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Research Article

Trend of Cancer in Young Adults

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Abstract

Introduction: National cancer Institute has given the definition of young adult cancer in which diagnosis occurs between the age of 15 and 39 years. (1) Cancer with AYA have high risk of long-term effect of cancer and its treatment like organ dysfunction, infertility and secondary cancers as compared to older group of cancer patients (6,7,8) cancer is more common in elderly group according to some studies. Several Studies shown increasing evidence in younger population.

Result: We have analyzed the data from 2014 to 2021. Total 4667 (20.11%) Cases were registered, 3410 (52.89%) were males and 3037 (47.1%) were females. We analyzed 15 common cancers in our study in which 4698 (14.65%) cases were registered, commonest cancer we found in this group from 20-39 years was carcinoma breast with 18.88%. 2nd commonest was Head and Neck cancer with 14.32% of the cases.

Discussion: Urban Population based registry of India shown 5.8% of incidence with younger adults, same rate of incidence also reported in England (13), other studies reported prevalence rate from 3.8 to 5.71% (15). Breast cancer is commonest cancer affecting females worldwide about 25.4% of all new cases diagnosed in a year, it is reported the major cause of the death in 103 countries including India (28) 1%-2% cases of breast cancer reported under 35 years of age globally (1) Breast cancer in young population reported higher histological grades, higher death rate, unfavorable hormonal status (29).

Conclusion: 20-39 years have different epidemiological, biological, genetic factors. Carcinoma Breast (19%) was commonest cancer in our study. 2nd commonest was Hematolymphoid (14.4%).

Keywords: Breast Cancer; Carcinoma Breast; Carcinoma Gall Bladder

Background Information

National cancer Institute has given the definition of young adult cancer in which diagnosis occurs between the age of 15 and 39 years [1]. Cancer in this age grouphave distinct features different distribution in different areas and types of cancer,cancer biology, risk factors, prognostic factors and survival rate in comparison ofother age group [2-5]. Cancer with AYA have high risk of long-term effect of cancer and its treatment like organ dysfunction, infertility and secondary cancers as compared to older group of cancer patients [6-8]. Cancer is more common in elderly group according to some studies. These evidences cause diagnostic delay in young patient age group [9]. AYA plays a role of bridge between pediatric cancer and elderly cancer. They have a large proportion of remaining life span; More Chances of secondary malignancy can be expected.

AYA Population have a important role in economy, and have important role with their family [10]. Several Studies shown increasing evidence in younger population. Globally increasing incidence of colorectal cancer under the age of 50 years in 19 countries out of 36 countries. 9 countries shown stable or decreasing trend in older adults [11]. Similar changes are also shown in other types of cancers [12].

Material and Method

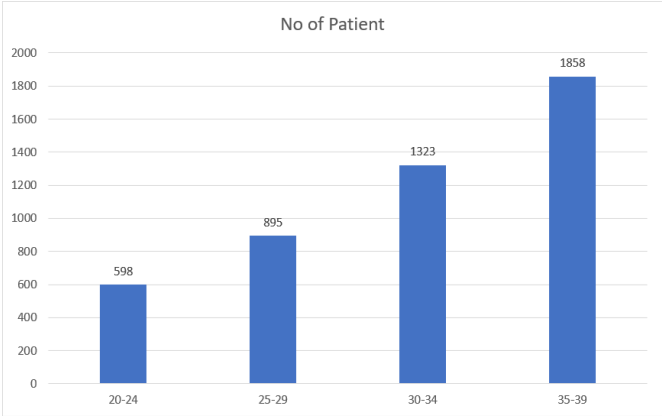
Our center is the State Cancer Center which caters approximately million population of Bihar. All the patients of 20-39 years registered under HBCR programme in Department of Radiation Oncology. We analyzed 15 common cancers in our record. According to age, sex, histology various type disease Ca gallbladder, Ca lung, Head and neck, Ca Breast, Ca Cervix, Hematolymphoid gastrointestinal disease, Ca Ovary, CA Prostate.

Results

We have analyzed the data from 2014 to 2021. Total of 32057 cases were reported in our study from 2014 to 2021. We analyzed 15 common cancers under this age group. 4663 cases were analyzed in which 2293 (51%) cases were Male and 2270 (48%) were female registered in this age group (20 to 39 years). Male: Female ratio shown was 1:1.2, Commonest cancer was Carcinoma Breast (19%), 2nd commonest cancer was Head and Neck Carcinoma 14.39%, Carcinoma Gall Bladder 11%, Carcinoma Colorectum (7.5%), Carcinoma Cervix 7.5%, Carcinoma Ovary 6.7%, Carcinoma Lung 3.7%. 598 cases were belonged to 20-24 years, 895 cases were belonged to 25-29 years, 1323 cases were belonged to 30-34 and 1858 cases were belonged to 35-39 years. Increasing trend of cases seen as age increases.

Table 1: Distribution according to Age Group.

Age Group (Year)	20-24	25-29	30-34	35-39
No of Patient	598	895	1323	1858



Graph 1: Distribution according to Age Group.

Commonest age group was 35 to 39 in which 2274. 2nd commonest age group was 30 to 34 years, 3rd commonest age group was 25 to 29 years and lowest represented in 20 to 24 (889).

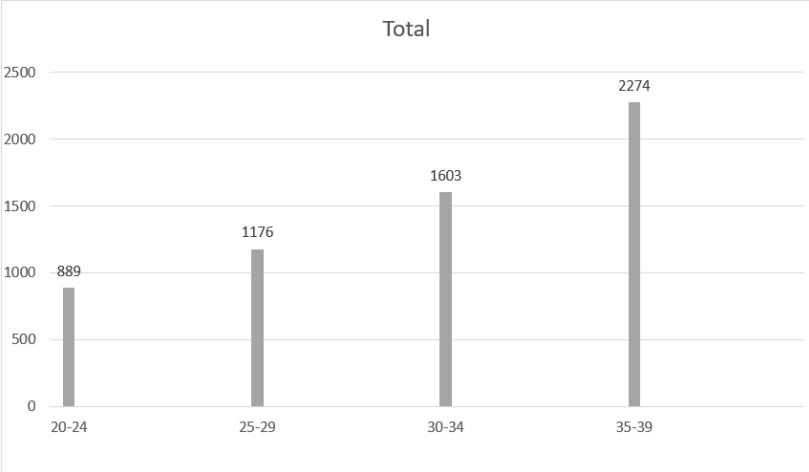
Table 2: Total number of patients differentiation according to age group between 20-39 years of age.

Sex	20-24					25-29					30-34					35-39				
Female	82	51	94	72	88	150	104	86	160	80	342	73	224	101	109	590	211	153	234	136
Male	122	90	119	89	82	159	110	91	155	81	278	79	181	93	123	379	144	122	196	109
Total	889					1176					1603					2274				

434 cases were registered in 2014, 536 cases were registered in 2015, 531 cases were registered in 2016, 1024 cases were registered in 2017, 228 cases were registered in 2018, 224 cases were registered in 2019, 633 cases were registered in 2020 and 863 cases were registered in 2021.

Discussion

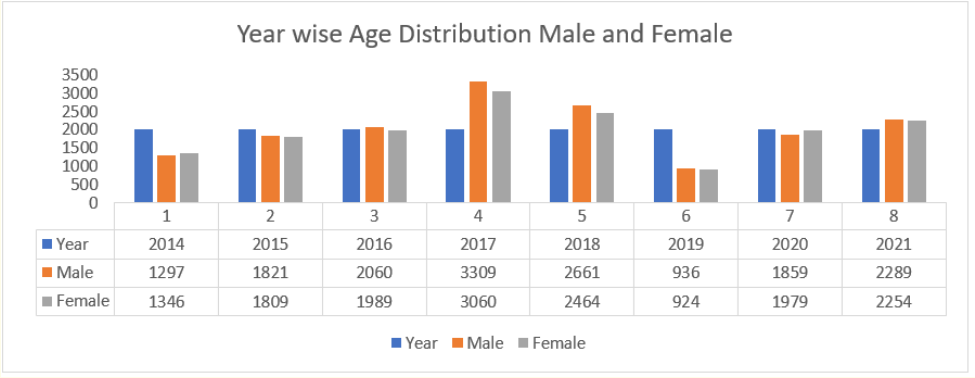
Urban Population based registry of India shown 5.8% of incidence with younger adults, same rate of incidence also reported in England [13], other studies reported prevalence rate from 3.8 to 5.71% [15]. 2.3% in Korea and 2% [14] in national cancer Institute surveillance, epidemiology and end results (SEER) mono-



Graph 2: Total number of patients according to age group between 20-39 years of age.

Table 3: Year Wise Distribution of Male and Female of Age group 20-39 Years.

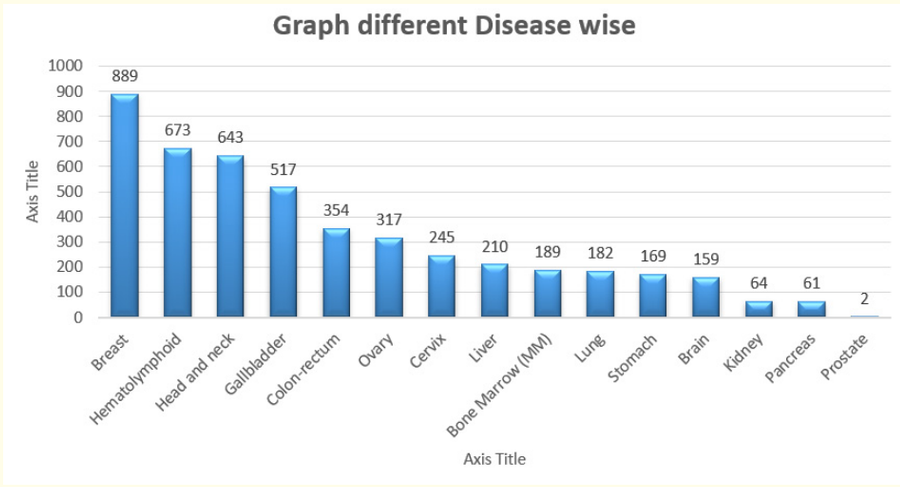
Year	Total	20-39	Percentage
2014	2643	434	1.35%
2015	3630	536	1.67%
2016	4049	531	1.66%
2017	6369	1024	3.19%
2018	5125	228	0.71%
2019	1860	224	0.70%
2020	3838	633	1.97%
2021	4543	863	2.69%
Total	32057	4473	13.95%



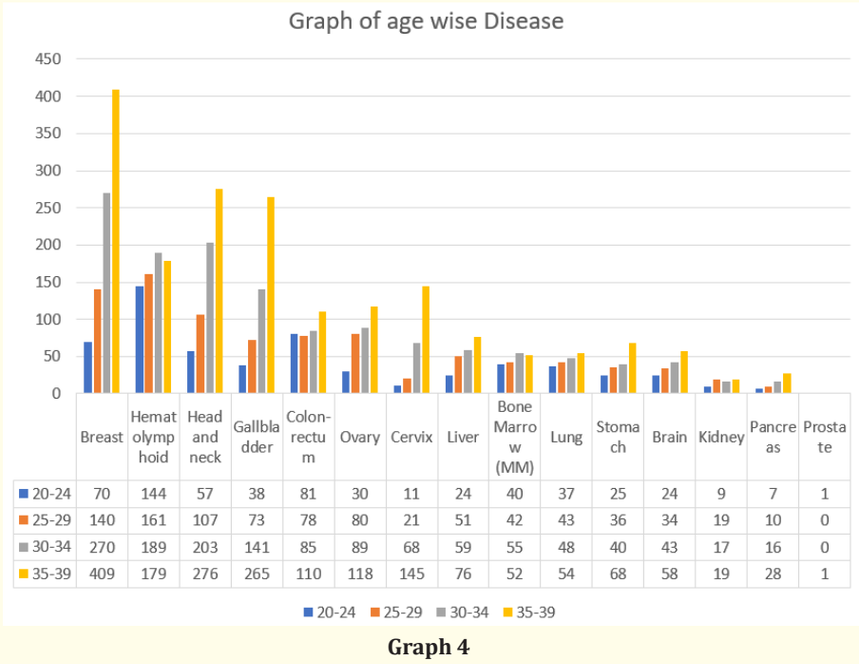
Graph 3

Table 4: Age Wise Data of different Disease wise.

Rank	Topography	20-24	25-29	30-34	35-39	Total	Percentage
1	Breast	70	140	270	409	889	26.21%
2	Hematolymphoid	144	161	189	179	673	34.87%
3	Head and neck	57	107	203	276	643	18.94%
4	Gallbladder	38	73	141	265	517	12.30%
5	Colon-rectum	81	78	85	110	354	34.44%
6	Ovary	30	80	89	118	317	28.74%
7	Cervix	11	21	68	145	245	12.02%
8	Liver	24	51	59	76	210	13.36%
9	Bone Marrow (MM)	40	42	55	52	189	18.48%
10	Lung	37	43	48	54	182	8.80%
11	Stomach	25	36	40	68	169	15.14%
12	Brain	24	34	43	58	159	29.28%
13	Kidney	9	19	17	19	64	10.46%
14	Pancreas	7	10	16	28	61	13.62%
15	Prostate	1	0	0	1	2	0.43%
Total		598	895	1323	1858	4674	



Graph 4



Graph 4

graph [16]. In our study 66% cases reported is in 31-39 years of age. 12.5% cases in 20-25 years of age 28% in 31-35 years of age 40% cases in 30-39 years. Study conducted by Aben et at. shown 30% and 52% cases in 20-24 years of age and 25 to 29 years of age comparable results are also shown by studies from Australia [17] and united states [18]. Incidence of 45 to 55 cases seen in 30-39 years of age; [19] while in our study shown 40% cases with this age group.

Breast cancer is the commonest cancer among the females, about 31.8% of all cancers [20]. In low socioeconomical group incidence is increasing [21]. Breast cancer is commonest in 41 and 50 years [22] Incidence in young women under 40 years of age are increasing rapidly due to screening of disease after the age of 35 years. Incidence rate [23] among adolescent women is reported 5.6%. Breast Cancer in young patient may have familiar history larger tumour size, Unfavorable biological characteristics, and advanced stage of disease [24]. Young Women with breast cancer develop higher risk of psychological illness [25]. Breast cancer contributed about 14% of all young adult cancer and 7% of all breast cancer. Delayed childbirth has been shown an important risk factor breast cancer in young adult [26]. Genetic Mutation in BRCA 1, BRCA2 and TP53 gene have been considered as significant causative factor globally in young patient of carcinoma breast [27]. Most common cancer in our study was Carcinoma Breast (19%) in all groups and in females; In Males Carcinoma Head and Neck was the most common cancer (14.32). Haematolymphoid was the second commonest cancer in the Males. Carcinoma Breast was the commonest in females and 2nd commonest was Carcinoma Gall Bladder. 30% population was registered as illiterate, 66% cases of were of the people who were literate up to matric and only 5.6% patients who got education after matriculation.

Breast cancer is commonest cancer affecting females worldwide about 25.4% of all new cases diagnosed in a year, it is reported the major cause of the death in 103 countries including India [28]. 1%-2% cases of breast cancer reported under 35 years of age globally [1]. Breast cancer in young population reported higher histological grades, higher death rate, unfavorable hormonal status [29].

In India increasing trend of the Breast cancer incidence shown [30,31], In India females carcinoma breast shown aggressive histology, loss of Estrogen and Progesterone receptor expression [32-35]. The cancer Incidence increases as the age increases in AYA corelates with other studies [13,14,36] Male: Female ratio was 1:1:2. In Our study, while 1:132 was seen in the study done by padhey., *et al*. [37]. Studies done by Mohanti., *et al*. and Raina., *et al*. shown 5.5% and 8% of breast cancer in Indian population respectively [38,39]. Study done by Sithara Arvind shown 3.86% cases of breast cancer under 35 years of age [40]. Study done by Li J. Shown digestive cancer cases contributed 2.55% of new cases and 2.19% cancer associated deaths. Cancer in young adults the haematological cancer cases decreases and breast cancer cases increased as the age increased [41,42]. Colorectal Carcinoma, Liver Carcinoma and Carcinoma Stomach accounted 86.04% of total new cases and 81.45% of the total deaths [43]. As compared to US SEER database, common tumor was reported Lymphomas, Germ Cell Tumor of Female genital tract and Melanomas, CNS Malignancies, Gastrointestinal Malignancies, Leukaemia's, Bone tumour were less common. SEER database of other countries like Australia, [44] Netherlands, [45].

HDGC is an autosomal dominant syndrome developed from germline mutation in tumor suppressor gene CDH1. It is characterized by Gastric Cancer development commonly diffuse type at young age (46, 16%-33%) Germline mutation seen in colorectal cancer diagnosed with before the age of 50 [42]. Another method to improve outcome in this age group of digestive cancer in screening and early diagnosis [10,48].

Age standardized incidence rate were found 2.1,1.4 and 1 per lakh population per year, ASMRS shown 0.83,1.1,0.62 per lakh population for colorectal, liver and stomach cancers [49].

New cases of Liver and Gastric carcinoma shown decreasing trend from 1990- 2012 suggests, Males were more affected as compared to the females with Male: Female ratio 1.34 for the incidence of 1.58 for the deaths, (Jian Li) In our study carcinoma gall bladder shown 11%, Carcinoma Liver, Carcinoma Stomach, Carcinoma Colorectum shown 7%, 4.5%,3.6%,7.5% respectively.

Carcinoma gall bladder incidence are higher in Indian population as compared to global statistics. Highest rate of gall bladder cases is seen in the Northern part of India and Pakistan, East Asia, Eastern Europe and South America [50]. Carcinoma Gall bladder reported the most common gastrointestinal malignancy in the Northern India. Incidence of gall bladder cancer in Northern Part of Indian Females as high as 9 per lakh per year as compared to western India and Southern India reported low incidence 1 per lakh per year [51]. Gall bladder cancer was the most common cancer among the gastrointestinal cancers and 2nd commonest cancer in women. Head and Neck Cancer reported 13.7%. 20-39 years age group shown different Cancer Distribution associated with different risk factors in comparison to the other age group. In Delhi gall bladder cancer incidence rate reported 6.6 per lakh population and ranked 4th common cancer after Carcinoma Cervix, Carcinoma Breast and Carcinoma Ovary and the most common gastro intestinal cancer in Women. In Jammu it was reported as 3rd common cancer [52]. Male: Female ratio in Carcinoma gall bladder shown 0.55. 2.1:1 in

Carcinoma Liver, 1.5:1 in Carcinoma Liver, 1.7:1 in Carcinoma Colon rectum. Gastrointestinal cancer contributed 20.3% cases including carcinoma gall bladder, Carcinoma Liver, Carcinoma Stomach, Carcinoma Pancreas.

Carcinoma Liver shown 3 times more common cancer than women with the incidence and the deaths of Carcinoma Stomach and Carcinoma Gall Bladder Cancer were more common in the females as compared to the males. Incidence of carcinoma liver generally more reported in low- and middle-income countries with risk factors responsible for hepatocellular carcinoma are more prevalent in these countries [43,53]. India and China were found to have more new cases in 2020. They contributed about 41.6% of the total estimated new cases and 43.35% deaths [49].

The incidence of Digestive Tract Cancer in the Young Adult was 5.16 per 1,00,000 population per year. Worldwide and Mortality rate was 3.04 per 1,00,000 population [41,42]. Incidence of colorectal carcinoma occurred in greater population in the developed countries and the incidence shown a slow increase in the young adults [54,55].

Liver cancer is generally more common in low- and middle-income countries, majority of hepatocellular carcinoma mainly associated with risk factors like Aflatoxins, extreme alcohol consumption, obesity, type 2 diabetes and smoking, Hepatitis B or Hepatitis C exposure [43,53]. These risk factors are more common in the males than in females, higher incidence was reported in the males [43,53]. Male predominance shown in our study Carcinoma Gall Bladder which found predominance with commonest pathology as adenocarcinoma. Carcinoma Stomach reported more common in females in young adults which gradually changes from higher to lower as the age increases, estrogen level may be associated with carcinoma stomach incidence in young females [49].

Factors responsible for diagnosis delay vary across the country and regions, geographical accessibility, limitations of diagnosis and treatment facility, physiological and cultural factors. For Hepatobiliary cancers screening bases on ultrasound and serum markers can be easily be done in various places.

In colorectal carcinoma and gastric carcinoma screening and endoscopy is required which has skill, limitation, and expansions [56]. Over the half century it has been noticed that the incidence and mortality of non-cardia cancer [57]. Treatment of H Pylori especially in the high incidence areas like East Asia, can decrease the incidence of gastric cancer. Increase in the incidence of Carcinoma Colorectum is increasing like change in life style, diet decreased as no physical activity, obesity may be possible reason for that [58] Chronic *H. Pylori* infection is reported, the principal cause of carcinoma stomach [59] is of *H. Pylori* infection. The counties which have high incidence rate of gastric cancer, various preventive method are incorporated to improve environmental condition and to reduce chronic infections [53,60].

Incidence of Colorectal Carcinoma in young adults shown increasing but the death rate shown stable while the number of the deaths due to carcinoma gall bladder, pancreatic and gastric cancer decreased from the year 1985 to 2016. It might be due to the improvement of diagnosis and treatment facilities [60] Gastrointestinal tumor contributed about 20.3% cases under this age group [61].

Study conducted by EM [62] type shown about 2.8% of the head and neck cancer reported under 38 years of the age, while about 0.4% - 5% reported in western countries [63,64]. Carcinoma gall bladder shown commonest cancer in gastrointestinal tumour and 2nd commonest malignancy in females. Male cases were reported in males than females, some of the other studies reported female predominance in younger age group [65,66]. Eng type [67] In our study Commonest Cancer in Head and Neck Cancer was Carcinoma Tongue (44%) 2nd commonest cancer was Carcinoma Buccal Mucosa (30%), Squamous cell carcinoma was the most commonest Pathology reported 65% of the patient found having habit of tobacco chewing. Head and Neck squamous cell carcinoma occurs in about 90% of all Head and Neck Cancer and worldwide it is the 6th leading cancer by incidence. It occurs commonly 6th to 7th decades of life.

Some studies have shown high incidence in younger age group in some countries like India, China, USA and Europe [68-72] 0.4% to 3.6% HNSCC cases occurs in young adult below 40 years. Commonest site in Head and Neck Squamous cell carcinoma are Oral Cavity, esophagus, Larynx, hypopharynx [73,74]. Main risk factor associated with HNSCC are environmental and lifestyle factors like smoking, tobacco chewing, alcohol consumption. Some studies shown strong association with human papilloma virus in non-smoking patients [75,76]. In North Eastern part of India where people use to have habit of tobacco and nut chewing. In Mizoram, Tripura, Assam, Meghalaya, Nagaland and Manipur [77]. Chewing of smokeless tobacco products [78] and bidi cigarette smoking are common [79]. Some other factors related to HNSCC are poor dental hygiene, poor diet and mucosal fibrosis, gastrointestinal reflex, immunosuppressant, Iron deficiency anemia [72,81-85].

In India it contributed about 30% of all cancers [86]. Study conducted by Sharma., *et al*. shown common site of Head and Neck cancer was carcinoma oral cavity. In our study 14.3% cases reported

Head and Neck Carcinoma, Male predominance shown 4.2:1, Male: Female ratio. Common pathology shown squamous cell carcinoma 95% of the cases. The commonest site was Carcinoma Tongue 51% followed by Carcinoma Buccal mucosa 39%, Lower alveolus 4% nasal sinus and nasopharynx 1%. shown SCE of Larynx and Hypopharynx are rare about 10% and 1% of all the HNSCC in patients under 40 years of age [88].

Ovarian cancer in AYA commonly present with abdominal pain (57%) abdominal or pelvic mass 46%, weight loss and loss of appetite, nausea or vomiting, constipation [89] Germ cell tumour and sex cord stromal tumours generally present with abdominal pain due to torsion, hemorrhage, or rupture [90] Hormone producing Ovarian Tumour can present with precocious puberty, menstrual irregularities [91]. Uterine malignancies are rare in this group 15% of the cases of Endometrial cancer usually present in premenopausal women and only 1% of the patient reported before 40 years of age. Our study 1.98% of all the cancer cases in this age group. Common age group shown 35 to 39 years of age. Gynecological malignancies contributed 30.9% of all cancer in this group. Incidence of all cancer shown Increasing trend as the age increases, In year wise distribution number of cases increases from 2014 to 2018 then shown a dip during 2019, 2020-2021 due to COVID-19 and non-renewal of the Project, It is again showing an Increasing trend till 2021.

The most common cancer found in our study in this age group were Carcinoma Gall Bladder, Carcinoma Head and Neck, Carcinoma Breast, Carcinoma Lung, Carcinoma Colorectum, Carcinoma Haematolymphoid, Carcinoma Cervix contributing about 77.54% of the Cancer. Our study shows increase in incidence of cancer registry among this group. Study done by Edi Martered shown increasing incidence of colorectal, breast, Pancreas, kidney, uterine cancer in young people, Incidence of bladder, lung, larynx is decreasing. Number of cases increasing as age increases from 20 to 39 years. Lifestyle, environmental factor, correlation of genetic factors are related with young adult digestive cancers. About 20% of colorectal cancer and 5 to 10% of gastric cancer are associated with inherited Cancer predisposition syndrome. It has been shown that family history of hereditary diffuse gastric cancer, familiar adenomatosis polyposis, lynch syndrome associated with development of colorectal and gastric cancer in young adults [46,47].

A high incidence of Carcinoma Cervix reported among AYA in UK and Australia as compared to India may show incidence of different sexual behavior and In Females commonest cancer was Carcinoma Breast 889 cases followed by Carcinoma Gall Bladder with 517 cases.

In Male the commonest cancer was Head and Neck. Haematolymphoid, Gastrointestinal Cancer contributed 25.3%, gynaecological cancer contributed 23.2%. In year wise distribution shown increasing trend of cases from 2014 to 2021 (9.3% to 18.5%). Ease registration has been decreased (4.8%) from 2019 to 2020 due to non-renewal of project followed by COVID. About 25% patient were illiterate, 69% were illiterate up to matric and only 5.6% were literate after matric. 402 patients were not analysed because of no availability of details of the patient for timely diagnosis. Specific screening tests or guidelines are available to target these population and elder [33,56].

Conclusion

- 20-39 years have different epidemiological, biological, genetic factors than pediatric and geriatric age group patients.
- Carcinoma Breast (19%) was commonest cancer in our study. Carcinoma Breast is the commonest in the younger age group.
- 2nd commonest was Haematolymphoid (14.4%), Head and Neck (13.7%) Carcinoma was commonest among the Males.
- Gynecological cancers contributed 31% of the cases including Carcinoma Breast, Carcinoma Ovary Cases were high as compared to carcinoma cervix, Only 2 cases reported of Carcinoma Prostrate, Carcinoma Cervix is not common in younger age group. Due to the habit of Tobacco chewing, Head and Neck shown commonest cancer in this age group.

Bibliography

1. US Department of Health and Human Services. Closing the gap: research and care imperatives for adolescents and young adults with cancer: Report of the Adolescent and Young Adult Oncology Progress Review Group. NIH publication (2006): 2-3.

2. Miller KD., *et al*. "Cancer statistics for adolescents and young adults, 2020". *CA Cancer Clinics* 70.6 (2020): 443-459.

3. Trama A., *et al*. "Cancer burden in adolescents and young adults: a review of epidemiological evidence". *Cancer* 21.6 (2018): 256-266.

4. Chao C., *et al*. "Incidence, risk factors, and mortality associated with second malignant neoplasms among survivors of adolescent and young adult cancer". *JAMA Network Open* 2 (2019): e:195536.

5. Bleyer A., *et al*. "The distinctive biology of cancer in adolescents and young adults". *Nature Reviews Cancer* 8 (2008): 288-298.

6. Bright CJ., *et al*. "Risk of subsequent primary neoplasms in survivors of adolescent and young adult cancer (Teenage and Young Adult Cancer Survivor Study): a population-based, cohort study". *Lancet Oncology* 20.4 (2019): 531-545.

7. Jim HSL., *et al*. "Cognition in adolescent and young adults diagnosed with cancers an understudied problem". *Clinical Oncology* 36.27 (2018): 2752-2754.

8. Adams SC., *et al*. "Young adult cancer survivorship: recommendations for patient follow-up. exercise therapy, and research". *NCI Cancer Spectrum* 5.1 (2020): pkaa099.

9. Adam R., *et al*. "Do patients' faces influence General Practitioners' cancer suspicions? A test of automatic processing of sociodemographic information". *PLoS ONE* 12 (2017): 0188222.

10. Magrath I and Epelman S. "Cancer in adolescents and young adults in countries with limited resources". *Our Oncology Report* 15 (2013): 332-346.

11. Siegel RL., *et al*. "Global patterns and trends in colorectal cancer incidence in young adults". *Gut* 68 (2019): 2179-2185.

12. Sung H., *et al*. "Emerging cancer trends among young adults in the USA: analysis of a population-based cancer registry". *Lancet Public Health* 4 (2019): 137-147.

13. Arora RS., *et al*. "Cancer at ages 15-29 years: the contrasting incidence in India and England". *Pediatric Blood Cancer* 58.1 (2012): 55-60.

14. Moon EK., *et al*. "Cancer incidence and survival among adolescents and young adults in Korea". *PLoS One* 9.5 (2014): 96088.

15. Sharma D and Singh G. "Spectrum of cancer in adolescents and young adult: an epidemiological and clinicopathological evaluation". *Indian Cancer* 53 (2016): 457-459.

16. Bleyer A. "How NCCN guidelines can help young adults and older adolescents with cancer and the professionals who care for them". *JNCCN* 10.9 (2012): 1065-1071.

17. Barr RD., *et al*. "US National Cancer Institute Science of Adolescent and Young Adult Oncology Epidemiology Working Group. Incidence and incidence trends of the most frequent cancers in adolescent and young adult Americans, including "nonmalignant/noninvasive* tumors". *Cancer* 732.071 (2016): 1000-1008.

18. Roder DM., *et al*. "Australian adolescents and young adults-trends in cancer incidence, mortality, and survival over three decades". *Journal of Adolescent and Young Adult Oncology* 3 (2018): 326-338.

19. Gupta N., *et al*. "Epidemiology of cancer in young in central India: an analysis of rural cancer hospital data". *South Asian Journal of Cancer* 6.4 (2017): 183-185.

20. Qureshi MA., *et al*. "Common cancers in Karachi, Pakistan: 2010-2019 cancer data from the Dow Cancer Registry". *Pakistan Journal of Medical Sciences* 36 (2020): 1572-1578.

21. Manzoor S., *et al*. "Presentation, diagnosis and management of locally advanced breast cancer: Is it different in low /middle income countries?". *Pakistan Journal of Medical Sciences* 35 (2019): 1554-1557.

22. Oluogun WA., *et al*. "Histological classification, grading, staging, and prognostic indexing of female breast cancer in an African population: a 10-year retrospective study". *International Health Science* (Qassim). 13 (2019): 3-9.

23. Johnson RH., *et al*. "Breast cancer in adolescents and young adults". *Pediatric Blood Cancer* 65 (2018): e23797.

24. Anastasiadi Z., *et al*. "Breast cancer in young women: an overview". *Updates Surgery* 69 (2017): 313-317.

25. Rossi L., *et al*. "Diagnosis and treatment of breast cancer in young women". *Current Treatment Options in Oncology* 20 (2019): 86.

26. Gabriel CA and Domchek SM. "Breast cancer in young women". *Breast Cancer Research* 12 (2010): 212.

27. Carraso DM., *et al*. "Comprehensive analysis of BRCA1. BRCA2 and TP53 germline mutation and tumor characterisation: a portrait of early -onset breast cancer in Brazil". *Plos One* 8 (2013): 657581.

28. Sung H., *et al*. "Global Cancer Statistics 2020. GLOBOCAN Estimates of Incidence and Mortality Worldwide For 36 Cancers in 185 Countries". *CA: A Cancer Journal for Clinicians* 71 (2021): 209-249.

29. Martinez MT., *et al*. "Breast cancer in very young patients in a Spanish cohort: age as an independent Dad prognostic indicator". *Breast Cancer: Basic Clinical Research* 13 (2019): 1-10.

30. Varughese AA., *et al*. "Descriptive study on selected risk factors and histopathology of breast carcinoma in a tertiary care centre in Kerala, India with special reference to women under 40 years old". *The Asian Pacific Journal of Cancer Prevention* 16 (2019): 181-184.

31. Gogia A., *et al*. "Young breast cancer: A single centre experience". *Indian Journal of Cancer* 51 (2014): 604-608.

32. Takalkar UV., *et al*. "Clinicopathological profile of breast cancer patients at a tertiary care hospital in marathwada region of Westen India". *The Asian Pacific Journal of Cancer Prevention* 17 (2016): 2195- 2198.

33. Parmar V. "Rising Incidence of Breast Cancer in the Young Fertile Indian Population-a Reality Check". *Indian Journal of Surgical Oncology* 9 (2018): 296-299.

34. Deshmukh SP., *et al*. "Breast cancer in young women in India". *Annals of Oncology* 23 (2012): 101.

35. Ghosh S., *et al*. "Clinico-morphological profile and receptor status in breast cancer patients in a South Indian institution". *The Asian Pacific Journal of Cancer Prevention* 15 (2014): 7839-7842.

36. Bleyer A., *et al*. National Cancer Institute, NIH Pub. No 06-5767; 2006 Cancer Epidemiology in Older Adolescents and Young Adults 15-29 Years of Age, Including SEER Incidence and Survival: 1975-2000.

37. Padhye B., *et al*. "Patterns of malignancies in adolescents and young adults in tertiary care center from developing country". Implication for outcome optimization and health service SIOP Abstract book (2006): 479-480.

38. Mohanti BK., *et al*. "Young patients with breast cancer (<35 years): Single-institution study of 194 patients from India". *Journal of Clinical Oncology* (2012): e11013.

39. Raina V., *et al*. "Breast cancer in the young (=35 years): A single centre study from the All India Institute of Medical Sciences". *Journal of Clinical Oncology* (2013): e12539.

40. Howlader NN., *et al*. "Cancer Statistics Review (CSR) 1975-2014". Cancer Stat Re….2020……

41. Sung H., *et al*. "Emerging cancer trends among young adults in the USA: analysis of a population-based cancer registry". *Lancet Public Health* 4 (2019): e137-e147.

42. Adolescent and Young Adult Oncology Progres Review Group: Closing the gap: research and care imperatives for adolescents and young adults with cancer (2021).

43. Arnold M., *et al*. "Global Burden 5 Major Types of Gastrointestinal Cancer". *Gastroenterology* 159 (2020): 335-349. e15.

44. Aben KK., *et al*. "Cancer in adolescents and young adults (15-29 years): a population-based study in the Netherlands 1989-2009". *Acta Oncology* 51.7 (2012): 922-933.

45. Haggar FA., *et al*. "Cancer incidence and mortality trends in Australian adolescents and young adults, 1982-2007". *BMC Cancer* 12 (2012): 151.

46. Gamble LA., *et al*. "Hereditary Diffuse Gastric Cancer Syndrome and the Role of CDH1: A Review". *JAMA Surgery* 156 (2021): 387-392.

47. Valle L., *et al*. "Genetic predisposition to colorectal cancer: syndromes, genes, classification of genetic variants and implications for precision medicine". *Journal of Pathology* 247 (2019): 574-588.

48. Fidler MM., *et al*. "A global view on cancer incidence and national levels of the human development index". *International Journal of Cancer* 139 (2016): 2436-2446.

49. Li J. "Digestive cancer incidence and mortality among young adults worldwide in 2020: A population-based study". World J Gastrointest Oncol. 14.1 (2022): 278-294.

50. National Comprehensive Cancer Network. The NCCN adolescent and young adult (AYA) oncology clinical guidelines (version 1, 2021).

51. Sikora SS., *et al*. "Palliative surgical treatment of malignant obstructive jaundice". Eur J Surg Oncol 1994;20:580-4.

52. Kapoor VK., *et al*. "Early carcinoma of the gallbladder. An elusive disease". J Surg Oncol 62 (1996): 284-287.

53. Sharma B. "Deserprive pidemiology of inesdence and mortaliy of primary liver cancer in 185 countries: evidence from GLOBOCAN 2018". *Jpn Journal of Clinical Oncology* 50 (2020): 1370-1379.

54. Chang HS., *et al*. "Comparing endoscopy and upper gastrointestinal X-ray for gastric cancer screening in South Korea: a cost-utility analysis". *The Asian Pacific Journal of Cancer Prevention* 13 (2012): 2721- 2728.

55. Howson CP., *et al*. "The decline in gastric cancer: epidemiology of an unplanned triumph". *Epidemiology Review* 8 (1986): 1-27.

56. Conti L., *et al*. "Revisiting the impact of lifestyle on colorectal cancer risk in a gender perspective". *Critical Reviews in Oncology/Hematology* 145 (2020): 102834.

57. Plummer M., *et al*. "Global burden of gastric cancer attributable to Helicobacter pylori". *International Journal of Cancer* 136 (2015): 487-490.

58. Arnold M., *et al*. "Recent trends in incidence of five common cancers in 26 European countries since 1988: Analysis of the European Cancer Observatory". *European Journal of Cancer* 51 (2015): 1164-1187.

59. Fidler MM., *et al*. "Cancer incidence and mortality among young adults aged 20-39 years worldwide in 2012: a population-based study". *Lancet Oncology* 18.12 (2017): 1579-1589.

60. Iype EM., *et al*. "Oral cancer among patients under the age of 35 years". *Journal of Postgraduate Medicine* 47.3 (2001): 171-176.

61. Carniol PJ and Fried MP. "Head and neck carcinoma in patients under 40 years of age". *The Annals of Otology, Rhinology and Laryngology* 91 (1982): 152-155.

62. Byers RM. "Squamous cell carcinoma of the oral tongue in patients less than 30 years of age". *American Journal of Surgery* 130 (1975): 475-478.

63. Venables CW and Craft IL. "Carcinoma of the tongue in early adult life". *British Journal of Cancer* 21 (1967): 645-650.

64. Son YH and Kapp DS. "Oral cavity and oropharyngeal cancer in a younger population". *Cancer* 55 (1985): 441-444.

65. Kuriakose M., *et al*. "Comparison of oral squamous ell carcinoma in younger and older patients in india". *European Journal of Cancer Part B: Oral Oncology* 28 (1992): 113-120.

66. Gupta PC. "Mouth cancer in India: A new epidemic?" *Journal of Indian Medical Association* 97 (1999): 370-373.

67. Llewellyn CD., *et al*. "Risk factors for squamous cell carcinoma of the oral cavity in young people A comprehensive literature review". *Oral Oncology* 37 (2001): 401-418.

68. Llewellyn CD., *et al*. "Squamous cell carcinoma of the oral cavity in patients aged 45 years and under: A descriptive analysis of 116 cases diagnosed in the south East of England from 1990 to 1997". *Oral Oncology* 39 (2003): 106-114.

69. Llewellyn CD., *et al*. "Squamous cell carcinoma of the oral cavity in patients aged 45 years and under: A descriptive analysis of 116 cases diagnosed in the South East of England from 1990 to 1997". *Oral Oncology* 39 (2003): 106-114.

70. Toner MO and Regan EM. "Head and neck squamous cell carcinoma in the young: A spectrum or a distinct group? Part1". *Head and Neck Pathology* 3 (2009): 246-248.

71. Jemal A., *et al*. "Cancer statistics, 2007". *CA: A Cancer Journal for Clinicians* 57 (2007): 43-66.

72. Boyle P and Levin B. "World Cancer Report". International Agency for Research on Cancer, (2008).

73. Ragin CC., *et al*. "The epidemiology and risk factors of head and neck cancer. A focus on human papillomavirus". *Journal of Dental Research* 86 (2007): 104-114.

74. Kreimer AR., *et al*. "Human papillomavirus types in head and neck squamous cell carcinomas worldwide: A systematic review". *Cancer Epidemiology, Biomarkers and Prevention* 14 (2005): 467-475.

75. Sturgis EM., *et al*. "Descriptive epidemiology and risk factors for head and neck cancer". *Seminar on Oncology* 31 (2004): 726-733.

76. Stepanov I., *et al*. "New and traditional smokeless tobacco: Comparison of toxicant and carcinogen levels". *Nicotine Tob Research* 10 (2008): 1773-1782.

77. Mondal R and Ghosh SK. "Accumulation of mutations over the complete mitochondrial genome in tobacco-related oral cancer trom Northeast India". *Mitochondri31 DNA* 24 (2013): 432-439.

78. Schantz SP and Yu GP. "Head and neck cancer incidence trends in young Americans, 1973-1997, with a special analysis for tongue cancer". *Archives of Otorhinolaryngology-Head and Neck Surgery* 128 (2002): 268-274.

79. Sturgis EM and Wei Q. "Genetic susceptibility-Molecular epidemiology of head and neck cancer". *Current Opinion on Oncology* 14 (2002): 310-317.

80. Llewellyn CD., *et al*. "Risk Factors for oral cancer in newly diagnosed patients aged 45 years and younger: A case-control study in Southern England". *Journal of Oral Pathology and Medicine* 33 (2004): 525.32.

81. Sturgis EM., *et al*. "Descriptive epidemiology and risk factors for head and neck cancer". *Seminar on Oncology* 31 (2004): 726-733.

82. Dahlstorm KR., *et al*. "Squamous cell carcinoma of the head and neck in never smoker-never drinkers: A descriptive epidemiologic study". *Head and Neck* 30 (2008): 75-84.

83. Kulkarni MK. "Head and neck cancer burden in india". *International Journal of Head and Neck Surgery* 4 (2013): 29-35.

84. Sharma JD., *et al*. "Head and neck squamous cell carcinoma in young adults: A hospital-based study". *Indian Journal of Medical and Paediatric Oncology* 40 (2019): S18-22.

85. Gawecki W., *et al*. "Clinical and histopathological analysis of squamous cell carcinoma of the head and neck in young adults". *Otolaryngologia polska* 61 (2007): 11-16.

86. Schultz KA., *et al*. "Pediatric ovarian tumors: a review of 67 cases". *Pediatric Blood Cancer* 44 (2005): 167-173.

87. Koulouris CR and Penson RT. "Ovarian stromal and germ cell tumors". *Seminar on Oncology* 36 (2009): 12636.

88. Shanbhogue AK., *et al*. "Clinical syndromes associated with ovarian neoplasms: a comprehensive review". *RadioGraphics* 30 (2010): 903-919.

89. Smyczek-Gargya B and Geppert M. "Endometrial cancer associated with polycystic ovaries in young women". *Pathology - Research and Practice* 188 (1992): 946-948.

90. di Martino E., *et al*. "Incidence trends for twelve cancers in younger adults—a rapid review". *British Journal of Cancer* 126 (2022): 1374-1386.

91. Fan X., *et al*. "China: Advances, challenges and visions*". Chinese Journal of Cancer Research* (2021).