

*Research Article***Pattern of Childhood Cancers in Minia Governorate****Hager A. Zaky, Eman M. Mahfouz, Eman S. Mohammed, and Eman R. Ahmed.**

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Abstract

Background: Childhood cancer incidence has shown an increase over time. Despite all the improvements in treatment and diagnostic techniques in the field of oncology during the past decades, cancer remains the second main reason of death in children under 15 years old in most parts of the world. **Aim of the study:** To describe the pattern of childhood cancers in Minia governorate, Egypt.

Methodology: A cross sectional study included 96 children with established diagnosis of cancer aged from two up to 18 years old. The data collected via interviewed questionnaire with mothers of children diagnosed with cancer who attended Minia oncology center during the period from January to November 2020. **Results:** The most frequent type of cancer in children was leukemia (27.1%), followed by lymphoma (26%). The least frequent tumors were retinoblastoma and unspecified malignant neoplasms (2.1% and 1%, respectively). Leukemia and lymphoma were higher in males than females, while brain and spinal tumors, kidney tumors and retinoblastoma were higher in females than males. **Conclusion:** Leukemia and lymphoma are the commonest childhood cancer with more predilections toward males.

Keywords: Childhood cancer, Minia, epidemiological pattern.

Introduction:

Cancers form one of the major causes of death in children aged 15 years or less. They differ markedly from adult cancers in their nature, distribution and prognosis. Worldwide, childhood cancer burden is increasing (Mellstedt, 2006) and over 80% of children who develop cancers each year live in low and middle income countries (Howard et al., 2008).

The global incidence of childhood cancer ranging from 50-180 per million person years with the highest value in Southern Europe and the lowest value in sub-Saharan Africa (Chen et al., 2019).

The patterns of childhood cancers in the United States of America and Europe are very similar, with leukemia and central nervous system tumors accounting for over one-half of the new cases. In contrast, lymphoma is the most common prevailing childhood cancer in Africa (Haroun et al., 2006).

The distribution of childhood cancers varies within age groups. About 50% of childhood cancers occur in pre-school age and pre-

puberty marks a new beginning of increased cancer incidence. Boys have a 20-25% excess

risk for cancer more than girls in all age groups (Gosselin et al., 2011).

The National Cancer Registry Program was initiated in Egypt in 2008; a population-based registry was performed in the Ministry of Health Cancer Centers located in the three governorates to cover the Upper, Middle and Lower Egypt. The program started in the Governorate of Aswan then registries were done in the governorates of Damietta and Minia. Data analysis was released in 2010 and the first Egyptian national cancer incidence rates report was published based on these registries (Abo-Touk et al., 2020).

In Egypt, the crude Egyptian national incidence rates of children aged from 0-15 years old of childhood cancer were estimated as 132.9 for both sex, 143.4 for males and 122.1 for females /1,000,000 children (Ibrahim et al., 2018).

In this study we aimed to present the pattern of childhood cancers admitted at the Minia

Oncology Center, Minia governorate to give an idea about the disease pattern in our community and its relation to demographic factors.

Subjects and methods

Study design and setting: This cross-sectional study conducted at Minia Oncology center which is a referral center for childhood malignancies. It serves all Minia governorate, Egypt, during the period from January to November 2020.

Study population: All children at age group from two up to 18 years admitted to the Minia Oncology Center during the period of the study, with confirmed diagnosis of cancer were recruited. Ninety-six children were enrolled in the current study with response rate 94.6%.

Data collection: Children's mother was interviewed using a detailed structured questionnaire. The interview consisted of

questions pertaining to the child, the mother and the father, asking about their socio-demographic characteristics and socioeconomic variables. Medical data were collected from the inpatient's hospital records.

Ethical consideration: Ethical approval was granted by the ethical committee of the Faculty of Medicine, Minia University. Prior to data collection, verbal informed consents were obtained from parents of all children after supplying comprehensive information about the nature of the study. Verbal consents were taken as considerable proportions were illiterate.

Statistical analysis: The collected data were presented by tables and graphs, computerized and statistically analyzed using Statistical Package of Social Science version 20 (SPSS).

Data were expressed as mean \pm SD, minimum and maximum of range for quantitative parametric measures in addition to both number and percentage for categorized data.

Results

Table 1: Socioeconomic characteristics of children diagnosed with cancer, Minia governorate, 2020.

	no (%)
Age (Mean±SD) range	9.08±4.97 (2-18)
Sex	
Males	51 (53.10)
Females	45 (46.90)
Residence	
Rural	89 (92.70)
Urban	7 (7.30)
Child birth order	
1 st	38 (39.60)
2 nd	26 (27.10)
3 rd	12 (12.50)
≥4 th	20 (20.8)
Family monthly income	
< 2.000	43 (44.80)
2.000- <5.000	51 (53.10)
5.000- ≥10.000	2 (2.10)
Education level of mother	
Illiterate	55 (57.30)
Primary/ preparatory	12 (12.50)
Secondary/Intermediate institutes	26 (27.10)
University/Postgraduate	3 (3.10)
Working status of mother	
House wife	92 (95.8)
Working	4 (4.20)
Education level of father	
Illiterate	38 (39.60)
Primary/preparatory	14 (14.60)
Secondary/Intermediate institutes	41 (42.70)
University/Postgraduate	3 (3.10)
Working status of father	
Not working/ retired	4 (4.20)
Craft and related trades workers	66 (68.8)
Clerks	25 (26.00)
Professional	1 (1.00)
Consanguinity of the parents	
Relatives (4 th degree)	60 (62.50)
Not relatives	36 (37.50)
Family history of cancer	
Positive	5 (5.20)
Negative	91 (94.80)

The characteristics of the participants were shown in (Table 1). Ninety-six children diagnosed with cancer were included in the present study, 51 (53.1%) were males and 45 (46.9%) were females, with a mean age of 9.08 ± 4.97 years. The majority of cases were

rural residents, regarding birth order, 39.6% of were the first child. The majority of children's mother (95.8%) were housewives, 57.3% were illiterate and the parents of about two-thirds (62.5%) of children were relatives. Positive family history of cancer was reported in 5.2%.

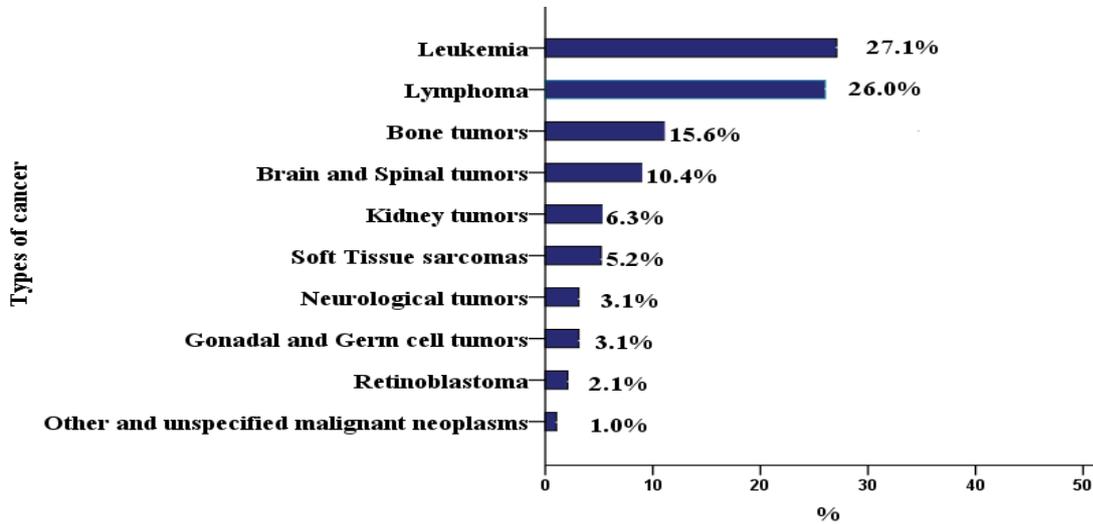


Figure 1: Frequency distribution of childhood cancer types, Minia governorate, 2020.

Figure (1) shows that the most frequent type of cancer among children was leukemia (27.1%), followed by lymphoma (26%). About 15.6% were bone tumors, and 10.4% were brain and

spinal tumors. The least frequent tumors were retinoblastoma and unspecified malignant neoplasms (2.1% and 1%, respectively).

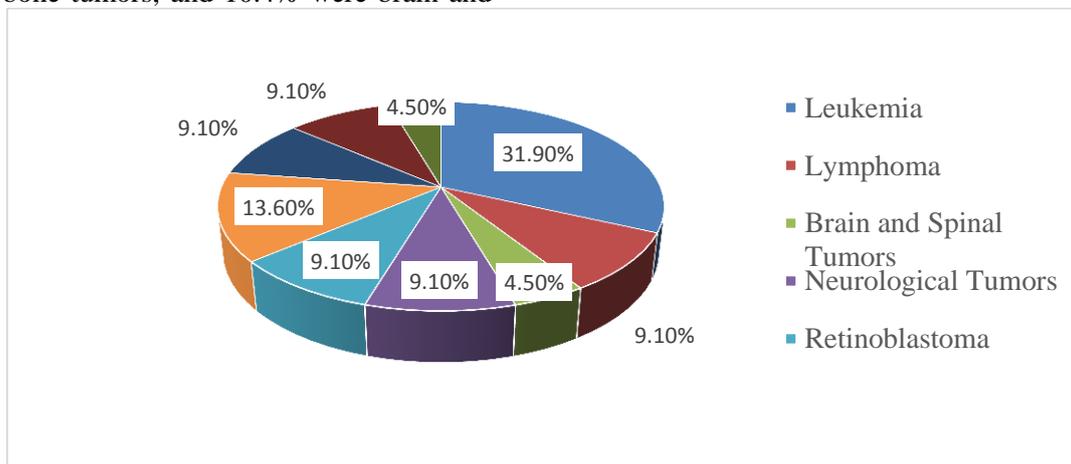


Figure 2a: Frequency distribution of childhood cancer types according to age groups (children aged less than five years), Minia governorate, 2020.

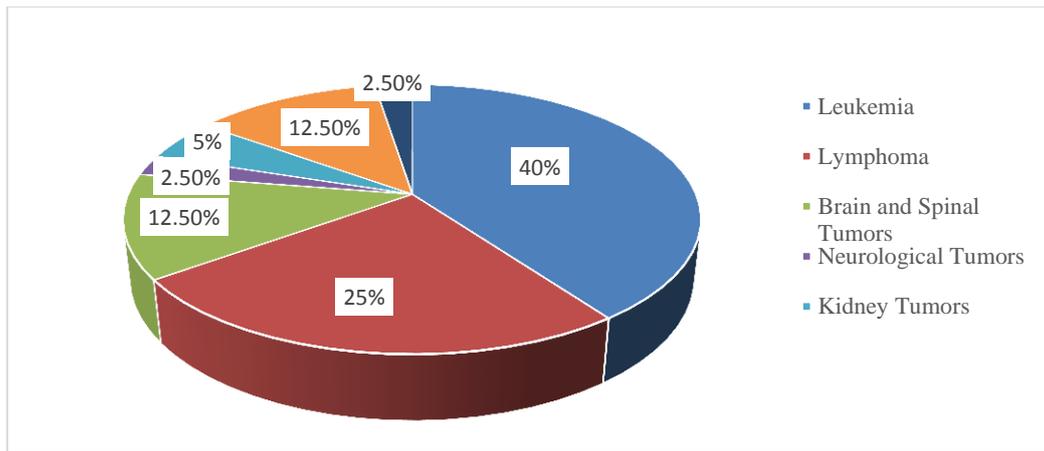


Figure 2b: Frequency distribution of childhood cancer types according to age groups (children aged five to ten years), Minia governorate, 2020.

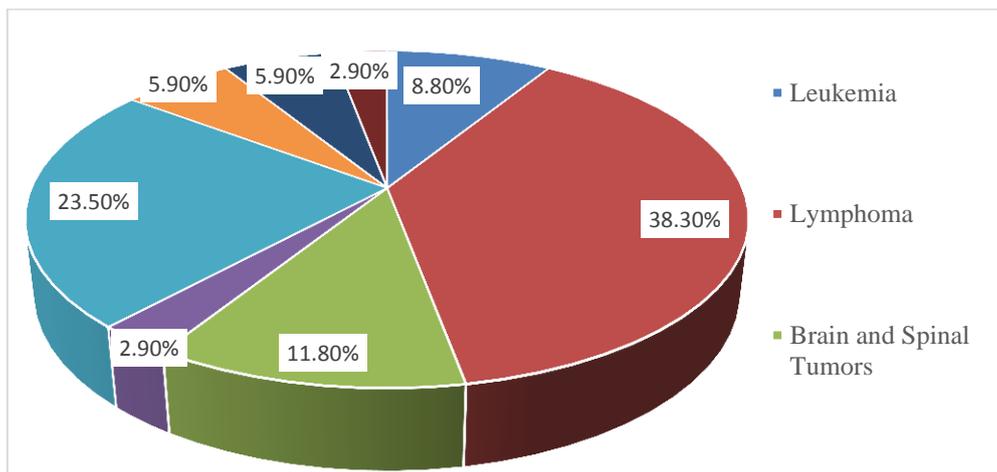


Figure 2c: Frequency distribution of childhood cancer types according to age groups (children aged more than ten years), Minia governorate, 2020.

In children aged less than five years old, the most common tumors occurred were leukemia (31.9%), followed by renal tumors (13.6%). neurological, retinoblastoma, bone tumors and soft tissue sarcomas were equal represent 9.1%. The least frequent tumors in this age group were brain and spinal tumors and gonadal and germ cell tumors (4.5%, Figure 2a).

Children aged from five to ten years old. Leukemia represents 40% which is the highest frequent tumor in this age group followed by lymphoma 25% while brain and spinal tumors

and bone tumors represent 12.5%. Renal tumors found in 5% of children, neurological tumors and soft tissue sarcomas were the least frequent tumors (Figure 2b).

Lymphoma was the most frequent tumor (38.3%) in the children aged > 10 years old followed by bone tumors (23.5%) while brain and spinal tumors represent 11.8% and leukemia represent 8.8%. The lowest percentage is 5.9% for soft tissue sarcomas gonadal and germ cell tumors, 2.9% for kidney tumors and unspecified malignant neoplasms (Figure 2c).

Table 2: Frequency distribution of childhood cancer types according to sex, Minia governorate, 2020.

Type of cancer	Sex	
	Females No (%)	Males No (%)
Leukemia	10 (22.20)	16 (31.40)
Lymphoma	11 (24.40)	14 (27.50)
Brain and Spinal Tumors	5 (11.10)	5 (9.80)
Neurological Tumors	3 (6.70)	0 (0.00)
Retinoblastoma	1 (2.20)	1 (2.00)
Kidney Tumors	5 (11.10)	1 (2.00)
Bone Tumors	7 (15.60)	8 (15.70)
Soft Tissue Sarcomas	0 (0.00)	5 (9.80)
Gonadal and Germ Cell Tumors	3 (6.70)	0 (0.00)
Other and Unspecified Malignant Neoplasms	0 (0.00)	1 (2.00)
Total	45 (100)	51(100)

Table 2 shows that, male predominance was marked in leukemia, lymphoma, and soft tissue sarcoma while female predominance was marked in renal tumors, brain and spinal tumors, neurological tumors and germ cell tumor. Bone tumors and retinoblastoma were nearly equal in both sexes.

Discussion

In the current study, tumors were classified according to their frequency among different age groups. The frequencies were 22.9% in children aged less than five years old, 41.7% in five to ten years of age group and 35.4% in children aged more than ten years old. Contrary, a retrospective study was conducted to find out the pattern of childhood cancer in South Egypt Cancer Institute, Assiut, reported that the highest frequency was seen in one to five years of age group (42.8%) and lowest incidence is seen in ten to 15 years of age (27.1%) (Ali et al., 2016). In Aswan, Egypt, the highest frequency was in the age group from one to four years (44.4% for males, 52.2% for females and 47.5% for both sexes together) (Ibrahim and Mikhail, 2010).

This study revealed that Leukemia was the most prevalent cancer among the studied children (27.1%) followed by lymphoma (26%) that is in line with American cancer society that reported that leukemia account for about 28% of cancers among children

(Society, 2019). A study conducted by Binesh et al., (2016) showed that leukemia and lymphomas were the main cancers among Iranian children.

Our study revealed that leukemia was the most common tumor in children aged less than ten years old while, lymphoma was the commonest among older children and adolescents. This is in accordance with (Steliarova-Foucher et al., 2017) who studied the global cancer incidence patterns in children younger than 20 years for 2001–10, based on data collected in 153 population-based cancer registries in 62 countries found that the overall cancer incidence in children aged below 14 years; the most common cancer was leukemia while in older children up to 19 years, the most common cancer being lymphomas (Steliarova-Foucher et al., 2017).

The majority (92.7%) of cases in this study were rural residents. In line with our finding, a study conducted by Patel et al., (2020) showed that residential proximity to agriculture has been associated with increased risk of childhood leukemia and central nervous system tumors in Denmark (Patel et al., 2020).

Maternal high educational level was previously reported to be a risk factor in studies from Denmark (Erdmann et al., 2020a; Erdmann et al., 2020b) and from the USA

(Johnson et al., 2008). A previous Egyptian study found an association of high maternal education level with childhood ALL (Ezzat et al., 2016). On contrary, the present study found that cases were more likely to have a lower level of maternal and paternal education. This can be explained through knowing that most of those cases that went to governmental places to be provided with health care are of a close lower social level and for those with a higher social level are capable to go to private places to receive treatment on their own expense.

In the current study, parental consanguinity was 62.5% among cases. A similar pattern of results was obtained in a previous study showed higher consanguinity percentage in the families of patients with ALL (Bener et al., 2001).

Conclusion

Leukemia and lymphoma are the commonest childhood cancer with more predilections toward males. In the current study tumors were classified according to their frequency among different age groups. The childhood cancers frequency was highest in children aged from five to ten years old.

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