

## Cancer report – a statistical analysis by site, age and sex distribution in rural area of Melmaruvathur, South India

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### Abstract

**Background:** Among various diseases, cancer has become a big threat to human beings globally. The incidence of cancer is increasing nowadays because of modernized world and changing life pattern.

**Objective:** This study aim to measure the incidence and pattern of cancer in rural area of Melmaruvathur, Tamilnadu.

**Materials and Methods:** A retrospective study was carried out in the pathology department of Melmaruvathur Adhiparasakthi institute of medical sciences. Data was collected from cancer register maintained in the pathology department from 2009-2015 .A total of 393 cases were collected and statistically analyzed.

**Results:** The common type of cancer noted in this area was squamous cell carcinoma (43%) affecting cervix, penis, skin, esophagus followed by adenocarcinoma affecting thyroid, breast, stomach, prostate and colon. The age and sex of predominantly affected were females (64%) between the age group of 40-60 years (55%) with an exception that males were commonly affected with stomach cancer (57%) and younger age group of less than 40 years were affected predominantly by thyroid cancer (100%).

**Conclusion:** The incidence of cancer is more common among females and between the age group of 40-60 years in this rural area. The most common cancer affecting females are cancer of cervix, breast and thyroid and males are affected frequently by cancer of penis, prostate and stomach. This study concludes that, the population resides in this rural area is more commonly affected by Genital squamous cell carcinoma followed by papillary carcinoma of thyroid and breast carcinoma.

**Keywords:** Cancer-incidence, Statistics, Trends, India, Cervical cancer.

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This study aims to assess and present the cancer pattern in this rural part of Tamil Nadu.

### Materials and Methods

This is a retrospective study carried out in the pathology department of Melmaruvathur Adhiparasakthi institute of medical sciences, a tertiary health care center in the rural area of Melmaruvathur Tamil Nadu India. All cancer cases reported from endoscopic, incisional and excision biopsy samples in pathology department between the years 2009-2015 were collected. A total of 393 cases were recorded in the cancer register. The Data was statistically analyzed based on site, age and sex distribution of cancer.

### Introduction

Cancer is the second largest non-communicable disease that contributes to significant pschycological morbidity and mortality<sup>(1)</sup>. Nearly ten million new cancer cases are diagnosed annually in the world and out of these about half cases are from developing world only. It is predicted that by 2020, over ten million people would die globally each year because of cancer with 70% deaths from the developing countries. In spite of good advancement for diagnosis and treatment, cancer is still a big threat to our society<sup>(2)</sup>. The world cancer report documents that cancer rates are set to increase at an alarming rate globally. Cancer rates could increase by 50% new cases for the year 2020<sup>(3)</sup>. The incidence of cancer pattern varies not only throughout the world and also between different population groups within same country<sup>(4)</sup>. The reason is variation in life style pattern, environmental pollution, dietary habits among urban and rural population. Study of the pattern of cancer is the first step in determining clues to the cause of cancer, to plan and assess control measure.

## Results

Table 1: Sex distribution of cancer 2009-2015

	Male		Female		Total
	Count	Percentage	Count	Percentage	
2009	29	48%	31	52%	60
2010	16	35%	30	65%	46
2011	8	15%	44	85%	52
2012	24	38%	40	63%	64
2013	29	42%	40	58%	69
2014	10	32%	21	68%	31
2015	25	35%	46	65%	71
total	141	36%	252	64%	393

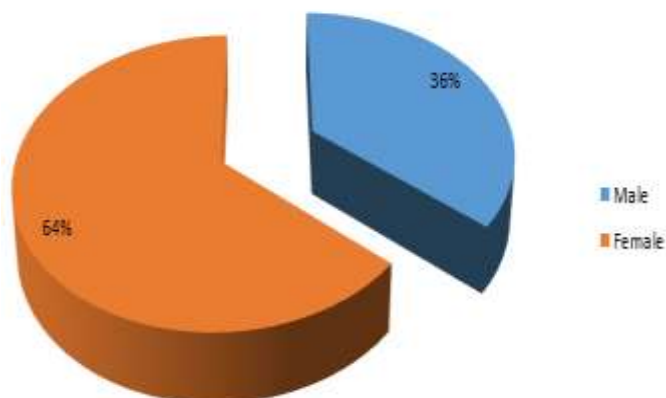
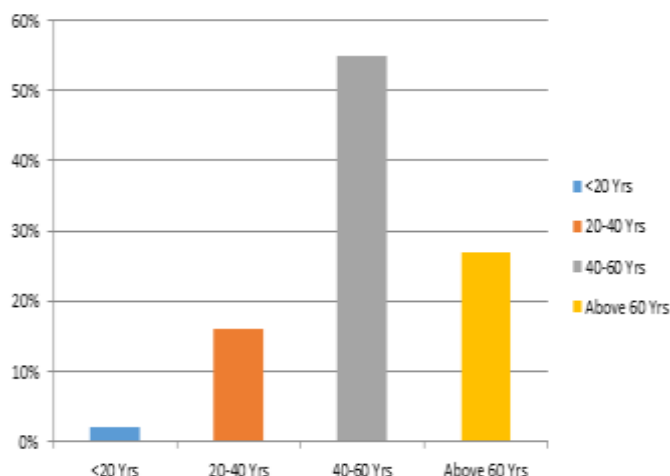


Fig. 1: Sex distribution of cancer 2009-2015

Table 2: Age distribution of cancer 2009-2015

	<20		20-40		40-60		>60		Total
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	
2009	2	3%	9	15%	32	53%	17	28%	60
2010	0	0%	6	13%	26	57%	14	30%	46
2011	0	0%	7	13%	32	62%	13	25%	52
2012	2	3%	11	17%	35	55%	16	25%	64
2013	0	0%	8	12%	41	59%	20	29%	69
2014	0	0%	7	23%	14	45%	10	32%	31
2015	2	3%	13	18%	38	54%	18	25%	71
total	6	2%	61	16%	218	55%	108	27%	393



**Fig. 2: Age distribution of cancer 2009-2015**

**Table 3: Site distribution & Type of cancer**

S. No	Site	Cancer type	Number	Percentage	Total	Percentage
1	Cervix	Squamous cell cancer	80	20%	86	22%
		Adenocarcinoma	6	2%		
2	skin	Squamous cell cancer	27	6.8%	41	10%
		Basal cell carcinoma	10	2.5%		
		Melanoma	1	0.25%		
		Metastatic deposits	3	0.8%		
3	Thyroid	Papillary carcinoma	36	9.1%	38	10%
		Follicular carcinoma	1	0.25%		
		Hurthle cell carcinoma	1	0.25%		
4	Breast	Infiltrating ductal carcinoma- NOS			36	9%
5	Stomach	Adenocarcinoma			35	9%
6	Penis	Squamous cell cancer			34	9%
7	Prostate	Adenocarcinoma			23	6%
8	Esophagus	Squamous cell cancer			19	5%
9	Colon	Adenocarcinoma			18	5%
10	Bladder	Transitional cell cancer	12	3%	13	3%
		Squamous cell cancer	1	0.25%		
11	Soft tissue	Sarcoma			9	2%
12	Uterus	Adenocarcinoma	6	2%	7	2%
		Stromal sarcoma	1	0.25%		
13	Ovary	Epithelial adenocarcinoma	5	1.2%	6	2%
		Teratoma	1	0.25%		
14	Kidney	Clear cell carcinoma	5	1.2%	6	2%
		Transitional cell cancer	1	0.25%		
15	Bone	Osteogenic sarcoma	3	0.8%	5	1%
		Giant cell tumor	1	0.25%		
		Adamantinoma	1	0.25%		
16	Node	Non Hodgkin lymphoma	2	0.5%	4	1%
		Hodgkin lymphoma	2	0.5%		
17	Salivary gland	Mucoepidermoid cancer	2	0.5%	4	1%
		Adenoid cystic	2	0.5%		

		carcinoma				
18	Others- Oral mucosa, tongue, alveolar mucosa	Squamous cell cancer	7	1.78%	9	2%
	Gall bladder	Adenocarcinoma	2	0.5%		
	total				393	100%

Table 4: Type of cancer distribution

Type	No. of Cases	2009	2010	2011	2012	2013	2014	2015
carcinoma	370	55	43	49	60	68	30	65
sarcoma	18	3	3	3	3	1	1	4
lymphoma	4	2						2
melanoma	1				1			
Total	393	60	46	52	64	69	31	71

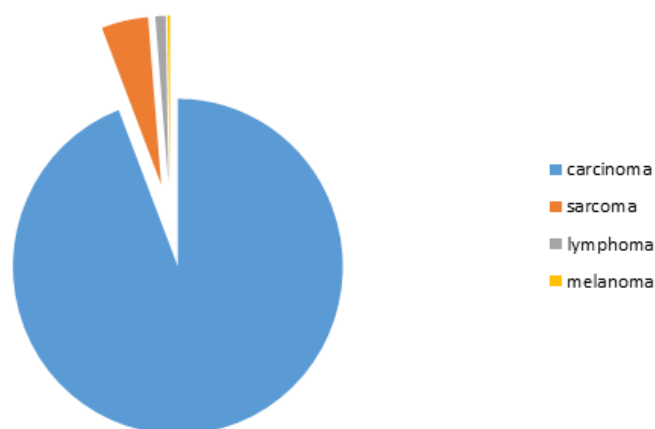


Fig. 3: Type of Cancer

Table 5: Age distribution of Squamous cell carcinoma at different sites

Age group *		Squamous cell cancer					Total	
		Penis	Cervix	Skin	Esophagus	Others		
age group	<40 Yrs	Count	2	18	1	2	0	23
		%	5.9%	22.5%	3.7%	10.5%	0.0%	13.7%
	41-60 Yrs	Count	17	53	16	9	6	101
		%	50.0%	66.2%	59.2%	47.3%	75.0%	60.1%
	Above 60 Yrs	Count	15	9	10	8	2	44
		%	44.1%	11.2%	37%	42%	25.0%	26.2%
Total		Count	34	80	27	19	8	168
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6: Age distribution of common Adenocarcinoma

Age group		Adenocarcinoma					
		Stomach	Prostate	Breast	Colon	Thyroid	
age group	<40 Yrs	Count	4	0	11	3	28
		%	11%	0%	31%	17%	74%
	41-60 Yrs	Count	10	3	22	11	10
		%	29%	13%	61%	61%	26%
	Above 60 Yrs	Count	21	20	3	4	0
		%	60%	87%	8%	22%	0%
Total		Count	35	23	36	18	38
		%	100%	100%	100%	100%	100%

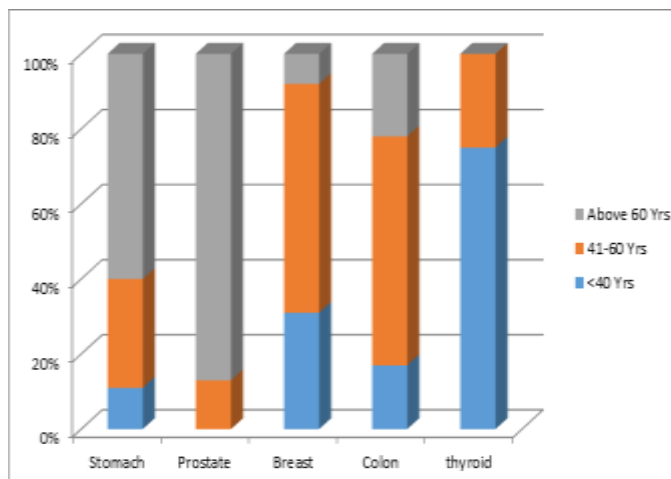


Fig. 4 Age distribution of common Adenocarcinoma

Table 7: Sex distribution second common cancer

	Stomach	Colon	Thyroid
<b>Male</b>	20	8	2
<b>%</b>	57%	44%	5%
<b>Female</b>	15	10	36
<b>%</b>	43%	56%	95%
<b>Total</b>	35	18	38

### Observations

Out of 393 cases registered, cancer Incidence was predominantly seen in females (64%) and male contributed only 36% (Table 1 & Fig. 1). Age wise distribution of cancer shows that 40-60 years group people were commonly affected (55%) followed by more than 60 years age group people (27%) (Table 2 & Fig. 2). Regarding the site commonly affected, cervix was the leading one followed by skin, thyroid, breast, stomach, penis, prostate, esophagus, colon and bladder in descending order of frequency (Table 3). Among the malignant lesion of various sites, carcinoma was the commonly observed cancer type during the past seven years in this rural area. (Table 4 & Fig. 3). The predominant cancer type affecting the cervix was squamous cell carcinoma and the other sites affected by squamous cell carcinoma were penis, skin, esophagus, oral mucosa, tongue and bladder in decreasing frequency and the overall age incidence of squamous cell carcinoma at all sites were common in 40-60 years group (Table 5). The second common malignancy noted in this area was adenocarcinoma affecting thyroid, breast, stomach, prostate, and colon. The age distribution of this cancer varies at different sites. Stomach and prostatic cancer commonly affects people of above 60 years age group 60%, 87% respectively and papillary carcinoma of thyroid affects less than 40 years age group people predominantly (74%). Breast and colonic cancer incidence (61%) was common among 40-60 years age people (Table 6, Fig. 4). Sex distribution pattern of this cancer types shows

95% female predilection for papillary carcinoma thyroid and 100% for breast carcinoma. Male preponderance was noted for stomach cancer (57%) and female predominance (56%) was observed in colonic carcinoma. (Table 7).

### Discussion

Cancer is an important health problem at international, national and local levels<sup>(5)</sup>. Changing trends of cancer incidence and its burden in different parts of India were assessed by various studies<sup>(6,7,8,9,10)</sup>. Increased incidence of cancer among females and population of age between 40-60 years noted in this study was similar and supported by other study done in Chennai city of Tamil Nadu<sup>(11)</sup>. Top five cancers incidence among females noted in this study were cervix (22%), breast and thyroid (9%), stomach(4%), skin (3%), colon (2.5%). This is in contrast with the study at Chennai city where the top five cancers were breast (27.4%), cervix(18.5%), ovary (5%), stomach(4.7%), mouth (3.9%) respectively. Similarly the incidence of top five cancers among men in our study were penis(9%), prostate(6%), stomach(5%), skin (3.5%), esophagus (3.3%) whereas in the above study conducted in Chennai city showed lung (10.3%), stomach(10.2%), esophagus(7%), mouth and lymphoma(5.6%), Large bowel (5.5%) cancer as the top five cancers among men. This study revealed that squamous cell carcinoma affecting the genital system in both the sex was the most commonly observed cancer in this rural area. The peak age of occurrence of

cervical cancer in India is between 55-59 years.<sup>(12)</sup> But in our study out of eighty cases (100%) of squamous cell cancer of cervix, fifty three cases (66.2%) were reported between 40-60 years of age group and eighteen cases (22.5%) were reported among females of age under forty years also. This increasing frequency of cervical malignancy among females of less than 40 years of age group is an alarming sign that preventive screening programmes and health education is to be intensified in this area. Frequently repeated cytology screening programmes have led to a large decline in cervical cancer incidence and mortality in developed countries. But it remains uncontrolled in developing countries because of ineffective or no screening. This increased incidence of cervical cancer in this rural area may be due to lack of health education and awareness about screening programme. It has been widely believed that invasive cervical cancer develops from dysplastic precursor lesion, progressing steadily from mild to moderate to severe dysplasia, then to carcinoma in situ and finally to cancer over a period of years. So, a health education, effective screening programme for early detection of precursor lesions has to be implemented among the population of this rural area to reduce the incidence of this genital squamous cell carcinoma. This study also revealed that the incidence of papillary carcinoma of thyroid especially of follicular variant is also raising and equivalent to that of breast carcinoma incidence in this area. Many of these thyroid malignancies are associated with colloid goiter and incidentally diagnosed as micro tumor. The exact triggering factor for papillary carcinoma of thyroid is not known well other than radiation exposure. But the frequent association of colloid goiter in papillary carcinoma raises a suspicion that this may act as a triggering factor for it. The author recommends further work up on this to identify the predisposing factors for this second leading carcinoma in this rural area.

### Conclusion

This study concludes that the incidence of cancer is more common among females than males in this rural area which is a new report. The common age incidence of cancer is between 40-60 years with the exception that thyroid malignancy occurs frequently among less than 40 years and stomach cancer incidence falls more in above 60 years age group people. Genital squamous cell carcinoma was found to be the leading cancer in both sex among this rural population. The second common malignancy is papillary carcinoma of thyroid and breast cancer in this area.

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