

An Epidemiological Profile of Childhood Cancer in Benghazi, Libya (2020-2023)

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ABSTRACT

Background: Childhood cancer in Libya represents a significant health concern. It is marked by late diagnoses and limited treatment resources. This study aims to describe the pattern of childhood cancer epidemiology in light of available medical records of cancer patients at the pediatric hospital in Benghazi.

Methods: A cross-sectional study was conducted by a retrospective review of medical records of patients admitted from 2020 -2023 at the Department of Hematology and Oncology in the pediatric hospital in Benghazi.

Results: A total of 166 childhood malignancies were identified. The average age of patients was 6.9 years. The majority of cases were males more than females. Most of the patients were residents of Benghazi, followed by a higher number of cases reported from Al Baidya, Ajdabiya, Tobruk, Al Marj, Derna, and Toukra. About (38%) were diagnosed with Acute Lymphocytic leukemia. Metastasis and Hodgkin Lymphoma were reported in 9%, and 5.4% of cases respectively, Data on stage at diagnosis was missing for the majority of cases about 85.5%, a higher percentage of cases were reported with stage IV and stage III. more than half of the patients received chemotherapy (59%), while (13.8%) received combined treatment. About 5% of cases were treated with surgery, treatment data was missing for 21% of cases. About 59 % of cases were diagnosed with other diseases and conditions. While 35.5% with no other diseases. However, data on comorbidity was missing for 5.4% of cases. The most common comorbidity was bronchopneumonia, followed by pancytopenia.

Conclusion: Improvement of data quality and quality of care is essential for better cancer outcomes.

Keywords: Cancer, Childhood, Epidemiology, Benghazi, Libya

Introduction

Childhood cancer is a broad term encompassing various types of cancer that affect children and adolescents under the age of 18. Childhood cancer in Libya represents a significant health concern. It is marked by late diagnoses and limited treatment resources[1]. The survival rates for childhood cancer in Libya are notably lower than in high-income countries, while 80% of children in high-income countries recover from cancer, fewer than 30% survive in low- and middle-income countries like Libya [2]. This is further complicated by underestimation and uncertainty about the incidence, prevalence, and survival statistics of malignancies in children or adults. Due to lacking of effective national cancer registration linked with electronic

hospital databases, and updated reports on cancer epidemiology [3,4].

Limited studies are available on the epidemiology of childhood cancer in Libya. A study conducted in Benghazi from 2012 to 2016 reviewed 73 cases of childhood cancer. The most common type of cancer diagnosed was Acute Lymphoblastic Leukemia (ALL), accounting for approximately 52% of cases, followed by Acute Myeloid Leukemia (AML) and brain tumors. Other less common tumors included lymphomas, bone tumors, Wilms' tumor, and hepatoblastoma. About 86% of patients did not have staging at the time of diagnosis, and only a small percentage were diagnosed at earlier stages of the disease [5]. Where patient reporting is quite better than in Libya, another study demonstrated the epidemiology of Libyan cancer patients who

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received treatment in 2006 and 2019 at the King Hussein Cancer Center in Jourdan. There were 355 cases of pediatric cancer patients. Hematolymphoid tumors are the most common and Acute leukemia [6].

There have been ongoing efforts to improve access to treatment for childhood cancer in Libya. According to the World Health Organization (WHO), the National Oil Corporation donated funds to support the treatment of 722 children enrolled in cancer treatment programs in major hospitals in Tripoli and Benghazi. This funding aims to alleviate shortages of pediatric cancer medicines and equipment [1]. However, significant challenges remain [7]. Addressing these issues will enhance the quality of care and improve survival outcomes for children with cancer in Libya. Emphasizing the need for improved documentation and healthcare structures to accurately capture and address childhood cancer cases in the region.

This descriptive study aims to describe the pattern of childhood cancer epidemiology in light of available medical records of patients at the pediatric hospital in Benghazi.

Methods

A cross-sectional study was conducted in January 2024, by retrospective review of medical records at the Department of Hematology and Oncology at the pediatric hospital in Benghazi during the period from 2020- 2023. Admission Data were extracted from medical files of children diagnosed with cancer, and 22 files of patients with hematology were excluded from the study. in addition, there were only 7 files for cancer patients diagnosed between 2017-2019 were also excluded. Data was collected on gender, age, place of residence, diagnosis, stage at diagnosis, comorbidity, treatments, outcomes, date of diagnosis, and date of discharge.

In addition, mortality data was collected from the office of mortality statistics at the pediatric hospital in Benghazi from the same study period.

Data was entered and coded to SPSS program version 22, Descriptive analysis was performed, and the results of the study were presented and summarized in tables and figures.

The official agreement was taken from the faculty of public health, the University of Benghazi, and the administration of the pediatric hospital in Benghazi. files of patients kept confidential and data collected anonymized.

Results

A total of 166 childhood malignancies were identified by reviewing their medical files at the Department of Hematology and Oncology in Pediatric Hospital in Benghazi in the period from 2020/2023. As Figure 1 shows the higher number of cases were admitted during the years 2022 and 2023. The average age of patients was 6.9 years. The majority of cases were males more than females. The lower number of cases were under the age of 1 year. Gender and age distribution of cases through age intervals is described in Table 1.

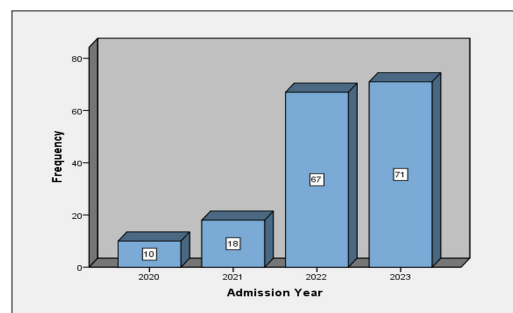


Figure 1: Distribution of childhood cancer patients according to Admission year

Table 1: Gender and age distribution of Childhood cancer cases diagnosed from 2020-2023

Characteristics	Frequencies	Percent %
Gender		
Males	114	55.4
Females	83	42.1
Age Groups		
Less than1	7	4.2
1-4	52	31.3
5-9	51	31.7
10 and above	53	31.9
Not recorded	3	1.8

Most of the patients were residents of Benghazi, followed by a higher number of cases reported higher Al Baidya, Ajdabiya, Tobruk, Al Marj, Derna, and Toukra. As shown in Figure 2.

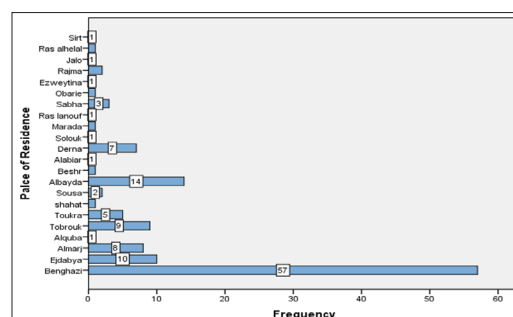


Figure 2: Distribution of childhood cancer patients by Place of residence

Data on stage at diagnoses was missing for the majority of childhood cancer cases about 85.5%. of the available data, a higher percentage of cases reported with stage IV and stage III Figure 3.

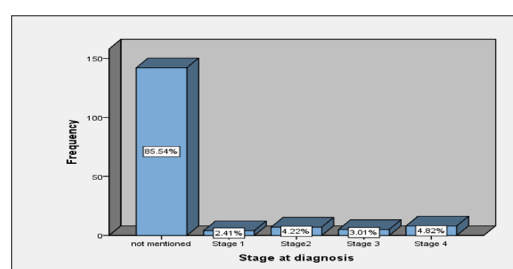


Figure 3: Distribution of childhood cancer patients according to stage at diagnosis

The majority of patients, about (38%) were diagnosed with Acute Lymphocytic leukemia (ALL). Metastasis and Hodgkin Lymphoma were reported in 9%, and 5.4% of cases respectively. 3 cases without recorded diagnoses and other fewer malignancies are described in Table 2.

Table 2: Histopathological diagnosis of childhood cancers

Diagnosis	Frequency	Percent %
Not mentioned	3	1.8
ALL	64	38.6
Metastasis	15	9.0
Hodgkin Lymphoma	9	5.4
AML	7	4.2
Brain tumor	6	3.6
Retinoblastoma	6	3.6
Rhabdomyosarcoma	5	3.0
Ewing sarcoma	5	3.0
Neuroblastoma	5	3.0
Astrocytoma	4	2.4
Craniopharyngioma	3	1.8
Fibrosarcoma	3	1.8
CML	2	1.2
Osteosarcoma	2	1.2
Medulloblastoma	2	1.2
Ependymoma	2	1.2
Non_Hodgkin lymphoma	2	1.2
Rhabdomyosarcoma of urinary bladder	1	.6
Nephroblastoma	1	.6
Chondroblast osteosarcoma	1	.6
Sarcoma	1	.6
Cervical ependymoma	1	.6
Burkitt's lymphoma	1	.6
Renal tumor	1	.6
Thyroid carcinoma "papillary type"	1	.6
Germ cell tumor	1	.6
Hypothalamic glioma	1	.6
Teratoma	1	.6
Total	166	100%

As Figure 4 shows, more than half of the patients received chemotherapy (59%), while (13.8%) received combined treatment. About 5% of cases were treated with surgery, treatment data was missing for 21% of cases.

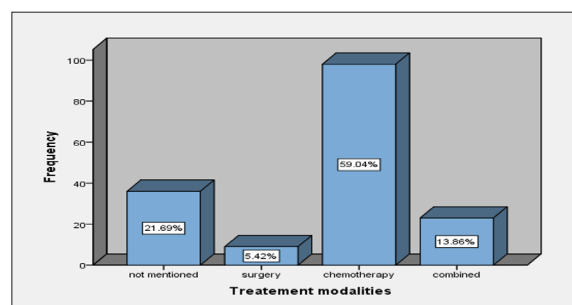


Figure 4: Distribution of childhood cancer patients according to treatment strategies

Regarding comorbidity, 59. % cases diagnosed with other diseases and conditions. While 35.5% with no other diseases. However, data on this characteristic was missing for 5.4% of cases, as shown in Figure 5. The most common comorbidity was 27% bronchopneumonia, followed by 17% pancytopenia. Less commonly reported comorbidities were anemia and thrombocytosis.

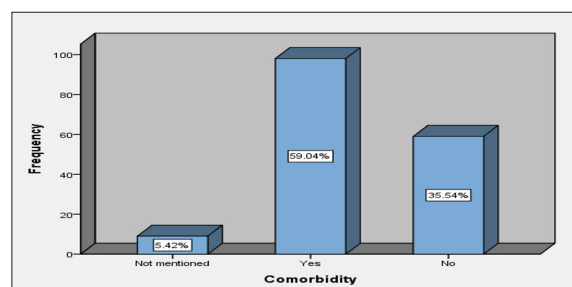


Figure 5: Distribution of childhood cancer patients according to stage at diagnosis

Outcomes of malignancies were not reported in the vast majority of cases 95%. Remission was reported for 3.6% of cases. Figure (6) shows a higher percentage of childhood deaths during the year 2020 compared with the years later. Little decline in the number of deaths in 2021, however, the number increased in 2022 and declined again in 2023.

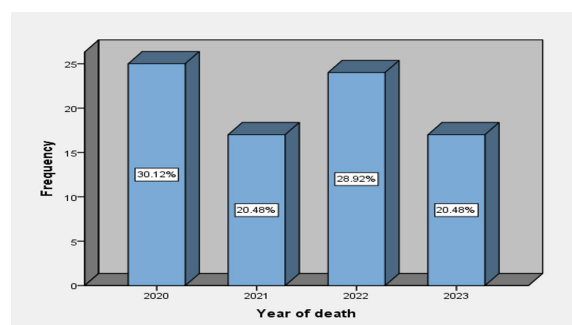


Figure 6: Distribution of childhood cancer patients by the year of death

Discussion

This study tried to provide an epidemiological and clinical profile of childhood cancers in Benghazi. The findings indicate an increased number of childhood cancers. In general, the cancer burden has been increasing in the last decades for all types both in children and adults. The latest report from the World Health Organization (WHO) based on the GLOBOCAN 2020

estimates, has raised the alarm about the increased cancer burden in the country[8]. By considering previous childhood cancer literature, the overall number of cases has markedly increased over the four-year study period compared to the previous study on patients treated at the pediatric hospital in Benghazi [5]. Gender differences are similar as males were more likely to be diagnosed with cancer than females. Little variations in the distribution of cases through age groups. The pediatric hospital in Benghazi is committed to providing cancer care in the eastern part of Libya. In contrast to previous findings, the majority of patients were from Benghazi [5]. However, some families had to move to Benghazi looking for cancer treatment. Regional variations observed in the number of cases treated at the pediatric hospital may be explained by access to health care and contribute to late diagnoses.

The most predominant type of cancer in childhood was Acute Lymphocytic leukemia (ALL) consistent with the previous findings either nationally or worldwide [5,6,9]. Additionally, the present study found a relatively higher number of cases with metastasis and Hodgkin Lymphoma. This may indicate changing the pattern of these cancers and require further investigations. The available treatment options were found to be the same being depending on chemotherapy for the majority of cases. Incompleteness of stage at diagnoses data was the same concern with the previous study in the same sitting.

This study highlights further concerns in addition to the increased burden of childhood cancer in Libya. The first is comorbidity which is reported in more than a quarter of cancer cases. consequently, additional challenges increase the morbidity burden on the healthcare system and families. In addition to the negative impacts of comorbidity as a prognostic factor on survival of children with cancers [10]. Second, the quality of data in terms of completeness was limited, which is the least parameter we looked for in the absence of an ongoing national registration system [11].

According to the Centers for Disease Control and Prevention, the true burden of cancer on a community's healthcare system and economy is determined by the number of people diagnosed with and dying of cancer [12]. Therefore, this study has looked at both admission and mortality data to be used as an indicator of the situation and cannot be used as an accurate estimate. As the denominator data was unknown, the findings of cancer epidemiological and clinicopathological aspects need to be interpreted with caution regarding the epidemiological measures. To reveal the nationwide childhood cancer epidemiology, responsible hospitals are required to routinely submit clinical records to their local population-based registry.

Yet there is a paucity of publications on childhood cancer in Libya, this study may contribute to increasing the body of literature and fill gaps in publications on cancers in children. It provides baseline data for use in future epidemiological studies. However, it has several limitations, being cross-sectional only provides a snapshot of the situation. Despite reviewing all medical files presented in the hospital. the results are based on a single health setting and cannot be generalized. There have been other oncology treatment units opened in the eastern part of Libya in 2017 in Tobruk, Al Bayda, and Ajdabiya [13]. Furthermore, Incomplete data on some patient characteristics

determine the clear clinical and epidemiological picture of the disease. It is widely reported that complete and accurate data are crucial for healthcare planning and decisions [14,15].

Conclusion

In light of this study's findings, childhood cancers continue to be a major public health concern in Libya. Especially with other comorbidities. For better cancer outcomes, there is a crucial need for improvements in the quality of care, quality of care, and research. Epidemiological measures of morbidity, mortality, and survival are important indicators of the quality of the healthcare system. Furthermore, the Implementation of nationwide cancer screening and identifying risk factors are recommended.

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