PORTUGUESE JOURNAL OF PEDIATRICS

PERMANYER

Check for updates

ORIGINAL ARTICLE

The Portuguese Pediatric Oncology Centre in support of pediatric cancer patients from Portuguese-speaking African countries: the experience of a decade of a cooperation agreement

Cátia Martins, Sónia Silva, Filipa Curinha, Mónica Jerónimo, and Manuel João Brito

Pediatric Oncology Centre, Hospital Pediátrico, Unidade Local de Saúde de Coimbra, Coimbra, Portugal

Abstract

Introduction and Objectives: Pediatric cancer is a leading cause of non-traumatic death in children over the age of one in high-income countries. However, low- and middle-income countries (LMICs) experience higher incidence and mortality rates due to late diagnoses, treatment abandonment, and inadequate healthcare systems. This study characterizes pediatric cancer patients from Portuguese-speaking African countries (PALOP) treated at a Portuguese Pediatric Oncology Centre (POC) under health cooperation agreements. **Methods:** Retrospective descriptive study of patients referred to a POC between January 2013 and December 2022. Since 2015, the POC has collaborated with the only National Reference Centre for Onco-Ophthalmology. **Results:** A total of 43 patients were referred, 65% of whom were male, with a median age of 3.2 years. Most patients came from Guinea-Bissau (34.9%), Cape Verde (32.6%), and Angola (23.3%), with 72.1% evacuated under cooperation agreements. Only 30.2% had initiated treatment in their home country. The median time from symptom onset to the POC consultation was 166 days. Solid tumors were most prevalent (76.7%), especially retinoblastoma (48.8%) and rhabdomyosarcoma (15%). Leukemia accounted for 45.5% of non-retinoblastoma cases. Metastatic disease significantly increased mortality risk ($p < 0.001$). Recurrence occurred in 23.3%, and 32.6% of patients died. Currently, 58.0% are out of treatment. **Discussion:** The high prevalence of retinoblastoma reflects the collaboration between the POC and the only National Reference Centre for Onco-Ophthalmology. The overall survival rate of 67.4% was higher than typically observed in LMICs, partly due to the high number of children with retinoblastoma. However, this improved survival rate, emphasizes the need for improved diagnostic and treatment strategies, as well as strengthened international collaboration to enhance pediatric cancer care in resource-limited settings.

Keywords: Neoplasms. Child. Developed countries. Less-developed countries.

***Correspondence:**
Cátia Martins
E-mail: aitacmartins@gmail.com

Received: 28-09-2024
Accepted: 05-06-2025
https://pjp.spp.pt

Available online: 02-07-2025
Port J Pediatr. (ahead of print)
DOI: 10.24875/PJP.24000081

O Centro Português de Oncologia Pediátrica em apoio a crianças com câncer dos países africanos de língua portuguesa: a experiência de uma década de um acordo de cooperação

Resumo

Introdução e Objetivos: A doença oncológica pediátrica é uma das principais causas de morte não traumática em crianças mais de um ano, em países de elevado rendimento. Nos países de baixo e médio rendimento (PBMR), a incidência e mortalidade são superiores pelo diagnóstico tardio, abandono de tratamento e sistemas de saúde insuficientes. Este estudo caracteriza os doentes oncológicos pediátricos provenientes de Países Africanos de Língua Oficial Portuguesa (PALOP) tratados num Centro de Oncologia Pediátrica (COP) português. **Métodos:** Estudo retrospetivo descritivo de doentes de PALOP tratados num COP, entre janeiro/2013 e dezembro/2022. Desde 2015, o COP colabora com o único Centro de Referência Nacional de Onco-Oftalmologia. **Resultados:** Foram incluídos 43 doentes, 65% do sexo masculino, com idade mediana de 3,2 anos. A maioria proveio da Guiné-Bissau (34,9%), Cabo Verde (32,6%) e Angola (23,3%); 72,1% foram evacuados ao abrigo de acordos de cooperação. Apenas 30,2% iniciaram tratamento no seu país e decorreu uma mediana de 166 dias desde o início de sintomas até à observação no COP. Os tumores sólidos predominaram (76,7%), sobretudo o retinoblastoma (48,8%) e o rabdomiossarcoma (15%). Excluindo os retinoblastomas, as leucemias representaram 45,5% dos casos. A presença de doença metastática à admissão do COP aumentou o risco de mortalidade ($p < 0,001$). A recidiva da doença ocorreu em 23,3% e 32,6% dos doentes faleceram. **Discussão:** A elevada prevalência de retinoblastomas reflete a colaboração do COP com o único Centro de Referência Nacional de Onco-Oftalmologia. A sobrevida global (67,4%) foi superior à observada em PBMR, em parte justificada pelo elevado número de crianças com retinoblastoma. Contudo, esta sobrevida superior destaca a necessidade de melhorar o diagnóstico e tratamento, e reforçar colaborações internacionais para facilitar os cuidados oncológicos em ambientes com recursos limitados.

Palavras-chave: Criança. Cancro. Países em Desenvolvimento. Países desenvolvidos.

Keypoints

What is known
- Pediatric cancer, although rare, is a leading cause of non-traumatic death in children over one year of age in high-income countries (HICs).
- In HICs, the five-year survival rate for children with cancer has increased in recent years to approximately 80%, in stark contrast to the 20% survival rate in low- and middle-income countries (LMICs).
- In LMICs, higher incidence and mortality rates are prevalent due to late diagnoses, treatment abandonment, and inadequate healthcare systems.

What is added
- The prevalence of solid tumors, even when excluding retinoblastoma cases, was higher than that of leukemias among patients referred from Portuguese-speaking African Countries.
- Only 30.2% of patients had begun antineoplastic therapy in their home country, even though it takes a median of 166 days from symptom onset to their first observation at a Portuguese Pediatric Oncology Centre.
- Despite delays in diagnosis and treatment, the overall survival rate was 67.4%, partly due to the high incidence of retinoblastoma, a tumor with a generally good prognosis. When excluding these cases, the survival rate drops to 54.5%, which remains higher than the typical survival rates observed in LMICs.

Introduction

Oncological disease is rare in the pediatric age, but in high-income countries (HIC) in particular, it is the leading cause of non-traumatic death in children over one year of age[1,2]. It is estimated that one in every 260 children and adolescents will be diagnosed with cancer before the age of 20[2], with approximately 280,000 diagnoses and 110,000 cancer-related deaths reported worldwide in 2020[3]. Current figures may be higher, as pediatric cancer is underdiagnosed in many regions[1].

In the United States of America (USA), according to Cancer Statistics 2023[2], leukemia is the most common pediatric malignancy (28%), followed by central nervous system (CNS) tumors (26% of which, nearly one third, are benign or low-grade malignancies). Among adolescents, CNS tumors are most frequent (21%), followed by lymphomas (19%). Advances in diagnostics and treatment over recent decades have markedly improved

survival outcomes. Between 1970 and 2020, mortality from childhood and adolescent cancers in the USA declined by 70% and 64%, respectively, largely due to enhanced treatment protocols and improved management of side effects. The five-year survival rate increased from 58% in the mid-1970s to 85% between 2012 and 2018, and from 68% to 86% in adolescents[2]. Similar trends have been observed in Europe, mainly HICs, where survival reached approximately 80% by 2007[4]. In Portugal, considered a HIC, 387 new pediatric neoplasms were diagnosed in 2020, according to the National Oncological Registry of All Tumors in the Portuguese Resident Population, accounting for 0.73% of all cancer cases, with mortality rates ranging from 1.2 and 4.6 deaths per 100,000 person-years[5]. In contrast, low-and middle-income countries (LMICs) face considerable challenges. Epidemiological data remains limited, but a higher incidence of childhood cancer has been observed, likely driven by genetic predispositions, exposure to infectious diseases, and environmental factors[6]. This incidence is expected to increase by 30% by the end of the decade[7-9]. Low health literacy and limited access to care often lead to delayed or missed diagnoses, worsening prognosis and lowering survival rates[1]. It is estimated that nearly 90% of children with cancer reside in LMICs[10,11], where the cure rate is around 20%, significantly lower than the 80% observed in HICs[12]. Late presentation, treatment abandonment, coexisting conditions (such as malnutrition and infections), insufficient palliative care, and ineffective healthcare systems represent major limitations to pediatric oncological care in LMICs[13]. Africa is particularly affected, accounting for over 20% of global pediatric cancer cases[14], with incidence projected to increase by 70% between 2012 and 2030[15]. Despite this growing burden, fewer than half of Sub-Saharan African countries have an established policy or strategic plan for cancer control[15]. Addressing these disparities will require investment in healthcare infrastructure, the implementation of national cancer control plans, and strengthened international collaboration[11].

Between 1977 and 1992, Portugal established health cooperation agreements with Portuguese-speaking African countries (PALOP), namely Angola, Mozambique, Cape Verde, Guinea-Bissau, and São Tomé and Príncipe, which remain active[16]. These agreements regulate the evacuation of patients from PALOP to Portuguese public hospitals in cases where the former do not have adequate resources to treat certain diseases[17]. This study aims to characterize the population of children and adolescents with cancer from PALOP who were treated at a Pediatric Oncology Centre (POC) in Portugal.

Methods

This was a retrospective, descriptive, single-center study based on the clinical records of children and adolescents from PALOP, observed at the Hospital Pediátrico of the Unidade Local de Saúde de Coimbra (ULS Coimbra) with a diagnosis of oncological disease, from 1 January 2013 to 31 December 2022.

The POC at ULS Coimbra is one of four pediatric oncology centers in Portugal. It treats all children and adolescents diagnosed with cancer up to the age of 17 years and 364 days, primarily serving the central region of Portugal. Notably, since 2015, it has collaborated with the only National Reference Centre in Onco-Ophthalmology, receiving and managing all Portuguese and PALOP children diagnosed with retinoblastoma.

All patients under 18 years of age with oncological disease, born in one of the PALOP, were included in the study. Data was obtained according to the General Data Protection Regulation. The study was conducted in accordance with ethical and legal principles, following the recommendations of the World Medical Association's revised Declaration of Helsinki (2013), the International Committee of Medical Journal Editors, and the Committee on Publication Ethics.

Demographic and clinical characteristics were analyzed, including sex, age, country of origin, diagnosis, and duration of symptoms until the first medical assessment and from this until the first consultation at the POC - ULS Coimbra. Staging, treatment carried out in the country of origin, the number of hospitalizations per year and their duration, disease progression, recurrence, and follow-up were also evaluated.

This was a convenience sample, so the sample size was defined by the total number of children and adolescents diagnosed with cancer during the study period.

Statistical analysis was conducted using the IBM Statistical Package for the Social Sciences (SPSS®), version 27. The mean, standard deviation, median, and interquartile range (IQR) were calculated for the continuous variables, while relative and absolute frequencies were determined for nominal variables. The normality of the distributions was assessed using the Kolmogorov-Smirnov test. Survival analysis was performed based on Kaplan-Meier curves. Chi-square and Kruskal-Wallis tests were used to determine associations and differences between variables, respectively. The significance level (α) was set at 0.05.

Table 1. Demographic and clinical characteristics of the sample

		Country of origin				
	Total (n = 43)	Guinea-Bissau (n = 15)	Cape Verde (n = 14)	Angola (n = 10)	Mozambique (n = 2)	São Tomé e Príncipe (n = 2)
Male sex, n (%)	28 (65.1)	12 (80)	10 (71.4)	4 (40)	1 (50)	1 (50)
Age in years, median (IQR)	3.2 (5.3)	4.3 (9.3)	2.4 (7.1)	2.3 (2.7)	1.7 (1.4)	6.9 (2.2)
Solid tumors, n (%)	33 (76.7)	10 (66.7)	11 (78.6)	9 (90)	1 (50)	2 (100)
Solid tumors with metastatic disease, n (%)	8 (24.2)	4 (40.0)	3 (27.3)	1 (11.1)	0 (0)	0 (0)
Start of treatment in country of origin, n (%)	13 (30.2)	4 (26.7)	4 (28.6)	2 (20)	2 (100)	1 (50)
Days elapsed from the onset of symptoms to the first medical observation, median (IQR)	92 (212)	101 (325)	70.5 (182)	153 (207)	56.5 (5.5)	265.5 (120.5)
Days elapsed from the first observation to the consultation at the POC, median (IQR)	74 (112)	85 (185)	68 (89)	74 (197)	131.5 (110.5)	36 (13)

IQR: interquartile range; POC: pediatric oncology center.

Results

Between 1 January 2013 and 31 December 2022, 43 pediatric patients from PALOP with a diagnosis of oncological disease were treated at the POC of ULS Coimbra. Of these, 65.1% (n = 28) were male and had a median age of 3.2 years (IQR 5.3 years). In this sample, 34.9% (n = 15) came from Guinea-Bissau, 32.6% (n = 14) from Cape Verde, 23.3% (n = 10) from Angola, 4.7% (n = 2) from Mozambique and 4.7% (n = 2) from São Tomé and Príncipe. The sample characterization is presented in table 1.

Out of the patients referred to the POC, 72.1% (n = 31) were evacuated under the cooperation agreements between the Portuguese government and the PALOP. A statistically significant difference ($p < 0.001$) was identified between the patients' origin and referral through the evacuation process. A total of 93.3% (n = 14) were evacuated from Guinea-Bissau, 20% (n = 2) from Angola, 85.7% (n = 12) from Cape Verde, 100% (n = 2) from Mozambique, and 100% (n = 2) from São Tomé and Príncipe.

From the onset of symptoms to the first medical assessment in the country of residence, an average of 158.5 days elapsed, with a median of 92.0 days (IQR 212 days). From the first assessment in the country of origin to the first consultation at the POC of ULS Coimbra, the mean duration was 113.9 days, with a median of 74.0 days (IQR 112 days). There was no statistically significant relationship found between the country of origin and the time elapsed until the first medical observation or until the observation at the POC.

A median of 4.5 new patients (IQR 3.3) were observed annually. These patients required a median of 39 hospitalizations per year (IQR 31.5), with a median duration of four days (IQR 5.8).

Table 2 presents the diagnosis and clinical course according to the country of origin.

Regarding diagnosis, among patients with leukemia, 14.0% (n = 6) had acute lymphoblastic leukemia (7.0% B-cell and 7.0% T-cell), and 7.0% (n = 3) had myeloblastic leukemia (4.7% acute, 2.3% chronic).

At the initial observation at the POC, among the patients with solid tumors, 24.2% (n = 8) were at stage IV, and a statistically significant relationship was identified between the tumor type and the presence of metastasis ($p < 0.001$): three (37.5%) patients had a diagnosis of osteosarcoma, three (37.5%) of retinoblastoma, one (12.5%) of neuroblastoma, and one (12.5%) of rhabdomyosarcoma.

Concerning antineoplastic therapy, 30.2% (n = 13) had started treatment in their country of origin, among which 11.6% (n = 5) received chemotherapy, 9.3% (n = 4) corticosteroid therapy, 2.3% (n = 1) imatinib, 4.7% (n = 2) underwent enucleation, and 2.3% (n = 1) had started treatment that was not specified. No association was found between the start of therapy and the country of origin or the presence of metastasis. Palliative therapy was initiated upon arrival at the POC in 7.0% (n = 3) of patients.

During follow-up at the POC, disease recurrence was observed in 23.3% (n = 10), with a mean time to recurrence of 337.8 days and a median of 260 days (AIQ 744). The event-free survival curve is presented in figure 1.

Table 2. Diagnosis and clinical course

		Country of origin				
	Total (n = 43)	Guinea Bissau (n = 15)	Cape Verde (n = 14)	Angola (n = 10)	Mozambique (n = 2)	São Tomé e Príncipe (n = 2)
Solid tumors, n (%)	33 (76.7)	10 (66.7)	11 (78.6)	9 (90.0)	1 (50.0)	2 (100)
Glioma	1 (2.3)	0 (0)	0 (0)	0 (0)	0 (0)	1 (50.0)
Hepatoblastoma	1 (2.3)	0 (0)	0 (0)	0 (0)	1 (50.0)	0 (0)
Nephroblastoma	1 (2.3)	1 (6.7)	0 (0)	0 (0)	0 (0)	0 (0)
Neuroblastoma	1 (2.3)	1 (6.7)	0 (0)	0 (0)	0 (0)	0 (0)
Osteosarcoma	3 (7.0)	1 (6.7)	2 (14.3)	0 (0)	0 (0)	0 (0)
Rhabdomyosarcoma	5 (11.6)	1 (6.7)	3 (21.4)	1 (10.0)	0 (0)	0 (0)
Retinoblastoma	21 (48.8)	6 (40.0)	6 (42-3)	8 (80.0)	0 (0)	1 (50.0)
Leukemia, n (%)	10 (23.3)	5 (33.3)	3 (21.4)	1 (10.0)	1 (50.0)	0 (0)
ALL B/T	6 (14.0)	2 (13.3)	3 (21.4)	1 (10.0)	0 (0)	0 (0)
AML/AMC	3 (7.0)	2 (13.3)	0 (0)	0 (0)	1 (50.0)	0 (0)
JMML	1 (2.3)	1 (6.7)	0 (0)	0 (0)	0 (0)	0 (0)
Relapse, n (%)	10 (23.3)	4 (26.7)	4 (28.6)	2 (20.0)	0 (0)	0 (0)
Under surveillance, n (%)	25 (58.1)	6 (40)	9 (64.3)	7 (70)	2 (100)	1 (50)
Deaths, n (%)	14 (32.6)	6 (40)	4 (28.6)	3 (30)	0 (0)	1 (50)

ALL: acute lymphoblastic leukemia; AML: acute myeloid leukemia; CML: chronic myeloid leukemia; JMML: juvenile myelomonocytic leukemia.

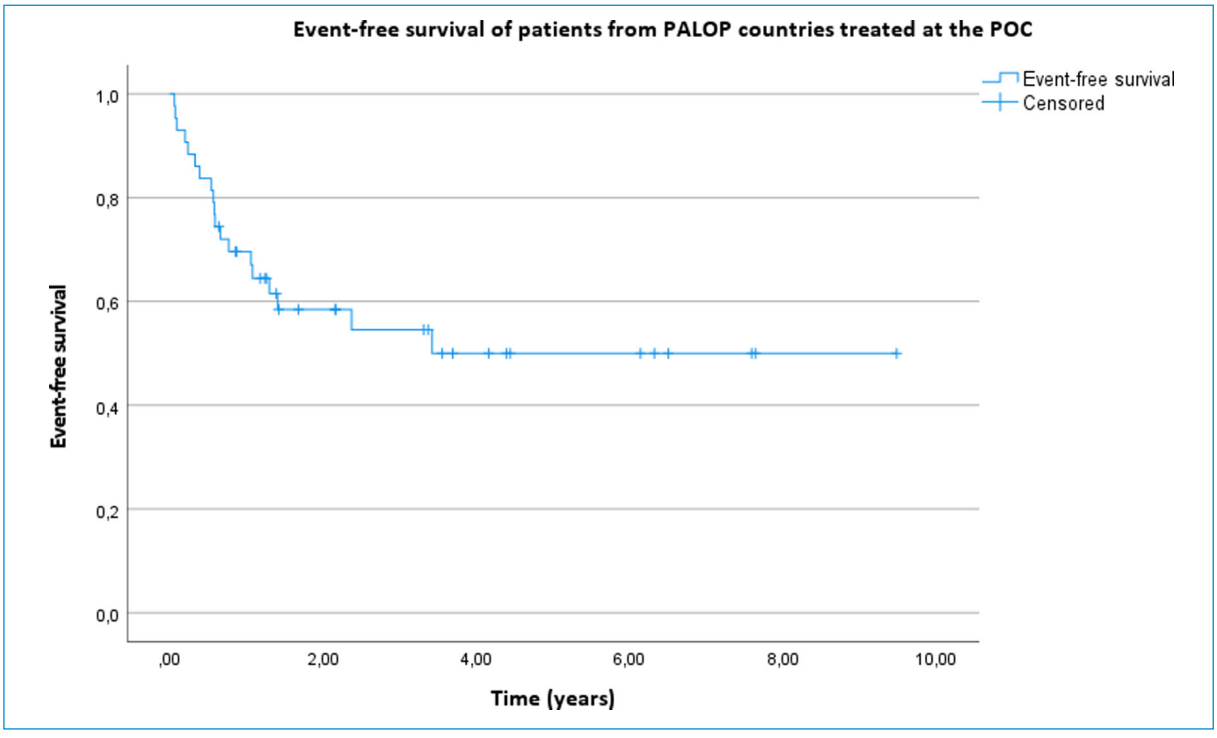

Figure 1. Event-free survival of patients from PALOP treated at the POC (Kaplan-Meier curve).

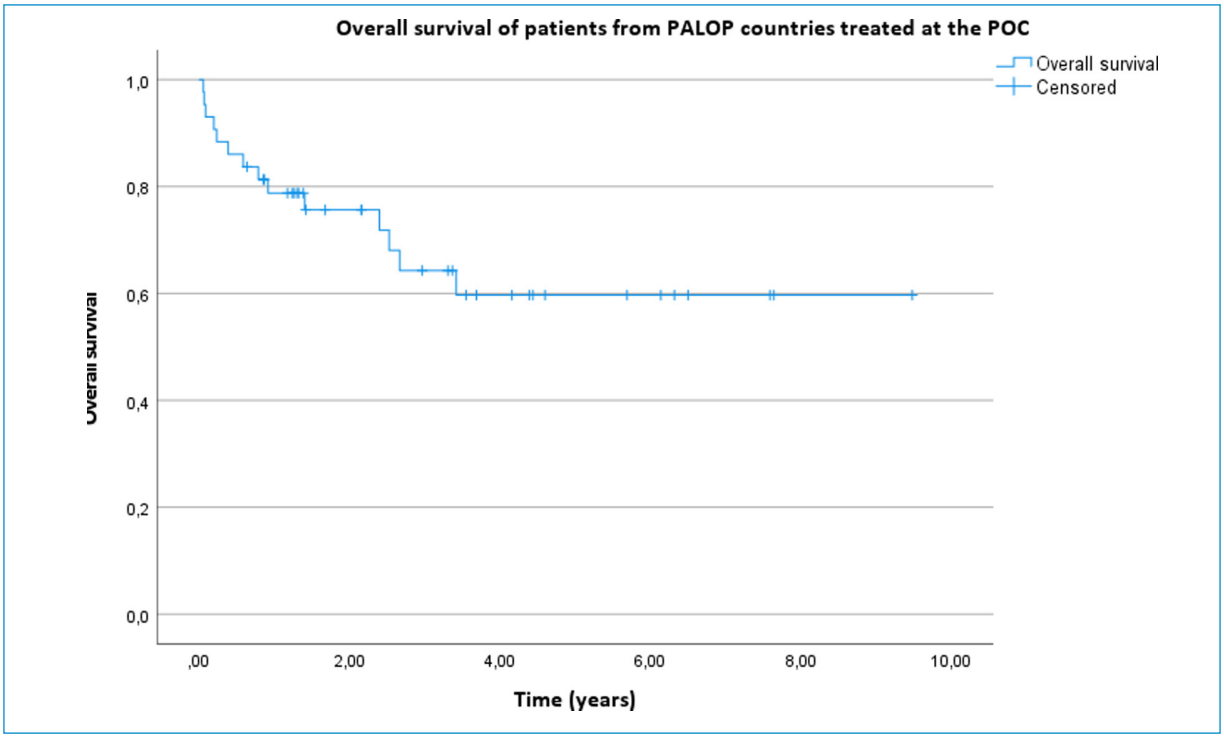

Figure 2. Overall survival of patients from PALOP treated at the POC (Kaplan-Meier curve).

Currently, 58.1% (n = 25) of patients have completed treatment: 46.5% (n = 20) are under surveillance at the POC and 11.6% (n = 5) are being followed up at another hospital or in their country of origin. Of the remaining patients, 9.3 % (n = 4) are undergoing treatment and 32.6% (n = 14) have died. The overall survival curve of the sample is presented in figure 2.

A statistically significant relationship was found between the presence of metastatic disease and mortality ($p < 0.001$): of the eight patients with metastasis, seven (87.5%) died. However, of the 14 patients who died, 10 (71.4%) had solid tumors (four with retinoblastoma, two with rhabdomyosarcoma, two with osteosarcoma, one with neuroblastoma, and one with glioma), of which seven (50.0%) had metastatic disease.

Excluding cases of retinoblastoma, out of a total of 22 patients, 54.5% (n = 12) had solid neoplasms and 45.5% (n = 10) had leukemia. Disease recurrence was observed in 18.2% (n = 4) of patients and 45.5% (n = 10) died.

Discussion

This is a heterogeneous sample in terms of the origin of the patients followed at the POC, with the countries of Guinea-Bissau, Angola, and Cape Verde representing 90% of the patients observed at the POC. The high number of patients from Guinea-Bissau can be justified by the voluntary cooperation between members of the POC and doctors from this country, enabling discussion and perhaps earlier referral for these patients. In Angola and Mozambique, there are Pediatric Oncology Services, and therefore greater diagnostic accuracy and treatment capacity, with less need for evacuation of this type of pathology to Portugal. Although a high number of patients came from Angola, this is justified by the significant percentage of patients (80%) who did not come through the evacuation process but rather by their own means or with the support of Angolan charity institutions.

The epidemiology of neoplastic diseases on the African continent differs significantly from that described in HICs[18]. In many centers, the lack of complementary diagnostic methods leads to underdiagnosis. However, some oncological diseases are more common on this continent, particularly those related to infections (Kaposi's sarcoma, Burkitt's lymphoma, Hodgkin's lymphoma, and hepatocellular carcinoma) and embryonal neoplasms (such as retinoblastoma and nephroblastoma)[18-20]. According to Stefan DC et al.[18], who evaluated the distribution of pediatric cancer in Africa, the most frequent pediatric tumors on this continent were lymphomas, nephroblastoma (which can have an incidence of over 20% in some countries), Kaposi's sarcoma, and retinoblastoma. According to the Registo Oncológico Nacional de Todos os Tumores na

População Residente em Portugal, in 2020[5], the main diagnoses up to the age of 19 were CNS tumors at 15.7%, acute lymphoblastic leukemia at 11.6%, followed by non-Hodgkin's lymphomas at 9.6%, and bone tumors at 8.3%. In the sample presented, solid tumors were the most common, accounting for 76.7% of cases. Among these, the most common was retinoblastoma, identified in 48.8% of patients. As we mentioned before, this is one of the most common neoplasms in some African countries. It is simple to diagnose and, if diagnosed early, has a high cure rate[18]. In Portugal, in 2020, it represented about 0.8% of oncological diagnoses[5]. However, it is important to note that the POC of the ULS Coimbra collaborates with the only National Reference Centre for Onco-Ophthalmology. For this reason, all cases of retinoblastoma referred to Portugal are directed to this center, unlike other malignant tumors, which may explain the high prevalence of this pathology. In this case, high mortality was observed among retinoblastoma cases, with 19.0% of deaths (n = 4), which may be justified by delayed diagnosis and a high rate of metastasis (37.5%). Excluding retinoblastoma cases, leukemia was the most frequent diagnosis, observed in 45.5% of the remaining patients. This sample did not show a low incidence of this pathology in LMICs, which can probably be explained by the fact that this is a convenience sample and thus not representative of the PALOP population[21]. Regarding soft tissue sarcomas, these represent 4 – 8% of all pediatric neoplasms in Caucasian populations, and 4.9% in Portugal[5]. Of these, two-thirds to three-quarters are rhabdomyosarcomas. In the African continent, the incidence of this neoplasm is very variable and based on limited scientific data[19]. In this sample, it accounts for 11.6% of cancer cases, making it the third most common and significantly higher than reported in our country, probably due to greater accessibility in diagnosis. Bone tumors represent about 5% of all neoplasms in children. Their incidence in African countries is not clearly described, as histological confirmation is not always available. However, osteosarcoma appears to be the most common bone neoplasm[19]. In this study, it accounts for 7% of cancer cases, similar to the known incidence in Portugal[5]. They presented a poor prognosis, probably due to late referral: all three cases presented with metastatic disease and two eventually died. Regarding CNS tumors, these are the second most commonly described malignant disease in children in HICs, which seems to be related to the high availability of diagnostic methods. In the African continent and other LMICs, the lower incidence rates probably reflect the difficulty in accessing neuroradiology exams, with a consequent delay in diagnosis and underdiagnosis of this pathology[18,21]. The incorrect assumption of infectious differential diagnoses, such as cerebral malaria, tuberculous meningitis, and bacterial meningitis, also appears to contribute to this underdiagnosis[18]. In this study, only one CNS tumor case was identified, corresponding to 2.3% of the total, which is quite different from Portuguese records, where it is the most frequent oncological diagnosis in the pediatric age[5]. Regarding embryonal neoplasms, nephroblastoma is one of the most common solid tumors in Africa, with an incidence of over 20% in some countries, while in HICs it does not exceed 6 – 7%[18]. Contrary to expectations, only one case was identified in this sample. Neuroblastomas account for 6 – 10% of all childhood cancers. In Africa, the incidence is much lower, which probably reflects, once again, the lower accessibility of complementary diagnostic methods[19], which is consistent with the results of this sample, with only one case identified.

This sample does not reflect the distribution of oncological disease in PALOP, as not all diagnosed cancer cases are referred to Portugal because there are Pediatric Oncology Services in two of these countries. It only evaluates the cases referred to the POC of the ULS Coimbra. There is underdiagnosis or death of some children who are referred or who do not get referred for evacuation. These factors create bias in the sample, which may explain the high number of leukemia cases in our study, which was not expected in a sample from an LMIC.

It is essential to understand the epidemiology of oncological disease in LMICs and to create effective policies for the early diagnosis and treatment of this pathology. Thus, it is crucial to create or update national cancer disease registries, which are still scarce[15]. The lack of resources available makes these countries dependent on international collaboration, so governments must implement and finance local cancer policies[15]. A significant improvement in the treatment outcomes of Francophone African children with oncological disease has been achieved through various forms of international collaboration with HICs, particularly with France[20]. Partner countries have contributed not only to the training of healthcare professionals skilled in oncological care, but also to the creation and development of infrastructure, complementary diagnostic methods, and treatment protocols for oncological disease adapted to LMICs. They have also provided a large percentage of the funds needed to achieve these goals[20]. Priority should be given to interventions that also improve general pediatric care, especially through the enhancement of supportive care and complementary diagnostic

methods. Thus, the existing local infrastructure should be the starting point for any initiative in cancer treatment[22]. International collaboration can also facilitate the evacuation of these patients for treatment after referral, as is the case with the established protocols with the Portuguese government. However, based on the results of this study, it can be seen that, although most patients arrive in Portugal through the evacuation process, it takes far too long than would be necessary in this context.

Despite the delay in diagnosis and the consequent presence of metastatic disease, the survival rate was 67.4%, significantly higher than the 20 – 40% observed in LMICs[20]. This rate can be partly justified by the high incidence of retinoblastomas, which have a good prognosis; excluding these cases, the survival rate drops to 54.5%.

The limitations of this study have been presented throughout the discussion, particularly the fact that it is based on a convenience sample that evaluates only the cases referred to the POC of ULS Coimbra. Finally, it should be noted that, despite reflecting 10 years of oncological disease evacuated from PALOP, the sample size is small, which limits the drawing of reliable conclusions.

Conclusion

The epidemiological analysis of oncological disease in this sample from African countries reveals significant disparities in incidence patterns and predominant neoplasms compared to those described in the LMICs. This study found a high prevalence of solid tumors in children and adolescents, especially retinoblastomas, which emerged as the most common neoplasm. Mortality was lower than observed in LMICs, probably due to the high number of children with retinoblastoma and the low number of children with metastatic disease.

The creation or updating of national oncological disease registries is essential for understanding the epidemiology and developing effective policies to combat pediatric cancer in LMICs. The lack of resources, coupled with limited access to adequate healthcare, leads to diagnostic delays and underdiagnosis of oncological disease, as well as the low survival rates seen in these populations. Thus, international collaboration plays a vital role in enhancing healthcare by providing training, developing infrastructure, and offering financial support. The mortality rate in these countries could be reduced by prioritizing access to appropriate diagnostic and treatment methods, as well as ensuring the rapid evacuation of these children. Furthermore, improving diagnosis, facilitating healthcare access, and increasing public awareness of these conditions are crucial to ensuring medical help is sought in time.

Author contributions

C Martins: Conception and design of the study, report, review, or another type of work; Acquisition of data either from patients, research studies, or literature; Drafting the article; Final approval of the version to be published; Agreement to be accountable for the accuracy or integrity of the work. S. Silva: Analysis or interpretation of data from patients, research results, or literature search; Critical review of the manuscript for important intellectual content; Final approval of the version to be published; Agreement to be accountable for the accuracy or integrity of the work. F. Curinha: Analysis or interpretation of data from patients, research results, or literature search; Drafting the article; Final approval of the version to be published; Agreement to be accountable for the accuracy or integrity of the work. M. Jerónimo: Drafting the article; Final approval of the version to be published; Agreement to be accountable for the accuracy or integrity of the work. M.J. Brito: Critical review of the manuscript for important intellectual content; Final approval of the version to be published; Agreement to be accountable for the accuracy or integrity of the work.

Previous presentations

Presented at 23º Congresso Nacional de Pediatria 2023 as a Poster, with the title “10 anos de doença oncológica pediátrica referenciada dos PALOP.”

Funding

None.

Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have obtained approval from the Ethics Committee for the analysis of routinely obtained and anonymized clinical data, so informed consent was not necessary. Relevant guidelines were followed.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

References

1. Cancer IAfRo. Childhood cancer 2020. Available from: https://www.iarc.who.int/cancer-type/childhood-cancer/.
2. Siegel RL, Miller KD, Wagle NS, Jemal A. Cancer statistics, 2023. CA Cancer J Clin. 2023;73(1):17-48.
3. Cancer IAfRo. Global Cancer Observatory 2023. Available from: https://gco.iarc.fr/.
4. Gatta G, Botta L, Rossi S, Aareleid T, Bielska-Lasota M, Clavel J, et al. Childhood cancer survival in Europe 1999-2007: results of EUROCARE-5--a population-based study. Lancet Oncol. 2014;15(1):35-47.
5. Registo Oncológico Nacional de Todos os Tumores na População Residente em Portugal, em 2020 [Internet]. Instituto Português de Oncologia do Porto Francisco Gentil - EPE, ed. Porto. 2023 [cited 17/02/2024]. Available from: https://ron.min-saude.pt/media/2223/ron-2020.pdf.
6. Rodriguez-Galindo C, Friedrich P, Alcasabas P, Antillon F, Banavali S, Castillo L, et al. Toward the Cure of All Children With Cancer Through Collaborative Efforts: Pediatric Oncology As a Global Challenge. J Clin Oncol. 2015;33(27):3065-73.
7. Gupta S, Rivera-Luna R, Ribeiro RC, Howard SC. Pediatric oncology as the next global child health priority: the need for national childhood cancer strategies in low- and middle-income countries. PLoS Med. 2014;11(6):e1001656.
8. Olbara G, Martijn HA, Njuguna F, Langat S, Martin S, Skiles J, et al. Influence of health insurance status on childhood cancer treatment outcomes in Kenya. Support Care Cancer. 2020;28(2):917-24.
9. The Lancet Child Adolescent H. Fighting childhood cancer with data. Lancet Child Adolesc Health. 2019;3(9):585.
10. Bhakta N, Force LM, Allemani C, Atun R, Bray F, Coleman MP, et al. Childhood cancer burden: a review of global estimates. Lancet Oncol. 2019;20(1):e42-e53.
11. Wu Y, Deng Y, Wei B, Xiang D, Hu J, Zhao P, et al. Global, regional, and national childhood cancer burden, 1990-2019: An analysis based on the Global Burden of Disease Study 2019. J Adv Res. 2022;40:233-47.
12. Organization PAH. Childhood and Adolescence Cancer. Available from: https://www.paho.org/en/topics/childhood-and-adolescence-cancer.
13. Rodriguez-Galindo C, Friedrich P, Morrissey L, Frazier L. Global challenges in pediatric oncology. Curr Opin Pediatr. 2013;25(1):3-15.
14. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer. 2015;136(5):E359-86.
15. Stefan DC, Elzawawy AM, Khaled HM, Ntaganda F, Asiimwe A, Addai BW, et al. Developing cancer control plans in Africa: examples from five countries. Lancet Oncol. 2013;14(4):e189-95.
16. Doentes SdAàGdMd. Acesso aos cuidados de saúde no quadro da Cooperação Internacional com os Países Africanos de Língua Oficial Portuguesa (PALOP) 2015. Available from: http://mobilidade.dgs.pt/cidadaosestrangeiros/Paginas/Acesso-cuidados-sa%C3%BAde-quadro-Cooperacao-Internacional-com-PALOP.aspx.
17. Acordos de Cooperação Internacional no domínio da saúde celebrados entre Portugal e os Países Africanos de Língua Oficial Portuguesa (PALOP). Available from: https://www.acm.gov.pt/-/acordos-de-cooperacao-internacional-no-dominio-da-saude-celebrados-entre-portugal-e-os-palop.
18. Stefan DC. Patterns of distribution of childhood cancer in Africa. J Trop Pediatr. 2015;61(3):165-73.
19. Stefan C, Bray F, Ferlay J, Liu B, Maxwell Parkin D. Cancer of childhood in sub-Saharan Africa. Ecancermedicalscience. 2017;11:755.
20. Stefan D. Childhood cancer in Africa: Past, present, and future. Journal Africain du Cancer / African Journal of Cancer. 2014;6:127-8.
21. Steliarova-Foucher E, Colombet M, Ries LAG, Moreno F, Dolya A, Bray F, et al. International incidence of childhood cancer, 2001-10: a population-based registry study. Lancet Oncol. 2017;18(6):719-31.
22. Israels T, Ribeiro RC, Molyneux EM. Strategies to improve care for children with cancer in Sub-Saharan Africa. Eur J Cancer. 2010;46(11):1960-6.