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Original Research Article

Factors Associated with the Death of Children with Cancer in the Paediatric Haematology and Oncology Unit at Donka National Hospital (Guinea)

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Abstract: ***Introduction*:** The aim of this study was to document the factors associated with death in children with cancer in the haematology-oncology unit of the paediatric department at Donka National Hospital between 1 January 2018 and 31 june 2021. ***Methods:*** This was a retrospective-prospective analytical study : retrospective over a 3-year period from 1 January 2018 to 30 june 2021. ***Results*:** We identified 122 cases of cancer-related deaths, representing 52.81% of the total. Males accounted for the majority of cases, representing 52.45% of the total. The under-2 age group was the most represented, accounting for 28.68%, with an average age of 4.39 years (3.97 years) and extremes of 1 year and 18 years. 57.37% of patients resided outside Conakry. The most common cancer was Burkitt's lymphoma, accounting for 31.14%. The factors associated with death with a statistically significant p-value were age : p-value 0.018; distance from home to the unit : p-value 0.001; the family's socioeconomic status : p-value 0.04; and the type of chemotherapy used : p-value 0.018. ***Conclusion*:** Although rare, childhood cancer remains a significant cause of mortality in children. The high mortality rate of these cancers in Guinea demonstrates the importance of this study and highlights the need for an epidemiological surveillance programme to improve care.

Keywords: Cancers, Mortality, Children, Donka.

INTRODUCTION

Cancer is the uncontrolled proliferation of cells, leading to the formation of a tumour that tends to invade surrounding tissue and spread away from its initial site. It is the second leading cause of death worldwide in children aged 5 to 14, after accidents [1, 2].

Diagnosed cancers in children account for 0.5 to 1% of all cancers in a given population. It is therefore a relatively rare disease, with an incidence of 140 to 160 new cases per year per million inhabitants under the age of 16 [3].

In fact, paediatric oncology has undergone a radical evolution in its understanding and therapeutic effectiveness over the last few decades. Survival rates are now around 80% in developed countries, as proven by the French Cancer Society in 2021 [4].

This undeniable success is the result of advances in research and therapeutic performance thanks to the implementation of standardised protocols derived from international research, which mainly involve chemotherapy, radiotherapy and surgery [4].

In the United States, cancer was the ninth leading cause of death in 2018, accounting for 9.1% of deaths among children and adolescents [5].

In Mali in 2014, a five-year survey conducted at the Gabriel Touré University Hospital recorded 690 cancer patients aged between six months and 15 years, with 292 deaths, representing 39.4% of cases [6].

Cancer deaths are most often linked to delayed diagnosis, beliefs, poor compliance, relapse, low socioeconomic status, unavailability of anticancer drugs, stage of the disease, and type of cancer [7].

The objective of this study was to document the factors associated with deaths among children with cancer in the haematology-oncology unit of the paediatric department at Donka National Hospital from 1 January 2018 to 30 June 2021.

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MATERIALS AND METHODS

The haematology-oncology unit located within the paediatrics department of Donka National Hospital served as our data collection site. This unit provides multidisciplinary care for children with cancer. This was an analytical study : a retrospective study covering a period of three years and six months from 1 January 2018 to 30 June 2021.

The study involved children monitored for cancer during the study period.

We included in our study all children monitored in the unit who died of cancer during the study period.

We did not include children hospitalised and who died as a result of benign haematological conditions. We conducted an exhaustive recruitment of all patients meeting our inclusion criteria. We studied quantitative and qualitative variables grouped into data:

- sociodemographic: age, gender, treatment history, place of residence, socioeconomic status, place of death, socioeconomic status (based on average family income and number of dependents)
- clinical: type of cancer, presence of metastases
- therapeutic: type of chemotherapy, discontinuation of medication

The data were collected by consulting consultation records and children's files.

The data were collected manually on a pre-established and validated data collection form. Epi-info software version 7.2 and SPSS version 26 were used for data transcription and analysis. The sample was described by calculating means with their standard deviations for quantitative.

Before data collection began, a research protocol was developed and validated by the authorities. Data collection was anonymous and the confidentiality of the information gathered from patient records was respected.

RESULTS

We recorded 122 deaths out of 231 patients monitored for cancer, or 52.81%. There was a predominance of males, with 64 boys (47.57%) and 58 girls (52.45%), giving a male-to-female ratio of 1.1. Children under 2 years of age were the most numerous, accounting for 28.68% of cases, or 46.7%. Burkitt's lymphoma was the most common cancer with 43 cases (31.14%), followed by ALL with 26 cases (21.31%) and nephroblastoma with 16 cases (13.1%). Ninety-two patients were from a medium socioeconomic background (75.4%) and 20 patients were from a low socioeconomic background (16.39%).

Table I: Distribution of patients according to mortality, frequency of deaths due to cancer

Diagnostic	Number	%
Burkitt's lymphoma	**36**	**35,25**
ALL*	20	16,40
Néphroblastoma	20	16,40
Rétinoblastoma	17	13,03
Other lymphoma	6	4,92
Tératome sacrococcygien	5	4,10
AML**	4	3,25
Neuroblastoma	3	2,45
Rhabdomyosarcoma	2	1,64
Hodgkin Lymphoma	2	1,64
Total	**122**	**100**

*Acute Lymphoblastic Leukaemia **Acute Myeloblastic Leukaemia

Table II : Factors related to death

Variable	Categories	Death (n=122)	%	Survivors (n=109)	%	p-value
Age	≤2 ans	35	28,68	28	25,68	0,118
	3-5 ans	22	18,03	18	16,51	
	6-8 ans	18	14,75	15	13,76	
	9-11 ans	15	12,29	12	11,01	
	12-14 ans	20	16,39	20	18,35	
	≥15 ans	12	9,83	16	14,68	
Metastasis	Présente	32	72,1%	13	11,9%	**0,010**
	Absente	65	26,2%	96	88,1%	
Therapeutic trails	Traditional medicine	65	53,3%	20	18,3%	0,092
	Without traditional medicine	57	46,7%	89	81,7%	

Financial hardship	Yes	95	77,9%	27	24,8%	**<0,001**
	No	27	22,1%	82	75,2%	
Socio-economic status	Low	53	43,4%	40	36,7%	0,089
	Medium	69	56,6%	69	63,3%	
	High	0	0,0%	0	0,0%	
Refusal of treatment	Yes	6	4,9%	0	0,0%	0,072
	No	116	95,1%	109	100,0%	
Discontinuation of treatment	Yes	17	13,9%	0	0,0%	**0,009**
	No	105	86,1%	109	100,0%	
Type of chemotherapy	Curative	52	42,6%	70	64,2%	0,614
	Palliative	70	57,4%	39	35,8%	
Diagnosis time (days)	Mean ± Standard deviation	158,8 ± 204,5		110,5 ± 150,2		**0,021**
Processing time (days)	Mean ± Standard deviation	197.7 ± 227.1		150.3 ± 180.4		**0.028**

Table III : Multivariate logistic regression

Variable	OR	IC95%	p-value
Metastasis present	4,2	[2,1–8,5]	**<0,001**
Financial hardship	3,8	[1,9–7,6]	**<0,001**
Discontinuation of treatment	2,9	[1,5–5,6]	**0,002**
Diagnosis delay >180 days	2,1	[1,1–4,0]	**0,025**
Processing time >180 days	2,3	[1,2–4,4]	**0,015**

DISCUSSION

We conducted a retrospective analytical study over a period of three years and six months, from 1 January 2018 to 30 June 2021. During our study, our main difficulties were. During this period, the department recorded 52.81% of cancer-related deaths, of which 42.62% occurred in hospital, including 80.76% in the paediatric oncology unit.

In our study, among the cancers with the highest number of deaths, leukaemia ranked first, followed by nephroblastoma and Burkitt's lymphoma, with respective frequencies of 100%, 76.92% and 63.24%. These results are comparable to those of Togo B *et al*., [6], in their 2014 study in Mali on: Epidemiology and prognosis of paediatric cancers at the Gabriel-Touré University Hospital, which found that among the cancers with the highest mortality rates in children were: lymphomas 34.92%, followed by retinoblastoma with 19.58%. However, in a similar study conducted in Canada in 2006, D. Mitra *et al*., [4], found 32.5% of leukaemias and 19.9% of lymphomas. According to the literature, leukaemia is the most common cancer among children in developed countries, while studies in sub-Saharan Africa rank lymphoma as the most common cancer.

Overall, males were the most represented gender in our study, accounting for 52.45% of cases and a P-value of 0.86. In a similar study conducted in 2006 in an intensive care unit in Australia, Emilie C *et al*., [8], described a male predominance of 51% and a P-value of 0.90. Numerous studies on paediatric cancers still show a male predominance, but it would appear that, as in these two studies, gender has no impact on the occurrence of death.

We found that the presence of metastases is significantly associated with death, with a p-value of 0.01, as are socioeconomic status and treatment discontinuation, all with p-values <0.001. In fact, more than half of cancer patients arrive at the unit at a very advanced stage of the disease with the presence of metastases. This could be explained by long delays in treatment. In our study, the average time to diagnosis is 158.8 days and the average time to treatment is 197.7 days.

The under-2 age group is the most affected in our study, with 35 cases, or 28.68%. Lower results were found by A Yamagichi *et al.,* [9], in their study in the La tranche d'âge des moins de 2 ans est le plus touchée dans notre étude avec 35 cas soit un pourcentage de 28,68%. Ses résultats inférieurs sont trouvés par A Yamagichi et col [9], dans leur étude aux USA portant sur la mortalité par cancer chez les enfants, qui avaient retrouvé une prédominance de la tranche d'âge de 5 à 9 ans. Pourtant l'âge ne semble pas avoir d'influence sur la survenue du décès par cancer : P-value :1,3 selon leur étude et 1,1 dans la nôtre.

Certes nous avons eu des difficultés à estimer le niveau de vie des familles. Néanmoins avec les critères que nous avons utilisés nous avons noté une prédominance du niveau socioéconomique moyen. Notre étude est similaire à celle réalisée par Hendricks et coll. [10] en Afrique du Sud qui ont trouvé une corrélation entre niveau socioéconomique et le risque de survenu de décès chez les enfants atteints de cancer avec p < 0,001. Le niveau de vie de la famille a un impact significatif sur le devenir des enfants atteints de cancer. La prise en charge des cancers est très couteuse en termes de chimiothérapie, de bilans et de soins de supports. Il n'y a

pas de subvention et tous les frais liés à la prise en charge sont à la charge des parents.

USA on cancer mortality in children, which found a predominance in the 5-9 age group. However, age does not seem to have an influence on the occurrence of cancer deaths: P-value: 1.3 according to their study and 1.1 in ours.

Admittedly, we had difficulty estimating the standard of living of the families. Nevertheless, using the criteria we employed, we noted a predominance of average socioeconomic status. Our study is similar to that conducted by Hendricks *et al*., [10], in South Africa, who found a correlation between socioeconomic status and the risk of death in children with cancer with $p < 0.001$. The family's standard of living has a significant impact on the future of children with cancer. Cancer treatment is very expensive in terms of chemotherapy, tests and supportive care. There are no subsidies and all treatment costs are borne by the parents.

Chemotherapy was most often curative, except in certain cases where doctors were forced to put children on palliative care. The type of chemotherapy was decided based on the stage of the disease, the patient's clinical condition and the type of cancer. There is therefore a statistically significant link between the type of chemotherapy used and the occurrence of death, with a P-value of less than 0.001.

Our average consultation time was 138.8 ± 175.48 days, or 5.86 months. Our results are lower than those found in Nigeria by BO James *et al*., [11], who found a consultation time of 163 days. Some cancers, such as lymphomas, have clinical manifestations that appear fairly quickly and are only sensitive to chemotherapy, resulting in a rapid consultation time. On the other hand, others, such as intraocular retinoblastomas, have a much more insidious mode of development and result in long consultation times.

The average diagnosis delay was 158.83 days. Our results are similar to those reported by E Huyghe *et al*., [12], in their 2006 study on: Impact of diagnosis delay on cancer survival, where they found an average diagnosis delay of 3.7±5.1 months. This could be explained by the fact that patients' parents generally visit other centres or hospital departments or try traditional treatments, which contributes to delaying diagnosis and therefore treatment.

CONCLUSION

In summary, cancer in children is a disease that is prevalent in our community. During this study, 52.81% of deaths were related to this disease. Burkitt's lymphoma was the most common cancer found in the unit.

The cost of medication, metastasis, socioeconomic status and traditional healers are factors significantly associated with child mortality linked to parents. Furthermore, the types of chemotherapy, diagnostic errors and unqualified staff are significantly associated with the death of children following their illness in the department.

A study covering the entire paediatric department in the city of Conakry could further highlight the factors associated with cancer mortality in children.

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