well as environmental factors and differences in detection and access to health services[29].

Considering the therapeutic approaches that can be used to treat childhood and youth cancer, patients in this study underwent surgical intervention, chemotherapy and antibiotic therapy. Surgical resection, for example, is correlated with a significantly better survival rate when there is complete tumor removal mainly in the early stages of the disease, In addition, other factors such as age and tumor location are factors that influence the success of this approach[32]. The use of minimally invasive techniques has shown positive results in tumor removal and reduction of neurological damage[33].

The combination of therapies contributes significantly to the success of the treatment of childhood and youth cancer. Chemotherapy, when combined with other interventions such as surgery, has high cure rates, since it works by destroying cancer cells and preventing recurrence[33,34]. In this context, to avoid post-surgical complications and considering that chemotherapy leads to immunosuppression of the patient, antibiotic therapy is essential during cancer treatment, since these patients will have a higher risk of developing serious bacterial infections. The choice of antibiotic should be rational so that it is not harmful to the already weakened patient and should be effective in fighting the infectious agent[35].

Study Limitations

The present study presents a time-frame limitation to evaluate different factors as clinical manifestations presented by patients; in addition to long-term observational studies of patients to better establish the development of the disease and the reason for their admission to a Pediatric Intensive Care Unit.

Contributions to the Area of Nursing, Health or Public Policy

The present study demonstrates the importance of understanding the profile of patients who attend health units, as well as the importance of clinical pharmacy to support the clinical care of patients, since these data were observed through the pharmacotherapeutic follow-ups performed by clinical pharmacists of patients hospitalized in UTIP. By describing this clinical-epidemiological profile, the management levels will have an important aid to develop training and strategies adapted to local needs.

CONCLUSION

Research that delineates the clinical and epidemiological profile is crucial to understand the distribution and factors related to cancer in children and adolescents. This enables the identification of vulnerable groups and improves prevention and treatment strategies. Such investigations provide essential data for the optimization of health resource allocation, the detection of areas with greater need and the evolution of public health policies, thus helping to decrease mortality rates and increase survival rates.

Treatment of childhood and youth cancer involves a number of complex approaches, including surgery, chemotherapy, and the use of antibiotics. The combination of these therapies is essential to increase cure rates, with chemotherapy essential to eliminate cancer cells, while surgery contributes to effective tumor removal. However, patients undergoing these approaches have a higher risk of developing severe infections, making antibiotic therapy a vital part of treatment to prevent complications and ensure the patient's recovery.

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