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On Track for WHO Global Initiatives for Childhood Cancer? A Comparison of Survival Rates in Paediatric Nephroblastoma (Wilms Tumour) in Sub-Saharan Africa

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Introduction

Nephroblastoma (Wilms Tumour) is one of the most common paediatric solid tumours in sub-Saharan Africa (SSA). Nephroblastoma is a highly curable paediatric cancer in high-income settings, with overall survival (OS) rates exceeding 90% when using multidisciplinary approaches. Population-based data on nephroblastoma survival rates in SSA is scarce, particularly for 5-year survival estimates.

In 2018, the WHO launched the Global Initiative for Childhood Cancer (GICC), aiming for a minimum paediatric cancer survival rate of 60% by 2030 for nephroblastoma (and five other curable childhood cancers). This report examines nephroblastoma survival rates across seven African countries to determine end-of-treatment, short-term and OS rates across the region and highlight key reasons for treatment failure.

Methodology

Literature Review
A systematic literature review was conducted to evaluate OS rates for paediatric nephroblastoma patients in sub-Saharan Africa. This involved searching PubMed (MEDLINE), Scopus, and Global Health (CABI) for studies published from 2010 onwards.

Inclusion Criteria
Studies were included if they reported short or long term survival rates for histologically confirmed nephroblastoma in children in Uganda, Rwanda, Malawi, Sudan, Ethiopia, Ghana, or Cameroon.

Data Collection
Most studies shortlisted for inclusion provided retrospective treatment outcomes, collating survival data from published research. These were analysed with the aim of identifying commonalities and disparities in survival rates across and within these countries to gain insights into region-specific challenges and outcomes.

Results

Survival Rates Vary Significantly Between Countries in SSA

Large multi-centre studies in SSA estimate OS rate of 41.3%- 49.9% at 2 years.

All countries included follow similar treatment regimens, involving pre-operative chemotherapy and nephrectomy where possible (according to SIOP guidelines). However exact treatment availability and access to specialists varied. Long term OS comparisons are much more valuable as relapses are often not captured by one-year follow up.
In this region, Ghana and Rwanda perform particularly well, with Ethiopia performing the worst.

Country	Latest OS (%)	Year Range	Sample size	Reference
Cameroon	49% (2 year)	2007-2019	108	Tchouenkham et al, 2023
Ethiopia	37% (End of Treatment)	2011-2013	30	Paintsil et al, 2015
Ghana	67% (4 years)	2014-2022	127	Khontchou et al, 2023
Malawi	59% (1 year), 48% (2 years)	2016-2021	136	Holmes et al, 2023
Rwanda	57.5% (3 years)	2012-2018	136	Shriyambere et al, 2022
Sudan	43% (5 years)	2005-2014	143	Abdalla et al, 2022
Uganda	59.3% (1 year)	2017-2021	41	Ekuk et al, 2023

Table 1: Most Recent Studies on Overall Survival Rates in the Selected Countries

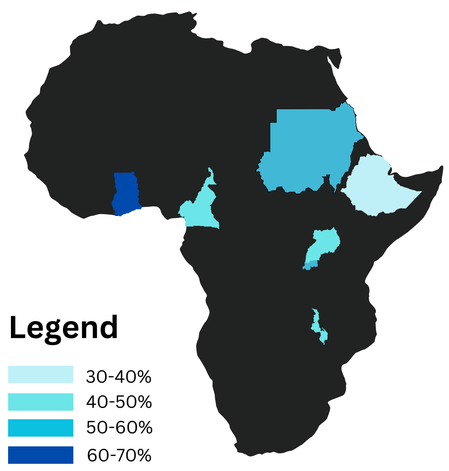

Figure 1: Map of Countries Analysed by OS rate (2-year Estimate)

Data availability and quality are variable. Malawi and Rwanda are particularly well studied, with multiple long-term retrospective studies. Data for Ethiopia remains scarce. A 2015 Ethiopian retrospective study, which unfortunately had a small sample size (n=13), reinforced prior findings of poor outcomes, with only one child (7%) having an improvement in disease. There is no recent Ethiopian research with long-term follow-up.

Survival Outcomes Are Worse for Advanced Disease

A significant reason for poorer outcomes in SSA compared to high-income countries is advanced disease (Stage III, IV or V) at presentation. Approximately 50-80% of presentations were Stage III or IV, and this was consistent across almost all countries studied. This is a significantly higher proportion of advanced disease on presentation than in higher-income countries.

Cancer Stage	1-Year OS (%)	3-Year OS (%)	5-Year OS (%)
Localised	81.4	69.8	64.4
Metastatic	34.3	22.9	11.4

Table 2: Survival of Nephroblastoma by Stage in Rwanda (Adapted from Businge et al, 2024)

Survival Rates are Broadly Improving With Time

Despite being one of the poorest countries in the world, Malawi has seen significant improvements in nephroblastoma one-year survival rates from 25% (1998-2004) to 46% (2006-2011) to 59% (2022) *(Fig.3)*.
One-year survival rates in Uganda have also seen similar improvements, however 3-year survival data has been much less concordant. Notably, OS rates in Sudan have dramatically improved from being the lowest in the region (11% in 2008) to 43% 5-year OS rate in 2022.

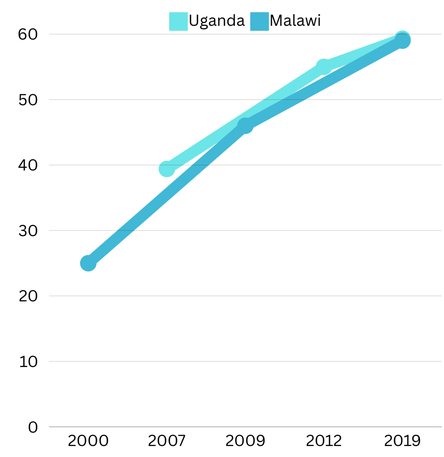

Figure 2: 1-Year Survival Rates for Uganda and Malawi Over Time

Discussion

Paediatric Nephroblastoma Rates in SSA Continue to Fall Short of WHO 2030 Targets

OS rates for all seven countries analysed here are significantly lower than those in high-income settings, and below the GICC Targets. OS differences can be explained by several region-specific reasons, as follows:

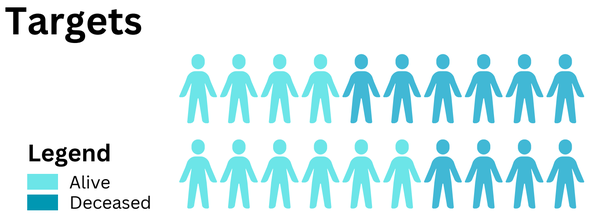

Figure 3: Difference between Current OS (above) and WHO Minimum OS Targets (Below)

- **Treatment abandonment** is the single most important reason for treatment failure identified in studies, ranging from 12% (in a multi-country collaborative project) to 43% in Sudan. It was most commonly linked to **barriers in accessing healthcare** (financially and practically) and **poor health literacy.**
- **Co-morbidities** (i.e., HIV, anaemia and poor nutritional status) which are often **region-specific**
- **Unfavourable tumour histology**
- **Advanced stage of disease**, particularly large tumours, distant metastases and hypoalbuminaemia
- **High mortality rates during treatment,** most often during pre-operative chemotherapy or post-operatively. This varied from 11% (Sudan) to 34% (Ghana).

Future Directions

Improving Data Collection

Available data registries do not adequately inform on true incidence and outcomes of nephroblastoma in SSA. Data from Ethiopia was particularly scarce, of low quality, and raised questions about selection bias. Data was also reported inconsistently, with some studies including treatment abandonment as an event, and others excluding it. Follow up time also varied significantly.

Targeting Treatment Abandonment

Several studies measured the efficacy of interventions to target treatment abandonment. A prospective 2020-2021 study in Malawi introduced interventions to enable treatment completion, including providing full funding of costs to the family (treatment, transport, accommodation, food) and tracking of patients who did not attend follow up. Treatment abandonment fell significantly from 19% to 7%, and survival without evidence of disease increased from 38% to 53%.

International Collaborations

The role of international collaboration, both i) between SSA countries, and ii) between SSA countries and cancer centres in high-income settings have yielded encouraging results. The Collaborative Wilms Tumour Africa Project, operating since 2014, has been associated with a marked reduction in treatment abandonment (from 23% to 12%) and improved end of treatment survival without evidence of disease (52% to 69%).