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Prevalence of cancer types and its relation with age and gender among adolescents and young adults: An observational study

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Abstract

Background: In India, cancer is one of the leading cause of morbidity and mortality. Cancer among adolescent and young adults (AYAs) are increasing day by day. There is substantial lack of evidence in the prevalence of different types of cancer among AYA.

Aims and Objectives: To study the prevalence of different cancer type and evaluate the possible relation with age and gender in AYA.

Materials and Methods: One hundred and sixty-five cancer patients are studied at the Department of Medical Oncology and Hematology of IMS and SUM Hospital, Bhubaneswar from January 2015 to December 2017. The entire study cohort is divided into <15 years, 15-20 years, 21-25 years, 26-30 years and >30 years groups. Data on age, sex, and type of cancer are collected using a semi-structured questionnaire.

Results: Mean age of the study cohort is 23.45±4.28 years. Cancer is found more prevalent among the age of 26-30 years (38.2%) and in male gender (57%). The majority are hematological malignancies as common cancer types (25.5%) followed by other malignancies in decreasing order, lymphomas (15.8%), cancer of gastrointestinal tract (GIT) (14.5%), sarcoma (13.3%), germ cell tumor (8.5%), cancer of the breast (8.5%) and ovarian cancer (7.3%). Distribution of cancer type depends on the age ($p=0.005$) and gender ($p<0.001$) of the patients.

Conclusion: Cancer in AYA have distinct characteristics in prevalence and pattern. This is alarming and demands more attention by the health care professional to monitor signs of cancer in AYA.

Keywords: Prevalence, adolescents, young adults, malignancy, cancer mortality, haematological malignancies, lymphoma, sarcoma, germ cell tumor

Introduction

Cancer is a disease of fear and concern for any age. The spectrum of malignancies with its subtypes and their increasing trend with its coincidence in adolescent and young age (15–29 years of age) have been dealt with in our present study. The distribution of cancer in adolescents and young adults (AYA) population show diversity from center to center on a regional basis and across the world [1, 2].

As per the recent report of the National Cancer Institute (NCI), AYA is diagnosed with cancer account for approximately 5% in each year at the United States. This is about six times the number of cancers is diagnosed in children of age 0-14 years. Cancer in AYA has distinct characteristics in incidence and pattern as compared to the older and pediatric age group [3].

In India, cancer has become one of the ten leading causes of death. Around 1.5-2 million cancer cases occur at any given point of time [4]. Over 7 lakh new cases of cancer and 3 lakh deaths occur annually due to cancer. Nearly 15 lakh patients require facilities for diagnosis, treatment and follow up at a given time [5].

World Health Organization (WHO) defines adolescent as one between 10–19 years of age, and youth as one aged between 15–24 years [6]. But in the Indian context, the age group of 15-30 years is taken as teenage and young adults. NCI refers to an individual with the age group of 15 to 39 as AYA [3]. In our present study, 15-29 yrs of age group is the selection

criteria as AYA, those on which the prevalence of cancer types has been studied. Focus at this stage of the period is important because of many issues like developmental, psychological, dependency and fertility factors revolve around it. Moreover, the treatment criteria like tolerance to intensive therapy, fewer co-morbidity factors, and long term side effects are also additional features [7].

In order to inform and develop future policies in India, it is important to study the spread of cancer in AYA group. Hence in the present study, we try to find out the prevalence of different types of cancer in AYA population using different age cut-offs and gender.

Materials and Methods

One hundred and sixty-five cancer patients who visited the Out Patients Department (OPD) at the Department of Medical Oncology and Hematology of IMS and SUM Hospital, Bhubaneswar between January 1, 2015, and December 31, 2017, are prospectively studied.

The entire study cohort is divided into a different subset of age groups as <15 years, 15-20 years, 21-25 years, 26-30 years and >30 years and different cancer types are studied.

Demographic profile including age and sex are recorded using a semi-structured questionnaire and filled by the patients on presentation to OPD and the data are then transferred to Microsoft 2010 excel sheet.

All the data analysis are performed using IBM SPSS version 20 software. A descriptive analysis is performed to find out the mean age of study. Frequency distribution and cross-tabulation are performed to prepare. Graphs are prepared using Microsoft Excel and PRIMS software. Quantitative data are expressed as mean ± standard deviation (SD) and gender, type of cancer are expressed as number and percentage. The p-value for the categorical variable is

assessed using the Pearson Chi-square test. Level of significance is assessed at 5%.

Results

A total of 165 cases are enrolled during the last 2 years. Mean age of the study cohort is 23.45±4.28 years which ranged from 14 to 32 years (Table 1).

Cancer is more prevalent among the age group of 26-30 years [63 (38.2%)] followed by 21-25 years [59 (35.8%)] and 15-20 years [31 (18.8%)](Figure 2). There are 11 (6.7%) patients who had age <15 years. We observed male preponderance [94 (57%)] among cancer patients. There are 71 (43%) females who had cancer in the present study.

Most common malignancy of the study cohort is hematological malignancies [42 (25.5%)] followed by lymphomas [26 (15.8%)], cancer of gastrointestinal tract (GIT) [24 (14.5%)], sarcoma [22 (13.3%)], germ cell tumor [14 (8.5%)], cancer of breast [14 (8.5%)] and ovarian cancer [12 (7.3%)] (Figure 1). We reported primitive neuroectodermal tumor (PNET) in 9 (5.55%) patients. Gender distribution among the different age groups is similar (p=0.657) (Table 1).

Table 1: Gender distribution in different age groups.

Age groups (years)	Gender		Total	Pearson Chi-Square	P value
	F	M			
<15	5	6	11	2.433, df=4	0.657
15-20	14	17	31		
21-25	22	37	59		
26-30	29	34	63		
>30	1	0	1		
Total	71	94	165		

Data are expressed as a number, p-value of <0.05 is considered as significant.

Table 2: Distribution of different cancer type in age groups.

Type of cancer	Age groups(years)					Total	Pearson Chi-Square	P value
	<15	15-20	21-25	26-30	>30			
Cancer of Bladder	0	0	1	0	0	1	61.325, df=36	0.005
Cancer of Buccal mucosa	0	0	0	1	0	1		
Cancer of breast	0	1	3	10	0	14		
Cancer of Ovary	1	0	2	9	0	12		
Germ cell tumor	0	3	4	7	0	14		
Cancer of GIT	0	1	6	17	0	24		
Hematological malignancies	5	10	18	8	1	42		
Lymphoma	1	7	12	6	0	26		
PNET	3	2	3	1	0	9		
Sarcoma	1	7	10	4	0	22		
Total	11	31	59	63	1	165		

Data are expressed as a number, p-value of <0.05 is considered as significant, PNET; primitive neuroectodermal tumor, GIT; gastrointestinal tract.

Table 3: Distribution of different types of cancer among genders.

Types of cancer	Gender		Total	Pearson Chi Square	P value
	F	M			
Cancer of Bladder	1	0	1	47.045, df=9	<0.001
Cancer of Buccal mucosa	0	1	1		
Cancer of breast	14	0	14		
Cancer of Ovary	12	0	12		
Germ cell tumor	2	12	14		
GIT	9	15	24		
Hematological malignancies	15	27	42		
Lymphoma	6	20	26		
PNET	3	6	9		
Sarcoma	9	13	22		
Total	71	94	165		

Data are expressed as a number, p-value of <0.05 is considered as significant, PNET; primitive neuroectodermal tumor, GIT; gastrointestinal tract.

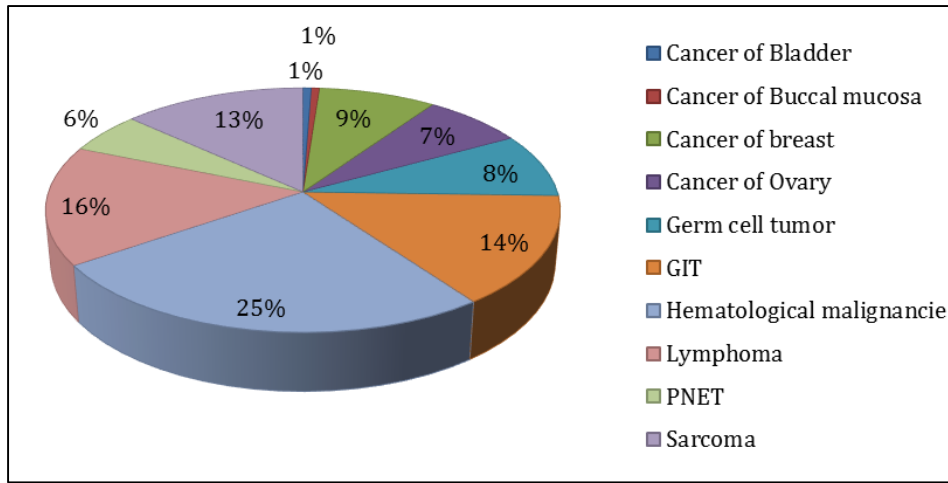


Fig 1: Percent Number of cases of various types of cancers

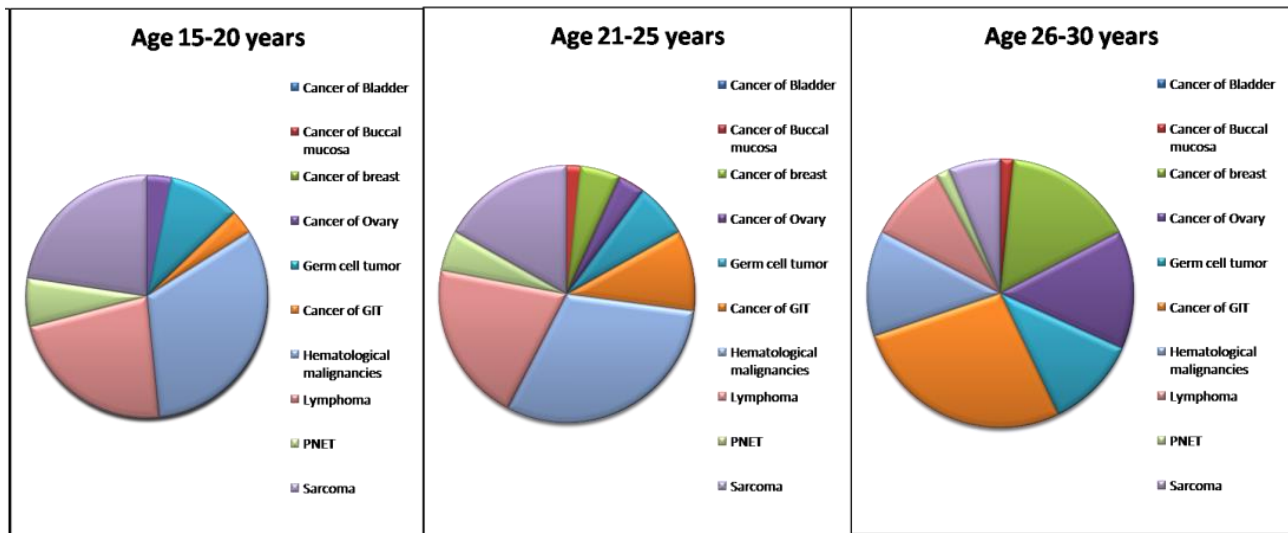


Fig 2: Age wise distribution of various type of cancer

Discussion

Knowledge of incidence and prevalence of cancer and its type help the public health professionals to form future strategies to decrease the morbidity and mortality among the population. Our study describes the prevalence of cancer types in different age groups and gender of AYA in Indian setup [Table 2 and Table 3].

In the present study, males outnumber the females, which is in agreement to the findings of Phukan *et al.* from Mizoram [8] that showed that cancer was more prevalent among the male population than females. However, present study findings are in contradiction with the study done by Puri *et al.* in 2014 at Chandigarh, which reported female preponderance [4]. A study from Indore district by Gupta *et al.* studied 327 teenage and young adults, reported that males are more affected by cancer compared to the female population [9]. We observed male preponderance (57%) among cancer patients. This is higher as compared to studies from the western authors [10, 11]. The plausible reason for this may be due to high male to female ratio among Indians and some cancer such as lymphoma are more common in males as compared to female. Previous studies have shown that the incidence of cancer increases with the age in AYA [10-12]. In the present study, we also observed the similar trend as the number of cancer patients in the age group of <15, 15-20,

21-25 and 26-30 years are 11, 31, 59 and 63, respectively (Figure 2 and Table 1).

In the present study, the distribution of cancer type is dependent on the age ($p=0.005$) and sex ($p<0.001$) of the patients (Table 2 and Table 3). The finding of a large nationwide study from Japan is hand in hand with present study findings, which also reported that the distribution of cancer types in AYA is dependent on age and sex [13]. Pesola *et al.* also reported that incidence of different types of cancer varies as a function of age [14]. Most common malignancy in the present study is hematological malignancies followed by lymphomas, cancer of GIT, sarcoma, germ cell tumor, cancer of breast and Cancer of ovary (Figure 1). In a similar study by Singh *et al.* who reported that the most common types of cancer in the young population are acute lymphocytic leukemia followed by lymphoma and osteosarcoma, which is consistent with present study finding [12]. A Korean study including cancer patients of age between 15-29 years reported thyroid carcinoma, non-Hodgkin lymphoma, stomach carcinoma, breast carcinoma, and acute myeloid leukemia as the most common cancer types in AYA group, which again provide strength to the present study findings [15]. Another study was done on English patients also reported leukemia followed by lymphoma as the most common cancer among age AYA [14].

Gupta *et al.* from Indore reported that carcinoma of the head (27.22%) followed by breast (10.7%) and GIT (8.26%) are the most common malignancy observed [9]. The results are consistent with our findings, where 19.71% of the female had breast cancer and 14.54% patients are found to have GIT related cancer. In agreement to our findings, where Hematological malignancies being most common accounts for 25.45% patients. Gupta *et al.* reported a lower percentage of hematological cancers (16.5%). Higher percentage observed in the present study could be due to the small sample size (n=165) as compared to Gupta *et al.* (n=5221).

There are few limitations of the present study, small sample size is one of them because of that the percentage of each cancer type could be higher. Second, as a tertiary care center, we receive a great number of referrals due to that the percentage of each cancer type could be higher.

Conclusion

The present study showed that cancer among the AYA population is a serious issue as we found hematological malignancies, lymphomas, cancer of gastrointestinal tract, sarcoma, germ cell tumor and cancer of breast as the most common malignancies. A significant difference is observed in different cancer type among different age groups and gender. There is a need for larger prospective trials to strengthen our findings.

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