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Pattern of Adolescent and Young Adult Cancers - A Ten Year Study

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ABSTRACT

Cancer incidence pattern among adolescents and young adults (AYA) are distinctive from the adult population. Because of the lower incidence rates of cancers in AYA, it has not been the focus of attention. The approach and treatment needs to be addressed differently from the adult cancers. An awareness of the screening programmes for patients with high risk needs to be propagated. There are very few such studies conducted in India. The present study is an attempt to explore the incidence and pattern of cancers in AYA in Tumkur, Karnataka. Of the 14,689 cases studied in the histopathology and cytology sections in the Dept. of Pathology, 1340 malignancies were diagnosed. 388 malignancies belonged to the category of AYA and formed 29.1% of the total number of cancers diagnosed and 2.6% of the total number of cases received in the histopathology and cytology sections. The male: female ratio was 1:1.8 with the maximum number of females in the 35-39yr category. The non-epithelial cancers were more common in adolescents and epithelial cancers gradually increased from adolescents to young adults. The lip/oral cavity/pharyngeal cancers were the commonest in males and carcinoma breasts were the commonest in females.

Keywords: Adolescent and young adults, cancer patterns, awareness, different approach.

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INTRODUCTION

The National Institute of Cancer groups 15-39 yr olds as adolescents and young adults [1]. These form a distinctive population in whom the cancers are different from those in older adults and more likely relate to genetic predisposition and exposure to risk factors early in life. Many of these cancers are preventable. The focus of attention at present has been the childhood and old age cancers, their treatment, palliative therapies etc. However, more attention is required for the AYA cancers due to the more life span, psychological factors, the effect of cancer on the workstyle of these patients and the burden of family on these adults [2,3].

MATERIALS AND METHODS

This study is a ten year retrospective observational study from 2001-2011. The data was archived from the histopathology and cytology registers in the Dept. of Pathology, Sri Siddhartha medical college, Tumkur, Karnataka. A total of 14,689 biopsies and cytologies were performed during this period. Of these, 1340 cases were diagnosed as malignant, which included all the age groups. However, for the present study only adolescents and young adults in the age group of 15-39 yrs were considered. The data such obtained was categorized and coded according to ICD – 10 [4]. The cases were analyzed for age, sex, the most common cancers in males and females and the trend of epithelial and non-epithelial cancers. Relevant history was obtained from the records. In the absence of such relevant data, the cases were excluded from the study. All cases diagnosed as cancer on cytology with a histopathological follow-up were considered as single cases. Only those cytology cases with no histopathological follow-up were taken as separate cases. The findings were compared with other similar studies.

RESULTS

During the ten year period from Jan 2001 – Dec 2011, the Dept. of Pathology received a total of 14689 cases, of which 10720 were histopathology and 3969 were cytology cases. A total of 1340 malignancies were reported, of which 388 were reported in AYA constituting a 28.95% of all the cancers reported in the above mentioned sections (Table 1 and 2).

Table 1: Cases Reported During the Ten Year Duration (2001-2011) in the Dept. of Pathology

	Total	Histopathology	Cytology
Total no. of biopsies/cytology specimens over a period of 10 yrs	14689	10720	3969
Total no. of malignancies	1340	899	441

Table 2: Distribution of Malignancies in Each Section and Based on Sex

Total no. of malignancies in adolescents and young adults	Males	Females
388	131	257

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The number of malignancies reported was very high in adolescent and young adult females when compared to AYA males. The male: female ratio gradually increased from 15-24yrs to 35-39yrs. The average ratio was M: F: 1:1.8 (Table3).

Table 3: Male to Female Ratio in Varying Age Groups

Age group	Males	Females	M : F
15-24yrs	28	34	1:1.2
25-34yrs	46	74	1:1.6
35-39yrs	57	149	1:2.6
Total	131	257	1:1.8

All the malignancies were coded and categorized based on the ICD 10 (Table 4).

Table-4: Number and Proportion of Leading Site of Cancers According to International Classification of Disease - Oncology (ICD-10)

ICD-CODE	SITE	MALES	FEMALES	TOTAL
C1-C14	Lip,oral cavity,pharynx Mouth Tonsil Pharynx Parotid	27 18 03 04 02	23 16 02 02 03	50
C15-C26	Digestive organs Esophagus Stomach Small intestine Colon Liver	21 01 11 02 01 06	27 03 08 03 07 06	48
C30-C39	Respiratory & intrathoracic organs	12	13	25
C40-C41	Bone and articular cartilage	09	04	13
C43-C44	Melanoma & other malignant neoplasms of the skin	10	10	20
C45-C49	Malignant neoplasms of mesothelial and soft tissues	08	12	20
C50-C50	Breast	--	72	72
C51-C58	Female genital tract Cervix Uterus Ovary	--	45 28 02 15	45
C60-C63	Male genital system Penis Testis	14 04 10	-- --	14
C64-C68	Urinary tract	04	03	07
C69-C72	Eye, brain & other parts of CNS		01	01
C73-C75	Thyroid & other endocrine glands	06	32	38
C76-C80	Malignant neoplasms of ill defined and other secondary and unspecified sites	--	--	--
C81-C96	Malignant neoplasms of lymphoid, hematopoietic and related tissues	20	15	35
	Total	131	257	388

In males, the oral cavity cancers were the commonest. These were followed by gastrointestinal, lymphoreticular malignancies. In females, the highest number of malignancies was reported in breast followed by thyroid cancers. The other malignancies reported in higher frequency were cervical, gastrointestinal & oropharyngeal cancers. Table 5 shows the most common malignancies in males and in females.

Table 5: Top Five Cancers in Males and Females in Present Study

s.no	males		females	
	SITE	%	SITE	%
1.	Lip/Oral cavity/pharyngeal	17.6	Breast	28.0
2.	Digestive organs	16.03	Female genital tract	16.73
3.	Lymphomas	15.26	Thyroid	12.45
4.	Male genital system	10.68	Digestive organs	10.5
5.	Respiratory/intrathoracic	9.2	Lip/Oral cavity/pharyngeal	7.78

In males, the cancers of the mouth constituted majority of the cancers. Among all the malignancies of the digestive organs, stomach cancer amounted to more than 50%. Hepatocellular carcinomas were also reported. In the malignancies of male genital tract, testicular cancers were more common. However, the penile carcinomas which are more common in elderly males were also reported in a few cases. Among the respiratory and intrathoracic malignancies, glottic cancers were more common.

In females, breast cancers were the most common. In fact, when malignancies in both sexes were considered, breast cancers were the commonest. In female genital tract, cervical cancers were more in number. The thyroid cancers outnumbered the cervical cancers. Papillary carcinoma of the thyroid was the commonest cancer in AYA. As in males, the stomach cancers were common in cancers of the digestive organs. But we also found an increasing incidence of small intestinal and colorectal cancers in AYA females. The oral cavity cancers made it to the top five cancers in this part of the country. The epithelial cancers occurred more commonly in females when compared to males. The non-epithelial cancers occurred in both sexes in almost the same frequency (Table 6 & 7).

In males, the incidence of oral, GI, respiratory and intrathoracic cancers were found to be increasing with age from adolescents to adults. The skin cancers were more common in the 15 – 24 yr age groups where as the bone cancers were more common in both the 15 -24yrs and 25 – 34 yrs category. The testicular cancers occurred more commonly in the 25 – 34 yr old males. Lymphomas occurred in the same incidence in all the age groups.

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Table 6: The Distribution of Epithelial and Non-Epithelial Malignancies in Males.

Types of malignancies in males (131)		
site	Epithelial	Non-epithelial
Lip,oral cavity,pharynx	27	00
Digestive organs	20	01
Respiratory & intrathoracic organs	12	00
Bone and articular cartilage	00	09
Melanoma & other malignant neoplasms of the skin	10	00
Malignant neoplasms of mesothelial and soft tissues	00	08
Male genital system	14	00
Urinary tract	04	00
Thyroid and other endocrine organs	06	00
Malignant neoplasms of lymphoid, hematopoietic and related tissues	00	20
Total	93	38

Table 7: The Distribution of Epithelial and Non-Epithelial Malignancies in Females.

Types of malignancies in females (257)		
Site	Epithelial	Non-epithelial
Lip,oral cavity,pharynx	23	00
Digestive organs	26	01
Respiratory & intrathoracic organs	13	00
Bone and articular cartilage	00	04
Melanoma & other malignant neoplasms of the skin	10	00
Malignant neoplasms of mesothelial and soft tissues	00	12
Breast	67	05
Female genital system	45	00
Urinary tract	03	00
Eye, brain & other parts of CNS	01	00
Thyroid and other endocrine organs	32	00
Malignant neoplasms of lymphoid, hematopoietic and related tissues	00	15
Total	220	37

In females, the incidence of carcinomas of the breast, thyroid, cervix, ovaries, GI, lip/oral cavity/pharynx, respiratory/intrathoracic was found to be increasing from adolescents to adults. Lymphomas and bone tumors were found to be gradually reducing with age.

The non-epithelial cancers were more common in the 15-24yr old age groups in both males and females as noted in the childhood malignancies where as the epithelial cancers which were more common in the older age were found to occur more in the 35-39 yrs with an increasing frequency from 25 – 34 yrs.

DISCUSSION

Adolescent and young adults are a distinctive population in terms of cancer occurrence. Because of their relatively low cancer incidence, the adolescents and young adult population

has not been the focus of attention in cancer control and prevention. There have been few publications on the overall cancer incidence patterns [3].

Cancers in AYAs may not be detected until later in their course, because people who experience symptoms may delay seeking medical help or may not have access to routine medical care that could allow prompt detection of disease. Physicians may also be less familiar with the signs and symptoms of cancer in AYA [5].

In the present study, the number of cancers in AYA accounted to 2.58% of the total number of cancers reported on histopathology and cytology in the Dept. of Pathology from 2001-2011. A comparable incidence of 2% was observed by Prithwish et al whereas in the study by Kalyani et al a higher incidence of 3.72% was noted [2, 5]. This could be because of the variations in the age considered for AYA which was 15-29yrs and 15-44yrs respectively in the above mentioned studies. However, for the present study, the AYA age as per NCI bulletin was considered [1].

The ratio of male to females was 1:1.8. A comparable incidence of 1:2 and 1:1.6 were found in studies by Kalyani et al and Xiaocheng et al. The occurrence of cancer was found to be higher in many studies among this group [2, 3, 6,].

In the present study, the cancers in the age group 15-19yrs were slightly higher in females but as the years progressed, the number of cancers in females increased significantly. We found that in females the cancers occurred 1.6 times more in 25-34yrs and 2.6 times more in the age group of 34-39yrs when compared to males. In the study by Prithwish et al, the incidence in 25-29yrs old females was 2.5 times more than that in males [5]. In yet another study by Xiaocheng et al, where the incidence of cancers were compared in blacks and whites in both sexes, the incidence of cancer in 20-24yr old males was marginally higher by 1.02 times whereas it was 1.3 times in 25-34yr old females and 1.6 times in 35-39yr old females [3].

The most common cancers in males in our center were oral cavity cancers followed by stomach cancers, lymphomas, testicular cancers and glottic cancers. The increased incidence of oral cavity cancers may be attributed to tobacco use. In the studies by Despande et al and Kalyani et al. higher prevalence of oral cavity cancers was due to increase tobacco use in rural areas of India and the high prevalence of the use of smokeless tobacco among young adult males [2, 7].

In females, the cancers of breast, thyroid and cervix were the commonest. In the study by Kalyani et al, the commonest cancer in females was mouth cancer followed by cervical and then breast cancers. The increased incidence of mouth cancers was attributed to increased use of tobacco and alcohol in both genders with the onset of this habit at a very young age especially in low socioeconomic group in that part of Karnataka [2]. However, such tobacco abuse by females is not much prevalent in our part of Karnataka. Tiwari et al and Hussain et al also found an increasing trend in breast cancer rates as in our study. The data from National cancer registry also suggests that the rates of cervix cancer are decreasing. Epidemiological

studies among female population have identified factors such as early menarche, late menopause, high calorie intake, high intake of saturated fats and less vegetables and fruits consumption were associated with breast cancer [8, 9].

In comparison with the epithelial and non-epithelial cancers, the non-epithelial cancers occurred in the same frequency in males and females and the numbers gradually reduced with increasing age. Xiaocheng et al also found a similar trend of non-epithelial cancers steadily decreasing with age [3]. Birch et al observed that the distribution of cancer types among the 15-19 year olds represents a transitional pattern between that seen in children and the pattern seen in 20-24 year olds which was more typical of older ages [10]. The risk factors for non-epithelial cancers are viral infections, radiation, genetic and environmental chemical carcinogens [2]. The epithelial cancers gradually peaked from the ages 25-34yrs and increased significantly in 35-39yr olds. These were more common in females when compared to males. Similar findings were also noted in the study by Xiaocheng et al where the epithelial cancers predominate in males after 40 yrs and in females after 25 yrs. This could be attributed to the cancers of breast, thyroid, and cervix which gradually increased from 15-24yrs to 25-34 yrs old females. The numbers increased sharply in 35-39yr old females [3]. Birch et al also observed marked increase in thyroid, breast and genitourinary tract cancers with age [10].

We observed that oral, pharyngeal, stomach cancers were increasing with age, the testicular cancers were more common in the 25-34yr old males and lymphomas were seen in all the age groups in almost the same frequency. In the study by Bapsy et al similar trend was noticed [7]. In females, we found that the breast, cervical, thyroid, colorectal cancers were increasing in young adults. Many such cancers may be due to genetic defects. Similar findings were also noted by Bapsy et al [7].

CONCLUSION

Our study highlights that many of the cancers in AYA are preventable. Many such cancers may be due to exposure to adverse carcinogenic factors at an early age or may have a genetic predisposition. Programmes directed at increasing the awareness and screening for cancers of may identify them at the earliest. The cancers in AYA need to be approached differently from that of adults. A co-ordinated approach is required and a follow up is necessary for the prevention of second cancers in this age group.

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