



ORIGINAL RESEARCH PAPER

Pediatrics

ASSESSMENT OF VARIOUS TIME LAG IN THE BEGINNING OF TREATMENT OF CHILDHOOD CANCER

KEY WORDS:

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ABSTRACT

BACKGROUND: Childhood cancer is the 9th leading cause of mortality in India with survival rates as low as 15%. This is due to delay in diagnosis and treatment of cancer which occurs at various levels from appearance of first symptom to consultation with pediatric oncologist, so present study was undertaken to study this various delays.

MATERIALS & METHODS: It is cross-sectional study in which we enrolled 50 patients of childhood cancer with age group <14 years over a period of 1 year. Parents of these children were interviewed and clinical and epidemiological data were recorded in a standard performa. Critically ill patients and parents who did not give consent were excluded from the study.

RESULTS: In our present study, total median delay was 52 days. Median delay was more in female patients as compared to male patients. The median delay was more in illiterate (60 days) and rural (83 days) population with respect to literate (23 days) and urban population (30 days). Median referral interval was highest in yolk sac tumor (365 days) followed by Hodgkin's lymphoma (270 days). Median diagnostic interval and treatment interval was highest in Osteogenic sarcoma (60 days and 30 days respectively). Lowest total median interval was in B-ALL (29 days).

CONCLUSION: In our study, most common cause for delay was misdiagnosis followed by delay in getting investigations. The delay was more in female patients. About 52% patients had significant delay. These findings are similar to other studies conducted in low and middle income countries stating similar causes of delay.

INTRODUCTION

According to Population based cancer registries, more than 80% of childhood cancer patients are found in low- and middle-income countries (LMIC). Out of this, 54% diagnosed cancer patients are solely found in India. In developed countries, the survival rates are 80-85% whereas in developing countries, it is 15-45%. In India, cancer is the 9th leading cause for deaths among children between 5-15 years of age⁽¹⁾. The reason being unawareness towards the disease, delay in seeking medical help, lack of appropriate infrastructure for early diagnosis and treatment of cancer leading to poor outcome⁽²⁾.

Early diagnosis of cancer focuses on detecting symptomatic patients as early as possible so they have the best chance for successful treatment. When cancer care is delayed or inaccessible there is a lower chance of survival, greater problems associated with treatment and higher cost of care⁽³⁾. Early diagnosis improves cancer outcomes by providing care at the earliest possible stage and is therefore an important public health strategy in all settings.

The cause of delayed diagnosis and delayed treatment should be identified. Various factors can affect the time required for diagnosis. These factors are divided into patient related and doctor related. The causes of patient related delay are:- vague and nonspecific sign and symptoms of childhood malignancy, limited cancer awareness and fatalistic beliefs (spiritual and traditional beliefs), as well as low socioeconomic position and difficulty navigating the health system⁽⁴⁾. The contributing doctor related factors are misinterpretation of ambiguous symptoms of malignancy, rate at which cancer progresses, non availability of specific diagnostic tests for cancer, non-availability of pediatric oncologist, lack of knowledge and skills to raise suspicion of cancer by general practitioner⁽⁵⁾.

Although much of the literature describes patient-related

delays, evidence suggests that health system delays may play a greater role in late diagnosis⁽⁶⁾.

Hence this study aims to study duration of delay from onset of first symptom to beginning of cancer treatment and various factors affecting this delay which will help in management of Pediatric cancer patients.

MATERIALS AND METHODS

A cross-sectional study was conducted in Paediatric Oncology Department in Government Cancer Hospital, Aurangabad from 01/01/2021 to 31/12/2021. Primary objective of study is to quantify the delay in diagnosis and beginning of treatment of childhood cancers. Secondary objective of study is to find out reasons for the delay in treatment of childhood malignancies which will help in improving outcome.

All the diagnosed childhood cancer patients from 0 to 14 years of age presenting to OPD were included in the study after informed consent. Patients who were critically ill and parents who did not give consent for participation were excluded from the study. Parents of these children were interviewed and clinical and epidemiological data were recorded in a standard performa. Figure 1 depicts the definition of various types of time intervals used for this study based on standardized terminology based on Aarhus statement⁽⁶⁾. The date of onset of symptoms and first contact with a health care professional was based on recall by the parents, while the date of first visit to Pediatric Oncology center, date of confirmation of diagnosis and date of initiation of treatment were recorded from the hospital case records. Any of the parent who can both read and write with understanding in any language was treated as literate. Socio economic status was considered using Modified Kuppuswamy Scale (MKS)⁽⁷⁾. Time delays between different groups were compared using the Yates Chi Square test.

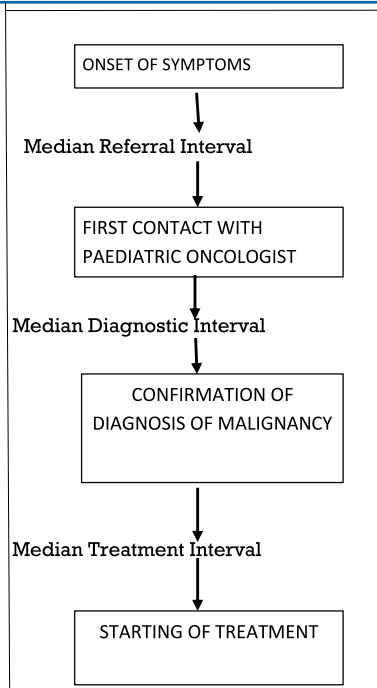


Figure 1: definition of different time intervals used in the analysis

RESULTS

A total of 50 diagnosed childhood cancer patients were enrolled in the study. Table 1 shows demographic and clinical characteristics of enrolled patients.

Most of the patients were more than 5 years of age [26 (52%)] as shown in the table 1. 29 patients were male while 21 patients were female with male to female ratio of 1.38:1. Majority of patient belonged to rural area [31 (62%)] and the rest belonged to urban area [19 (38%)]. Parents of 31 patients (62%) were literate. 49 patients (98%) belonged to class 4 Kuppuswamy scale. None of the patients were in class 1 or class 2 Kuppuswamy scale. Most common presenting symptom at the beginning of illness was fever which was seen in 20 patients (40%) followed by swelling in 13 patients (26%). There were various reasons for delay in diagnosis, misdiagnosis [17(34%)] being the most common reason as shown in table 1.

Table 1: Demographic and clinical characteristic of patients

Age		
<1 year	1	2
1-5 years	23	46
>5 years	26	52
Gender		
Male	29	58
Female	21	42
Locality		
Rural	31	62
Urban	19	38
Education of parents		
Literate	31	62
Illiterate	19	38
Socio economic status		
Class 1	0	0
Class 2	0	0
Class 3	1	2
Class 4	49	98
Presenting symptoms		
Fever	20	40

Swelling	13	26
Pain	5	10
Abdominal distension	4	8
Strabismus	1	2
Headache	1	2
Eye discharge	2	4
Breathlessness	2	4
Leukocoria	1	2
Cause of delay		
Misdiagnosis	17	34
Reports awaited	10	20
Covid lockdown	9	18
OPD treatment	6	12
Failed to follow up	4	8
Parental negligence	3	6
Multiple doctor consultation	1	2

Hematological malignancy and solid tumors had 27 and 23 cases respectively. Distribution of haematological malignancy and solid tumor is given in figure 2 and figure 3 respectively.

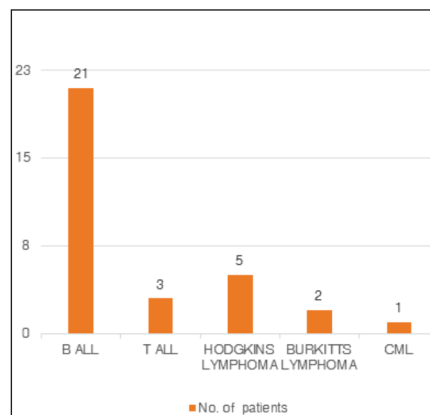


Figure 2: distribution of hematological malignancy

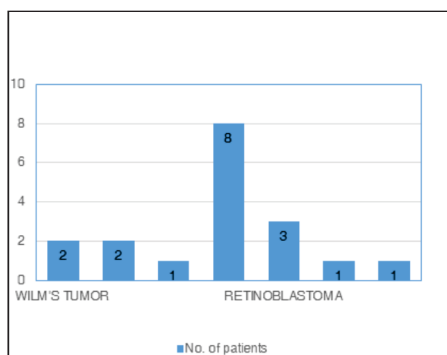


Figure 3: distribution of solid malignancy

Table 2 shows various factors affecting delay in beginning of treatment in pediatric cancer patient. Median referral interval, median diagnostic interval and median treatment interval was 43 days, 7 days and 2 days respectively for the entire cohort as shown in table 2. Total median time interval was 52 days for entire cohort. Median referral interval was 60 days for females while 30 days for male patients. Also median referral interval was more in illiterate parents (52 days) as compared to literate parents (19 days).

In rural population, median referral interval was 83 days while it was 30 days in urban population as shown in table 2. Median referral interval was highest in Yolk sac tumor (276 days) followed by Hodgkin's lymphoma (270 days). Median diagnostic interval and median treatment interval was highest in Osteogenic sarcoma which was 60 days and 30 days respectively.

Table 2: Various factors affecting delay in beginning of treatment in Paediatric cancer patient

CATEGORY	MEDIAN REFERRAL INTERVAL (IN DAYS)	MEDIAN DIAGNOSIS INTERVAL (IN DAYS)	MEDIAN TREATMENT INTERVAL (IN DAYS)	X ²	P-value
OVERALL	43	7	2	3.12	0.2101
GENDER					
MALE	30	7	2	1.806	0.4053
FEMALE	60	7	2		
PARENT'S EDUCATION					
LITERATE	19	7	2	6.823	0.033
ILLITERATE	52	7	2		
PLACE OF RESIDENCE					
RURAL	83	7	3	3.564	0.168
URBAN	30	7	2		
SOCIO-ECONOMIC STATUS					
MIDDLE CLASS	46	7	3	73.21	0.042
LOWER MIDDLE CLASS	40	7	2		
DIAGNOSIS					
B-ALL	20	7	2	384.7	0.058
T-ALL	30	5	3		
CML	45	7	3		
Burkitt's lymphoma	150	11	10		
Hodgkin's lymphoma	270	7	2		
Ewing's sarcoma	98	7	6		
Retinoblastoma	90	15	5		
Osteogenic sarcoma	150	60	30		
Pilocytic astrocytoma	30	7	3		
rhabdomyosarcoma	60	3	2		
Wilm's tumor	24	46	1		
Yolk sac tumor	276	7	5		

DISCUSSION

In present study, we enrolled 50 cases of pediatric malignancy. In present study most common affected age group is >5 years. Similar findings were seen in a study conducted by Ole Stoeter⁽⁸⁾ et al. In Sub Saharan Africa where mean age of all cancers was 9 years. Contrary to this, a study done by Gisela Michel et al.⁽⁹⁾ in Switzerland, most common age of presentation was 0 to 5 years. As this study was done in developed country which could explain the reason for early presentation.

In present study, we found that most of the patients were male which was similar with the study carried out by Shuvadeep Ganguly et al⁽¹⁰⁾. The median referral time is higher in females (60 days) than males (30 days). The reason being gender preference by parents, seeking early medical care for male child and also higher incidence of cancers in male child worldwide.

The median referral time in literate parents was 19 days, whereas in illiterate parents was 52 days suggesting lack of confidence in health care by parents as supported by study conducted done by BJ brown⁽¹¹⁾ in Nigeria. Similarly, findings seen in study done by Alemseged et al⁽¹²⁾ suggested parents who did not attend primary school were diagnosed late.

According to present study, the delay in diagnosis was more in rural population (83 days) unlike in urban population (30 days) supported by the study conducted by N Morshed et al⁽¹³⁾ where delay was more in rural population due to vast travelling distance. W Yadalla et al⁽¹⁴⁾, observed more delay in urban parents due to higher rates of parental employment in urban areas leading to decreased rates of seeking

specialized health care.

In our health care setup, most patients came with initial complains of fever which was also seen in study conducted by KJ Nazemi⁽¹⁵⁾. Pain was given as the most common presenting complain in patients which is against the findings of our study given in a study by JM Ahrensberg⁽¹⁶⁾.

We observed maximum population belonged to middle class according to MKS classification with comparable median delay in lower middle class. The study conducted by Ole Stoeter⁽⁸⁾ et al. Done in LMIC had similar findings were maximum population belonged to middle class.

CONCLUSION

Delay in diagnosis among pediatric cancer patients was common in our settings, with much of the delay occurring prior to the first encounter with pediatric oncologist. The median referral delay was 43 days, the median diagnosis delay was 7 days and the median treatment delay was 2 days. About 52% patients had significant diagnosis delay. These findings are more or less similar to other studies in LMIC. Delayed diagnosis was influenced by the residence, family's socioeconomic status, Parental education, type of malignancy and symptoms with much of the delay occurred prior to the first encounter with pediatric oncologist. Thus, every effort should be made to promote public and parental awareness of childhood cancer and promoting health insurance to those with low socioeconomic status. Training on childhood cancer should be incorporated into the curricula of medical training institutions so as to decrease referral delay

REFERENCES

1. Bashar MA, Thakur JS. Incidence and pattern of childhood cancers in India: findings from population-based cancer registries. Indian journal of medical and paediatric oncology: official journal of Indian Society of Medical & Paediatric Oncology. 2017 Apr;38(2):240.
2. Chukwu BF, Ezenwosu OU, Ikefuna AN, Emodi IJ. Diagnostic delay in pediatric cancer in Enugu, Nigeria: a prospective study. Pediatric hematology and oncology. 2015 Feb 17;32(2):164-71.
3. Dang-Tan T, Franco EL. Diagnosis delays in childhood cancer: a review. Cancer: Interdisciplinary International Journal of the American Cancer Society. 2007 Aug 15;110(4):703-13.
4. Daly H, Collins C. Barriers to early diagnosis of cancer in primary care: a needs assessment of GPs. Irish medical journal. 2007 Nov 1;100(10):624-6.
5. Wani RT. Socioeconomic status scales-modified Kuppuswamy and Udai Pareek's scale updated for 2019. Journal of family medicine and primary care. 2019 Jun;8(6):1846.
6. Verma N, Bhattacharya S. Time to diagnosis and treatment of childhood cancer. The Indian Journal of Pediatrics. 2020 Feb 13:1-3.
7. Ananthan VA. Modified Kuppuswamy scale for socioeconomic status of the Indian family-Update based on New CPI (IW) series from September 2020. Journal of Family Medicine and Primary Care. 2021 May 1;10(5):2048.
8. Stoeter O, Seraphin TP, Chitsike I, Chokunonga E, Kambugu JB, Wabinga H, Parkin DM, Kantelhardt EJ. Trends in childhood cancer incidence in sub-Saharan Africa: Results from 25 years of cancer registration in Harare (Zimbabwe) and Kyadondo (Uganda). International Journal of Cancer. 2021 May 4.
9. Michel G, von der Weid NX, Zwahlen M, Adam M, Rebholz CE, Kuehni CE. The Swiss Childhood Cancer Registry: rationale, organisation and results for the years 2001-2005. Swiss medical weekly. 2007 Sep 8;137(35-36):502-9.
10. Ganguly S, Kinsey S, Bakshi S. Childhood cancer in India. Cancer epidemiology. 2021 Apr 1;71:101679.
11. Brown BJ, Adeleye AO, Ibeh JN. A prospective study on the causes of delayed diagnosis of childhood cancer in Ibadan, Nigeria. Pediatric hematology and oncology. 2015 Aug 18;32(6):365-73.
12. Berhane A, Hailu T, Mulugueta A. Determinants of delayed diagnosis among pediatric cancer patients from Ayder Comprehensive Specialized Hospital, Mekelle, Northern Ethiopia. BMC pediatrics. 2019 Dec;19(1):1-8.
13. Morshed N, Zhan FB. Racial/ethnic, social characteristics and geographic disparities of childhood cancer late-stage diagnosis in Texas, 2005 to 2014. Annals of GIS. 2021 Oct 2;27(4):329-40.
14. Yadalla W, Al-Jadiry MF, Faraj SA, Ghali HH, Shakow A, Kasmani MN, Fawzi MC, Al-Hadad SA. Delay in diagnosis of cancer in Iraq: Implications for survival and health outcomes at Children's Welfare Teaching Hospital in Baghdad. Journal of Global Health Reports. 2021 Jul 22;5:e2021047.
15. Nazemi KJ, Malempati S. Emergency department presentation of childhood cancer. Emergency Medicine Clinics. 2009 Aug 1;27(3):477-95.
16. Ahrensberg JM, Hansen RP, Olesen F, Schröder H, Vedsted P. Presenting symptoms of children with cancer: a primary-care population-based study. British Journal of General Practice. 2012 Jul 1;62(600):e458-65.