



## A study on the demographic features of cancer patients done in a tertiary care centre in South India

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### ABSTRACT

Cancer is a major cause of increased morbidity and mortality in today's world. Several studies have shown that its incidence is governed by the gender and age of a person. The site and histological subtype of cancer vary between different age groups and sex. Knowledge of the demography of cancer in affected individuals will help in planning screening and prevention strategies. The present study was done to analyse the site of different cancers among various age groups and gender in patients coming to a tertiary care centre. Data of cancer patients was retrospectively analysed in terms of age, sex, site, and histopathological subtypes. The histopathological reports of all cases of cancer recorded at the histopathology laboratory of the tertiary care centre during a one year period- November 2017 to October 2018 were perused and the findings were recorded. Analysis of the data was done using SPSS version 17 to obtain the statistical significance. There were a total of 330 cases of cancer recorded during the study period. Out of these, 143 were male and 187 were female. Age group between 51 and 60 years had the maximum number of cases of cancer. Breast cancer in female and stomach cancer and oropharyngeal cancer in male were found to be more common. Among the histological subtypes, adenocarcinoma was found to be the most commonest across all ages and in both sexes.

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### INTRODUCTION

Cancer has become one of the leading causes of death worldwide. The rapid increase in the global

cancer burden has become a real challenge for the health care system. According to a 2018 ICMR study, the number of people living with cancer in India is estimated to be around 2.25 million. The total deaths due to cancer in 2018 was 7, 84, 821 and every year, 11, 57, 294 lakh new cancer are being registered (ICMR-NICPR 2018).

Even though cancer is a devastating disease, with the advent of technological advances in medicine and increasing public awareness, it can be either largely prevented, or morbidity can be reduced. Having adequate demographic data about cancer patients and by applying appropriate measures, a great impact on reducing the global cancer burden can be achieved (Ashat *et al.*, 2014).

Cancer development is a complex process that

**Table 1: Distribution of cancer cases based on age in years**

Age group	N	%
20-40	42	12.7
41-60	186	56.4
>60	102	30.9
TOTAL	330	100

**Table 2: Distribution of cancer cases based on site**

Site	N	%
Breast	54	16.4
Oropharynx	40	12.1
Stomach	38	11.5
Uterus	39	11.8
Colon & rectum	23	7
Liver	14	4.2
Lung	14	4.2
Skin	14	4.2
Urinary bladder	12	3.6
Esophagus	11	3.3
Small intestine	10	3
Larynx	9	2.7
Prostate	8	2.4
Ovary	7	2.1
Soft tissue	7	2.1
Thyroid	6	1.8
Gall bladder	5	1.5
Kidney	5	1.5
Brain	2	0.6
Bone	2	0.6
Head & neck	2	0.6
Lymph node	2	0.6
Salivary gland	2	0.6
Testis	1	0.3
Mediastinum	1	0.3
Pancreas	2	0.6
Total	330	100

occurs over a span of many years. It can be considered an age related disease because it has been observed that the incidence of most cancers increases with age. A possible explanation for this association with age could be that the biological mechanisms regulating age may be common with the pathogenetic mechanism of diseases like cancer (White *et al.*, 2014).

Gender is said to play a major role in the incidence, disease prognosis and mortality in a variety of cancers. Gender differences influence cancer susceptibility at the genetic or molecular levels and it has

been suggested that sex hormones play a crucial role in the development of cancers (Kim *et al.*, 2018). Recent studies reveal that men are at a higher risk of developing cancer. Even in childhood, males are more prone to develop cancer.

The most common sites of cancer diagnosed globally in both sexes are the lung, breast, colorectal, prostate and cervix uteri. In India, the most common sites of cancer in both sexes are breast, cervix uteri, oral cavity, lung and colorectum (Saranath and Khanna, 2014).

The histological type of cancer depends on the site

**Table 3: Correlation of site of cancer with various age groups**

Site	Number of cases and %			p-value
	20-40 yrs	41-60 yrs	>60 yrs	
Breast	8(14.8%)	25(46.3%)	21(38.9%)	0.25
Oropharynx	10(25%)	21(52.5%)	9(22.5%)	0.038*
Stomach	3(7.9%)	25(65.8%)	10(26.3%)	0.415
Uterus	2(5.1%)	27(69.2%)	10(25.6%)	0.157
Colon & rectum	2(8.7%)	13(56.5%)	8(34.8%)	0.804
Liver	2(14.3%)	8(57.1%)	4(28.6%)	0.973
Lung	0(0%)	7(50%)	7(50%)	0.158
Skin	0(0%)	8(57.1%)	6(42.9%)	0.281
Urinary bladder	1(8.3%)	7(58.3%)	4(33.3%)	0.895
Esophagus	2(18.2%)	4(36.4%)	5(45.5%)	0.396
Small intestine	0(0%)	7(70%)	3(30%)	0.437
Larynx	0(0%)	8(88.9%)	1(11.1%)	0.130
Prostate	0(0%)	0(0%)	8(100%)	0.000***
Ovary	2(28.6%)	5(71.4%)	0(0%)	0.142
Soft tissue	3(42.9%)	4(57.1%)	0(0%)	0.026*
Thyroid	5(83.3%)	1(16.7%)	0(0%)	0.000***
Gall bladder	1(20%)	4(80%)	0(0%)	0.319
Kidney	0(0%)	4(80%)	1(20%)	0.510
Brain	0(0%)	2(100%)	0(0%)	0.459
Bone	0(0%)	1(50%)	1(50%)	0.776
Head & Neck	0(0%)	1(50%)	1(50%)	0.776
Lymph node	0(0%)	1(50%)	1(50%)	0.776
Salivary gland	0(0%)	1(50%)	1(50%)	0.776
Testis	1(100%)	0(0%)	0(0%)	0.032*
Mediastinum	0(0%)	1(100%)	0(0%)	0.678
Pancreas	0(0%)	1(50%)	1(50%)	0.776

\*P<0.05, \*\* P < 0.01, \*\*\*P<0.001

involved. Certain histological types are more common in particular organs or sites. Adenocarcinomas are more common in sites like the stomach, intestines, breast, lung and kidney, while squamous cell carcinoma is seen more frequently in sites like the oropharynx and oesophagus. This study aims at understanding the correlation of age and gender with the site and type of various cancers.

## MATERIALS AND METHODS

This was a retrospective study carried out in a tertiary care centre. The proposal for the study was submitted to the institution ethics committee and approval was obtained. Complete enumerative sampling was done. The data of 330 adult patients diagnosed to have cancer between the period November 2017 to October 2018 was accessed from the manual and digital records in the histopathology labora-

tory and medical records division of the hospital and analyzed. Information regarding the age and gender of the patient, along with the site and histopathological subtype of cancer, was tabulated. The diagnosis had been done on histopathological examination of specimens, which included all kinds of biopsy and organ specimens. Reports of patients with benign lesions, pediatric cancers and blood malignancies were excluded from the study. All details regarding the patients were kept confidential. All statistical analysis was done using Statistical Package for Social Science (SPSS version 17) for Microsoft Windows. Descriptive statistics were presented as numbers and percentages. Pearson's Chi-square test was used to evaluate how the distribution of categorical variables differed from another. A two sided p value less than 0.05 was considered statistically significant. P < 0.05 was significant, p < 0.01 was considered moderately significant and p < 0.001 was taken

**Table 4: Correlation of site of cancer with gender**

Site	Number of cases and %		p value
	Male	Female	
Breast	3(5.6%)	51(94.4%)	0.000***
Oropharynx	25(62.5%)	15(37.5%)	0.009**
Stomach	27(71.1%)	11(28.9%)	0.000***
Uterus	0(0%)	39(100%)	0.000***
Colon & rectum	8(34.8%)	15(65.2%)	0.391
Liver	8(57.1%)	6(42.9%)	0.287
Lung	11(78.6%)	3(21.4%)	0.007**
Skin	8(57.1%)	6(42.9%)	0.287
Urinary bladder	9(75%)	3(25%)	0.024*
Esophagus	6(54.5%)	5(45.5%)	0.445
Small intestine	5(50%)	5(50%)	0.666
Larynx	9(100%)	0(0%)	0.001***
Prostate	8(100%)	0(0%)	0.001***
Ovary	0(0%)	7(100%)	0.019**
Soft tissue	2(28.6%)	5(71.4%)	0.426
Thyroid	2(33.3%)	4(66.7%)	0.618
Gall bladder	2(40%)	3(60%)	0.880
Kidney	3(60%)	2(40%)	0.449
Brain	0(0%)	2(100%)	0.215
Bone	1(50%)	1(50%)	0.849
Head & neck	1(50%)	1(50%)	0.849
Lymphnode	1(50%)	1(50%)	0.849
Salivary gland	1(50%)	1(50%)	0.849
Testis	1(100%)	0(0%)	0.252
Mediastinum	1(100%)	0(0%)	0.252
Pancreas	1(50%)	1(50%)	0.849

\*P&lt;0.05, \*\* P &lt; 0.01, \*\*\*P&lt; 0.001

**Table 5: Number of cases based on the type of cancer**

Histopathological type	N	%
Adenocarcinoma	190	57.5
Squamous cell carcinoma	119	36.1
Transitional cell carcinoma	10	3
Sarcomas	8	2.4
Malignant germ cell tumour	2	0.6
Basal cell carcinoma	1	0.3

as strongly significant.

## RESULTS AND DISCUSSION

A total of 330 cases of malignancies in adults registered in the hospital records during the period November 2017 to October 2018 were analyzed. Out of these, 143 were males (43.3%) and 187 were females (56.7%). The male: female ratio was 0.75:1. The age group of the cancer cases varied from 20

to 87 years. (Mean:  $55 \pm 12$  yrs) and the distribution of cases across various age group is given in (Table 1).

The number of cancer cases in different organs and sites was then tabulated (Table 2).

The site of cancer was also correlated with the various age groups (Table 3) and gender of the individual (Table 4).

**Table 6: Correlation of histopathological types of cancer with age in years**

Histopathological type	Number of cases and %			p value
	20-40	41-60	>60	
Adenocarcinoma	21(11.1%)	109(57.4%)	60(31.6%)	0.568
Squamous cell carcinoma	15(12.6%)	68(57.1%)	36(30.3%)	0.976
Transitional cell carcinoma	1(10%)	5(50%)	4(40%)	0.815
Sarcomas	3(37.5%)	4(50%)	1(12.5%)	0.086
Malignant germ cell tumour	2(100%)	0(0%)	0(0%)	0.001***
Basal cell carcinoma	0(0%)	0(0%)	1(100%)	0.326

\*\*\*P &lt; 0.001

**Table 7: Correlation of histopathological types of cancer with gender**

Histopathological type	Number of cases and %		p value
	Male	Female	
Adenocarcinoma	75(39.5%)	115(60.5%)	0.099
Squamous cell carcinoma	55(46.2%)	64(53.8%)	0.427
Transitional cell carcinoma	8(80%)	2(20%)	0.017**
Sarcomas	4(50%)	4(50%)	0.700
Malignant germ cell tumour	1(50%)	1(50%)	0.849
Basal cell carcinoma	0(0%)	1(100%)	0.381

\*\* P &lt; 0.01

The number of cases in different histological subtypes of cancer was enumerated (Table 5).

The histological subtypes were also correlated with the age groups (Table 6) and gender of the cases (Table 7).

Cancer is a leading cause of morbidity and mortality worldwide and is the second commonest cause of death in developed countries like the United States of America. In India, around 2.25 million people have been estimated to be living with cancer (ICMR-NICPR, 2018) and it has become one of the top non communicable diseases in the country. Studies on the demography and patterns of cancer will help to understand the dynamics of the disease. The present study is an attempt to analyze the above details in the cases recorded in a tertiary care centre in South India.

In this study, 330 cases of cancer, recorded over a period of one year, at the medical records division and the histopathology laboratory of the hospital were analyzed. There was an overall female preponderance (56.7%) as compared to males. Several studies done in India have also shown a female preponderance (Ashat *et al.*, 2014). However recent statistics that have emerged, shown a higher number of cases in males (Kim *et al.*, 2018).

It is generally postulated that cancers occur at an older age. In this study, too, majority of the cancers

occurred above the age of 40 years (288(87.3%)). This has also been reported in many recent documents on cancer statistics (Cinar and Tas, 2015).

In this study, the overall top five cancers were those of the breast, oropharynx, stomach, uterus, colon and rectum and the least common was those of the mediastinum and pancreas. According to statistics released by the Indian Council of Medical Research, the common site of cancers in both males and females together were those of the breast, oral cavity, Uterine cervix and lung(ICMR). A possible reason for tumors of the breast and uterus being more common could be explained by the fact that there was a female preponderance of cases in the present study.

While analyzing the age group and cancer occurrence, it was seen that cases of cancer of the thyroid and testis were more in the age group below 40 years, while the esophagus and prostate were more commonly affected above the age of 60 years. The values were statistically significant for thyroid, testis and prostatic cancers (p value < 0.001, < 0.05, < 0.001 respectively). Reports of studies done in South India and North America have also reported the age distribution of thyroid and testicular tumours to be below 40 years (Karkuzhali, 2017) and (Baird *et al.*, 2018). In a study from North Karnataka, the predominant age group at which prostatic carcinoma was reported was above

60 years (Ghagane *et al.*, 2016). Cancers of the breast, oropharynx, stomach, uterus, colorectum, liver, skin, urinary bladder, small intestine, larynx, ovary, soft tissue, gall bladder, kidney, brain occurred between the age of 40 to 60 years in the present study. Several studies have also reported a similar age distribution in cancers of the breast, soft tissue and oropharynx (Momenimovahed and Salehiniya, 2019; Saltus *et al.*, 2018; Malhotra *et al.*, 2014). All the remaining cancers in this study, namely those of the lung, bone, head and neck, lymph node, salivary gland and pancreas were seen above the age of 40 years.

The top five cancers in males in this study were those of the stomach, oropharynx, lung, urinary bladder and larynx. It is interesting to note that these cancers have a strong association with smoking. In females, cancers of the breast, uterus, oropharynx, colon and rectum and stomach were more common. This can be compared to the incidence of site specific cancers reported by the American Cancer Society wherein, the top five in men were cancers of the prostate, lung, colon and rectum, urinary bladder and skin and those in women were cancers of the breast, lung, colon and rectum, uterus and thyroid (American Cancer Society, 2016). In the present study, oropharyngeal and stomach cancers were found to be common in both males and females unlike the Western countries and this finding was statistically significant ( $p$  value < 0.01 and < 0.001)

In the present study, adenocarcinoma and squamous cell carcinoma were found to be the most common histological types of cancer in both males and females and occurred more frequently above the age of 40 years.

## CONCLUSION

The finding of a female preponderance of cancers in this study, emphasizes and reiterates the need for having comprehensive periodic screening programs for women. Such studies of the demography of cancer in different regions of the country would help to evolve strategies to direct health resources fruitfully in the management of this growing burden of disease. It will also help to identify and prioritize areas of research that help in prevention and effective treatment.

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## Limitations

Nil

## Conflicts of interest

No conflict of interest

## Ethical approval

Obtained and approved

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