

Childhood Cancers; Diagnostic Challenges in Sub-Saharan Africa

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ABSTRACT

Childhood cancers pose a significant public health challenge in sub-Saharan Africa due to late diagnoses, limited treatment options, and poor long-term survivorship. This paper aims to describe the key childhood cancers affecting the region, explore barriers to diagnosis and treatment, and propose potential solutions. The most common childhood cancers in Nigeria and other sub-Saharan countries include leukemia, brain tumors, lymphomas such as Burkitt's lymphoma, and solid tumors like neuroblastoma and Wilms' tumor. However, lack of diagnostic capacity, scarce chemotherapy resources, and high costs frequently delay diagnosis and prevent optimal treatment. Poverty is also associated with worse survival outcomes for pediatric cancer patients. Solving this crisis requires coordinated, multi-pronged efforts. Areas of focus include establishing childhood cancer surveillance and control policies, training primary providers to recognize early signs and symptoms, strengthening referral networks, increasing pediatric oncology services in underserved areas, expanding research on childhood cancers unique to the region, and enhancing financial access to treatment. With government support for childhood cancer programs and global partnerships to address shortages in skilled staff and technologies, survival rates have

the potential to significantly improve for Africa's children with cancer.

Keywords: Childhood cancer, malignancy, Diagnosis, Challenges.

OVERVIEW OF CHILDHOOD CANCERS

Cancers are a growing problem in developing nations, particularly among children. However, little attention has been paid to this issue. This can be explained by people's preoccupation with infectious diseases such as malaria which is responsible for roughly 25% of infant mortality¹.

Nevertheless, childhood non-communicable diseases are now recognized as an increasingly significant challenge due to the improvement of socioeconomic status, greater accessibility to healthcare services, and improved immunization coverage and uptake. In the past fifty years, there has been significant advancement in the diagnosis, prevention, and treatment of childhood cancers. This is mostly because of improvements in cancer diagnosis and treatment which has led to a significant amount of children with cancer being cured or experiencing long-term remission. However, it is important to highlight that the majority of these advancements have mostly taken place in developed countries.²

Globally, an estimated 400,000 kids and teenagers between the ages of 0-19 years are

diagnosed with cancer every year. In Nigeria, it is estimated that about 40,000 children develop cancer annually. Leukemia, brain tumors, lymphomas, and solid tumors including neuroblastoma and Wilms tumors are the most prevalent types of cancers in children. More than 80% of children with cancers are cured in high-income countries where full care is typically available. Less than 30% of patients with childhood cancers in low and middle-income countries (LMICs) are cured. Children are believed to make up 41% of the population in Africa and due to a more developed and effective public health care system and related rural-urban migration, the cancer rate may continue to rise².

Lack of advanced diagnostic equipment in many hospitals and resource-poor countries (LMICs) as well as therapeutic problems including the lack of necessary chemotherapy and when it is accessible, its high cost and unaffordability to most individuals is the reason for the high mortality rate in this countries².

Cancer is a leading cause of death for children and adolescents. The chances of surviving pediatric cancer diagnosis vary by the nation where the child resides. Reduces access to therapy, treatment abandonment, death from toxicities (side effects), and preventable relapse are some of the factors contributing to the low survival rate in low and middle-income countries LMICs³.

The study aims to identify some common childhood cancers in Sub-Sahara Africa, the diagnostic challenges, and proffer plausible solutions in other to improve survival rate³.

EPIDEMIOLOGY AND COMMON CHILDHOOD MALIGNANCIES

An estimated 400,000 children and adolescents worldwide, aged 0 to 19, receive a cancer diagnosis each year. Cancer is one of the main causes of mortality for young people⁴. Incidence rates vary widely depending on the location, with certain populations in North America and Europe having rates above 150 per million and

others in sub-Saharan Africa and India having fewer than 100 per million⁴.

In high-income nations, over 80% of children diagnosed with childhood cancer go on to receive a full recovery; but, in many low- and middle-income countries (LMICs), less than 30% of children receive a full recovery⁴.

It is estimated that over 40,000 youngsters in Nigeria get cancer every year. The most common malignancies in children include leukemia, brain tumors, lymphomas, and solid tumors, such as neuroblastoma and Wilms tumors⁴.

A retrospective study was conducted in 2009, to determine the common childhood cancers in Northern Nigeria, the study showed that 329 children with proven malignant illnesses were at least 15 years old. With a male-to-female ratio of 1.5:1, this accounted for 8.44% of all malignancies identified during that time. Of the cases, 27.01% were Burkitt's lymphoma, followed by retinoblastoma (17.02%), non-Hodgkin's non-Burkitt's lymphoma (9.42%), and rhabdomyosarcoma (9.42%). The remaining ones were osteosarcoma (2.13%), neuroblastoma (3.34%), colorectal cancer (2.43%), nephroblastoma (8.81%), Hodgkin's lymphoma (6.69%), and unidentified lymphomas (1.82%). The age categories with the highest prevalence of Burkitt's lymphoma were 5–9 and 10–15 years, retinoblastoma in the 0–4 year age group, and non-Hodgkin's lymphoma, Hodgkin's lymphoma, and unidentified carcinomas in the 10–15 year age group⁵.

IMPLICATIONS OF CHILDHOOD CANCERS TO NIGERIA HEALTH SYSTEM

The survival rate for the majority of childhood cancers is higher than 80% in the industrialized world, but it is only 20% in low and middle-income countries (LMICs). The provision of pediatric oncology care in settings with limited resources like Nigeria is hampered by several issues including inadequate infrastructure, a lack of chemotherapeutic agents, inadequate or

incorrect Diagnostic support, and inadequately designed health insurance⁶.

Only one effective population-based pediatric registry exists in Africa and the majority of this registry is housed in tertiary medical facilities because data in the majority of resource-constrained settings are unavailable, this poses a serious difficulty for planning and delivering treatment⁶.

It is alarming to see how common childhood cancers are in Nigeria. This might be due to factors including rising population, increased educational attainment, rural-urban migration, and improved diagnostic techniques⁷.

Since childhood cancer requires a multidisciplinary approach in the management, it has to involve specialists from different fields of medicine including pediatric oncologists, hematologists, hemato-oncologists, pediatric neurologists and nephrologists, pediatric nurses, pharmacists, psychologists, and social workers. It is demanding to manage childhood cancer. Studies show that many tertiary healthcare facilities in Nigeria lack the manpower for the management of childhood cancers⁷.

Funding for the management of childhood malignancy is a major constraint to the healthcare system. As communicable diseases are prioritized and provided with more funding, this in turn limits resource allocation for the management and treatment of childhood malignancy. The brain drain in the Nigerian health system also affects the management of childhood cancers as there are not enough healthcare providers and specialists to combat the rising incidence of childhood malignancy⁷.

CHALLENGES FACING THE DIAGNOSIS AND TREATMENT OF CHILDHOOD CANCERS

Several obstacles arise in the diagnosis and treatment of childhood cancer, such as delayed presentation, financial hardship or poverty, and caregiver burnout, which leads to a high rate of discharge against medical recommendations.⁸ The tendency to look for

other sources of care before presenting to the healthcare system implies a lack of faith in the system, which has been a major difficulty in the management of childhood cancer. It also reflects the sociocultural elements that shape the nation's health-seeking habits, which may contribute to a higher death rate⁹.

There is a greater risk of cancer in areas with high levels of poverty; however, there is little information regarding correlations with long-term poverty. Countries classified as persistently poor (those where $\geq 20\%$ of the population has lived in poverty since 1980) have behavioral, structural, and societal issues that may increase cancer risk in their citizens. Prolonged child poverty was found to be a common exposure linked to a lower overall survival rate of children with cancer¹⁰.

Due to a lack of resources for the immunohistochemistry of some specimens required for a confirmation diagnosis in the research center, the healthcare system also contributed to the delay in the diagnosis of some cancers. Because of this, it was necessary to send some specimens to different referral facilities. The timely delivery of histology samples which are necessary for an early diagnosis and treatment is a problem due to the lack of good roads and means of transportation⁹.

In order to ascertain the South African survival rates for pediatric cancer patients, a retrospective analysis was conducted in 2014. When compared to worldwide data, the results show that the overall survival rate for children cancer is still low (52.1%). The UK's total childhood cancer survival rate rose from 10% to nearly 90% over the previous 40 years. While survival rates were lower, the most prevalent cancers in underdeveloped nations were comparable to those most frequently encountered in rich nations in children¹¹.

CONCLUDING REMARK AND FUTURE PERSPECTIVE

Since childhood malignancies typically have risk factors that cannot be changed, early

and precise detection as well as prompt treatment are essential for better management. Because most pediatric cancer treatment services are located in tertiary medical centers, the following steps should be taken to improve outcomes and lower morbidity and mortality:¹².

1. Policies about childhood cancer:

Policies should be put in place to guarantee the provision of infrastructure and services to cater to the specific needs of cancer patients. Including childhood cancer in the list of diseases posing a public health threat¹².

2. Early diagnosis:

This entails raising awareness of the warning signs and symptoms of children's malignancies among community members and healthcare professionals. Training of primary care doctors in general practice to recognize the symptoms and indicators of children's malignancies and guarantee prompt referral. The World Health Organization's Early Detection of Children Cancer module examines the presence of childhood using an integrated management of childhood illnesses (IMCI) strategy and may be considered for integration into the current implementation system.¹³

3. Enhancing the referral process and services for children with cancer:

Even if it could be challenging to establish a specialized unit in every hospital, it might be better to offer services through the use of existing infrastructure and the facilities required for diagnosis and treatment. By improving referrals, pediatric oncology care could be increased. To address the scarcity of healthcare workers, oncology residents should be rotated into secondary centers. It is important to provide training opportunities for medical professionals interested in specializing in pediatric oncology.¹²

The cost of treating children's cancer is a serious issue that calls for coordinated efforts to increase accessibility. The

treatment of childhood cancer should receive money from the government. Common childhood cancers have to be among the illnesses that the health insurance program covers. Addressing the shortages of human resources, diagnostic and therapeutic services, and supportive care would benefit from public-private cooperation.¹³

4. Research and training in pediatric oncology:

Periodic pediatric oncology training programs are required for general practitioners, nurses, community health workers, medical social workers, and members of community-based organizations. Pediatricians should be encouraged to participate in pediatric oncology research because they are best equipped to detect clinical gaps and needs that have not yet been addressed. They can also collaborate as knowledge brokers with researchers in other fields.¹²

Compared to adult cancers, pediatric cancer has a different profile and demands on the health system. The availability, accessibility, and quality of pediatric cancer services in Nigeria must be strengthened and expanded by a multidisciplinary team effort combining coordinating efforts from interested parties.¹³

Declaration by Authors

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REFERENCES

1. National Malaria Control Programme in Nigeria; Annual Report. Nigeria: The Federal Ministry of Health Abuja; 2005
2. Mohammed A, Aliyu H.O, Childhood cancers in a referral hospital in northern Nigeria, Indian J Med Paediatr Oncol. 2009 Jul-Sep; 30(3): 95–98. doi: 10.4103/0971-5851.64253
3. Ekanem IA, Asindi AA, Ekwere PD, Ikpat NW, Khalil MI. Malignant childhood

- tumours in Calabar, Nigeria. *Afr J Med and Med Sci.* 1992;21(2):63–69
4. Steliarova-Foucher E, Colombet M, Ries LAG, et al, International incidence of childhood cancer, 2001-10: A population-based registry study. *Lancet oncol.* 2017 Jun. 18 (6): 719-731. www.qxmd.com/r/28410997.
 5. PubMed. (2009). Retrieved from PubMed: <https://pubmed.ncbi.nlm.nih.gov/20838544/>
 6. Stiller CA. The global problem of childhood cancer; Paper presented at the International Society of Paediatric Oncology (ISPO) workshop, London; 1996.
 7. Mohammed A, Aliyu H.O, Childhood cancers in a referral hospital in northern Nigeria, *Indian J Med Paediatr Oncol.* 2009 Jul-Sep; 30(3): 95–98. doi: 10.4103/0971-5851.64253
 8. James B, Ajayi S, Ogun O, Oladokun R. Factors influencing time to diagnosis of childhood cancer in Ibadan, Nigeria *Afr health Sci.* 2009;9(4). - PMC - PubMed
 9. Bassey, E. U., Akpan, I. A., Nnoli, C., & Akpan, E. E. Challenges in the Management of Childhood Cancer Patients in a Tertiary Hospital in Southern Nigeria. *Asian Journal of Medicine and Health*, 2022;20(10), 103–108. <https://doi.org/10.9734/ajmah/2022/v20i1030509>
 10. Moss J.L., Pinto C.N., Srinivasan S., Cronin K.A., Croyle R.T. Persistent poverty and cancer mortality rates: An analysis of county-level poverty designations. *Cancer Epidemiol. Biomark.* Doi: 10.1158/1055-9965.EPI-20-0007. - DOI - PMC - PubMed
 11. D K Stone., G P de Bruin., T M Esterhuizen et al, Childhood cancer survival rates in two South African units, *South Africa Medical Journal.* 2014; vol.104 n.7.
 12. Bengaluru, India Report of national cancer Registry programme (ICMR-NCDIR). 2020 (Available on:) https://www.ncdirindia.org/All_Reports/Report_2020/default.aspx
 13. WHO list of priority medical devices for cancer management. World Health Organization, 2017 (Available on:) [https://www.who.int/publications/i/item/9789241565462./](https://www.who.int/publications/i/item/9789241565462/) Date accessed: August 17, 2023

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