# The Growing Cancer Burden in an Urban Cancer Centre in Western Odisha: Epidemiology- A Retrospective Analysis.

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***Abstract:*** *All around the world, cancer manifesting in any form is one of the leading causes for death[1]. In our country approximately 1 million cancer cases are detected every year and the annual deaths due to cancer is around 0.63 million[2]. While lung and oral cancers are the commonest cancer for men, breast and cervical cancers are the commonest cancers for women in our country.[3] Our study was undertaken to find the incidence of cancer burden in an urban cancer centre in Western Odisha. A retrospective analysis was done involving collection of data of a three year period from 1st April 2014 to 31st March 2017. Total reported number of cancer cases during this period was 2278. There was an increase of 4.80% cancer burden in the second year and 7.33% in the third year in comparison to the first year. Females were more affected with malignancies than males. Also the study showed that cancer cervix with 22.30% incidence was the most common cancer followed by Carcinoma Breast (21.38%). We have also endeavoured to throw some light on the relations between higher incidences and aspects like geographical areas, sex and age for creating awareness and targeted solutions.*
***Keywords:*** *Cancer, Incidence, Western Odisha*

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## I. Introduction

Cancer, as a fatal disease poses a mammoth challenge to the people affected by it, as well as to the healthcare providers all over the world. India accounts for 8% of all estimated global cancer deaths and Cancer is the sixth leading cause of death among Indians[3]. In such a scenario it is alarming that the incidence of cancer is on the rise. It is because of population growth and increasing life expectancy. As per some estimates the average life expectancy of the Indian population is expected  to be around 70 years by 2021-25, with the proportion of elderly population showing a marked increase[4]. This increases the burden of non-communicable diseases such as cancer. It is projected that 1.1 million new cases of cancer are being diagnosed in India each year, with breast and cervical cancer being the commonest. The cancer mortality rate in India is 68% of the annual incidence meaning that the 5-year survival rate is less than 30%[1].

As per 2011 census, population of India was 121.09 crores. In 2017 it stood at 134.25 crores. There are more than 25 regional cancer centres in India. And the number is still growing. Yet there is no centralised system to deal with cancer patients and each centre treats patients with different modalities resulting in diversity of information and the need for sharing of knowledge.

The epidemiology of cancer involves a study of the factors affecting cancer, to infer the possible trends and causes. Such epidemiological data based studies assist in formulating strategies for the national cancer control program. Although there are some studies highlighting trends in cancer burden across our country, there is paucity of knowledge base regarding cancer burden in the states of Eastern India such as Odisha. Hence the present study was undertaken as a novel attempt to assess the incidence of cancer in an urban cancer centre in Western Odisha.

## II. Material And Methods

This retrospective observational study was carried out on patients attending Department of Radiotherapy at Veer Surendra Sai Institute of Medical Sciences (VIMSAR), Burla of Sambalpur district, Odisha from April 2014 to March 2017.

**Study Design:** Retrospective open label observational study

**Study Location**: This was a tertiary care teaching hospital based study done in Department of Radiotherapy at Veer Surendra Sai Institute of Medical Sciences (VIMSAR), Burla of Sambalpur district, Odisha.

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**Study Duration:** April 2014 to March 2017.

**Subjects & Selection Method**: The study population was drawn from patients who attended Department of Radiotherapy at VIMSAR with cancer between April 2014 to March 2017.

**Procedure Methodology**

Data was collected from records and registers of Outdoor of Department of Radiotherapy, VIMSAR. Socio-demographic characteristics such as age, gender, ethnicity, nativity were noted. The type of cancer i.e whether cancer of breast, cervix, head and neck etc with which the patient had presented was noted down.
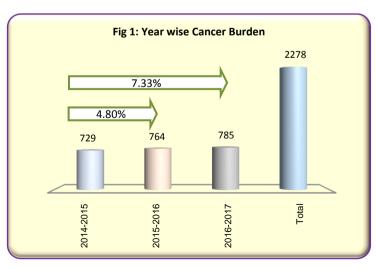
### III. Result

The incidence of cancer cases in this three year period study was 729, 764 and 785 respectively for the 1st, 2nd and the 3rd year totalling 2278 cases. There was an increase of 4.80% in the second year and 7.33% in the third year in cancer burden as against first year.
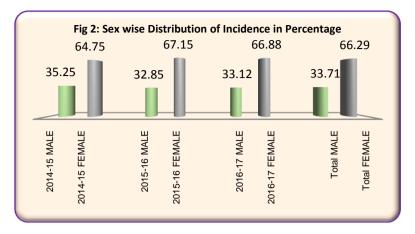
**Table 1** gives year wise percentage incidence of various types of cancer cases treated in our institute.

| SI No | Site | 2014-15 | 2015-16 | 2016-17 | Total |
|---|---|---|---|---|---|
| | | | | | |
| 1 | Cervical | 23.32 | 22.64 | 21.02 | **22.30** |
| 2 | Breast | 19.34 | 22.12 | 22.55 | **21.38** |
| 3 | Head & Neck | 16.46 | 16.36 | 15.67 | **16.15** |
| 4 | Stomach | 7.13 | 8.12 | 6.75 | **7.33** |
| 5 | Lung | 4.53 | 4.06 | 4.59 | **4.39** |
| 6 | Lymphoma | 3.43 | 2.62 | 3.31 | **3.12** |
| 7 | Colorectal | 3.02 | 3.53 | 2.55 | **3.03** |
| 8 | Ovarian | 1.65 | 1.70 | 4.46 | **2.63** |
| 9 | Gallbladder | 3.16 | 1.96 | 2.68 | **2.59** |
| 10 | Softtissue Sarcoma | 3.16 | 2.23 | 1.02 | **2.11** |
| 11 | Squamous Cell | 2.74 | 0.92 | 1.53 | **1.71** |
| 12 | Penis | 1.23 | 2.09 | 0.76 | **1.36** |
| 13 | Leukemia | 0.41 | 1.96 | 1.40 | **1.27** |
| 14 | Esophagus | 0.82 | 1.44 | 1.27 | **1.19** |
| 15 | Liver | 0.69 | 1.05 | 1.78 | **1.19** |
| 16 | Multiple Myloma | 1.37 | 0.92 | 1.02 | **1.10** |
| 17 | Others | 7.54 | 6.28 | 7.64 | **7.16** |
| | **Total** | **100.00** | **100.00** | **100.00** | **100.00** |

Table title: **Year wise incidence of Different Cancers in Percentage**

**Table 1**



Fig 1: Year wise Cancer Burden

Females were more affected in malignancies with 66.29% than males with 33.71% as depicted in Fig 2.

**Fig 2: Sex wise Distribution of Incidence in Percentage**

| | 64.75 | | 67.15 | | 66.88 | | 66.29 |
| 35.25 | | 32.85 | | 33.12 | | 33.71 | |

2014-15 MALE | 2014-15 FEMALE | 2015-16 MALE | 2015-16 FEMALE | 2016-17 MALE | 2016-17 FEMALE | Total MALE | Total FEMALE

As indicated by Fig 3, the mean age of occurrence in our study period has shifted marginally from 51.1 years in the first year to 51.6 years in the second year and to 52.2 years in the third year putting the overall mean age at 51.7 years.

**Fig 3: Mean Age of Cancers Burden**

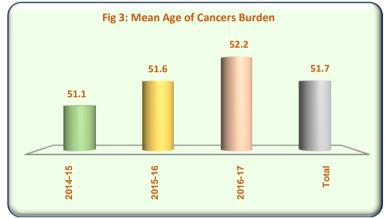| 51.1 | 51.6 | 52.2 | 51.7 |
| 2014-15 | 2015-16 | 2016-17 | Total |

Fig 4 shows the age wise incidence of cancer. As evident from this graph, the age wise spread looks normal and the maximum occurrences tend to concentrate around the middle ages. The most affected age groups were 41-50 and 51-60 with 28.62% each. So the combined age group from 41-60 with 57.24% becomes the most affected group.

**Fig 4: Age Distribution of Cancer Burden**

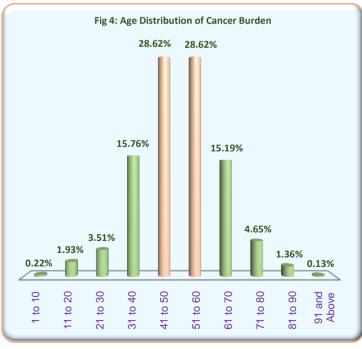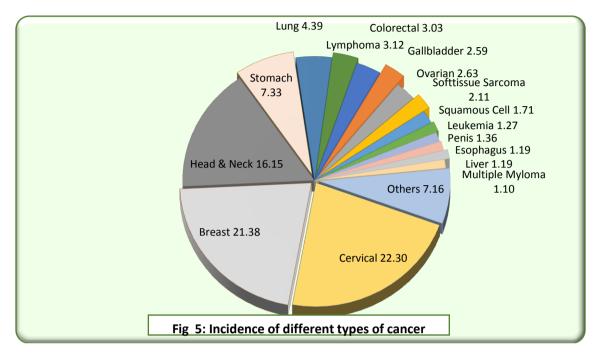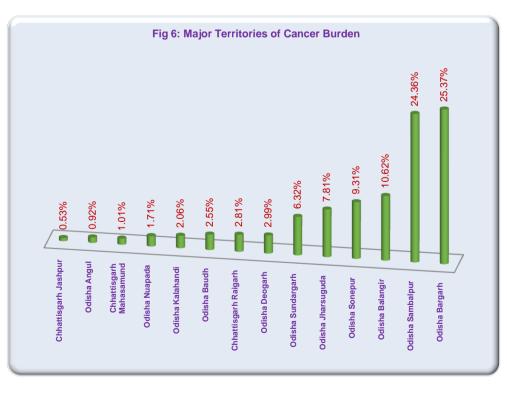| 0.22% | 1.93% | 3.51% | 15.76% | 28.62% | 28.62% | 15.19% | 4.65% | 1.36% | 0.13% |
| 1 to 10 | 11 to 20 | 21 to 30 | 31 to 40 | 41 to 50 | 51 to 60 | 61 to 70 | 71 to 80 | 81 to 90 | 91 and Above |

Fig 5 indicates the incidence of different types of cancer. Cervical cancer with 22.30% incidence was the most common cancer followed by Carcinoma Breast with 21.38%, followed by Head & Neck with 16.15%, followed by Carcinoma Stomach with 7.33%, followed by Lung Cancer with 4.39%. The least affected cancers were Carcinoma Duodenum, Endometrial Stromal Sarcoma, Mesothelioma, Verrucous Carcinoma and Unknown Primary with 0.04% each.



**Fig 5: Incidence of different types of cancer**

This Department of Radiotherapy though primarily intended for the Western part of Odisha, it also serves patients from neighbouring Chhatisgarh and Jharkhand. Fig 6 and Table 2 show the territorial incidence of cancer cases.



Fig 6: Major Territories of Cancer Burden

**Table 2** exhibits territorial spread of cancer burden handled by our institute.

| SI No | District | State | Incidence |
|---|---|---|---|
| | **Territorial spread of Cancer Burden** | | |
| 1 | Bargarh | Odisha | 25.37% |
| 2 | Sambalpur | Odisha | 24.36% |
| 3 | Balangir | Odisha | 10.62% |
| 4 | Sonepur | Odisha | 9.31% |
| 5 | Jharsuguda | Odisha | 7.81% |
| 6 | Sundargarh | Odisha | 6.32% |
| 7 | Deogarh | Odisha | 2.99% |
| 8 | Raigarh | Chhattisgarh | 2.81% |
| 9 | Baudh | Odisha | 2.55% |
| 10 | Kalahandi | Odisha | 2.06% |
| 11 | Nuapada | Odisha | 1.71% |
| 12 | Mahasamund | Chhattisgarh | 1.01% |
| 13 | Angul | Odisha | 0.92% |
| 14 | Jashpur | Chhattisgarh | 0.53% |
| 15 | Janjgir-Champa | Chhattisgarh | 0.26% |
| 16 | Ganjam | Odisha | 0.22% |
| 17 | Mayurbhanj | Odisha | 0.22% |
| 18 | Keonjhar | Odisha | 0.18% |
| 19 | Gariaband | Chhattisgarh | 0.09% |
| 20 | Balasore | Odisha | 0.09% |
| 21 | Baloda Bazar | Chhattisgarh | 0.04% |
| 22 | Baramkela | Chhattisgarh | 0.04% |
| 23 | Bilaspur | Chhattisgarh | 0.04% |
| 24 | Raipur | Chhattisgarh | 0.04% |
| 25 | Singhbhum | Jharkhand | 0.04% |
| 26 | Bhadrak | Odisha | 0.04% |
| 27 | Cuttack | Odisha | 0.04% |
| 28 | Dhenkanal | Odisha | 0.04% |
| 29 | Kendrapara | Odisha | 0.04% |
| 30 | Khurda | Odisha | 0.04% |
| 31 | Nabarangpur | Odisha | 0.04% |
| 32 | Nayagarh | Odisha | 0.04% |
| 33 | Medinipur | **West Bengal** | 0.04% |

**Table 2**

As shown in Table 2, Bargarh district has the maximum incidence with 25.37% followed by Sambalpur with 24.36% followed by Balangir with 10.62% and Sonepur with 9.31%.

## IV. Discussion

In our study, incidence of cancer burden in was 729, 764 and 785 respectively for the 1st, 2nd and the 3rd year totalling 2278 cases. Incidence of male cancer cases was 33.71% , while the incidence of female cancer cases was was 66.29%. Hence females were more affected than males with a male to female ratio of 0.51:1. Similar patterns were seen in other neighbouring states of eastern India. In Bihar the incidence of cancer in females was 59%, while in males it was 41% as reported in 2012[5]. In contrast in West Bengal the male:female ratio was found higher at 1.07[6].

The mean age of occurrence in our study was 51.1 years for the 1st year which shifted marginally in the 2nd year to 51.6 years and to 52.2 years in the 3rd year. The same for the whole study period was 51.7 years. The most affected age groups were 41-50 and 51-60 with 28.62% each. So the combined age group from 41-60 with 57.24% becomes the most affected group. In our study we found the incidence to be higher in the middle age group. This can be explained by the fact that we had a female preponderance of cases and in them the majority of cases were of cervical and breast cancers that are mostly diagnosed in the pre- or post- menopausal phases.

Results from our study showed that uterine cervical cancer with 22.30% incidence was the most common cancer followed by Carcinoma Breast with 21.38%, followed by Head & Neck with 16.15%, followed by carcinoma stomach. Head & Neck was the commonest cancer seen among men. As per data from the Kolkata registry the most frequently reported malignancies in males were cancer of lungs (16.3%) followed by cancers of the oral cavity (7.1%) while the most frequently reported cancer sites in females were breast (22.7%) followed by uterine cervix (17.5%). The higher incidence of lung cancer in West Bengal can be explained by the higher prevalence and duration of tobacco smoking in the population, common both amongst men and women[7].

Cancer of the uterine cervix, which is still one of the leading cancer amongst women in India with an estimated 126,000 new cases every year[8,9]. Previous studies show that early marriage, early initiation into coitus, early age at first child birth, sexual promiscuity (among both women and their spouses), multiparity, low

socioeconomic status and poor genital hygiene as major risk factors for cervical cancer in India[10,11]. The high total fertility rates is another major factor for development of cervical cancer mostly seen in economically and developmentally challenged rural areas[5]. Infection with the oncogenic subtypes of human papillomaviruses (HPV) is the necessary cause for cervical cancer. It is known that cytology screening programmes help decrease the incidence and mortality from cervical carcinoma in India and in many developing countries[12,13]. Improved awareness on cervical cancer has been shown to be associated with early detection of and improved survival in India and elsewhere. Hence it is imperative that such strategies are also adopted by our state.

Carcinoma breast is the most frequent cancer among the urban women in India and the number of cases is increasing annually, due to the aging of the population as well an increase in age-specific incidence. The important risk factors for the same are nulliparity, earlymenarche, late age at marriage and late age at first pregnancy seen more commonly among the urban women[14,15]. This urban/rural difference could be due to differences in lifestyle factors. Early detection along with optimal and patient specific treatment, taking various tumer markers into account is important in the control of breast cancer.

From the territorial spread point of view, Bargarh district has the maximum incidence with 25.37% followed by Sambalpur with 24.36%. Total six districts of Western Odisha account for more than 83% of the incidence. Different territories of neighbouring Chhattisgarh have the incidence of 4.87%. Even though located at an urban site, yet the population served by our centre caters to mainly the rural population of western odisha as well as neighbouring states of Chhatisgarh and Jharkhand. This is important to note because about three-quarters of Indians reside in rural areas. Yet, mortality for specific cancers is estimated mostly with data from India's 24 urban population-based cancer registries, with only two registries representing rural areas[16].

## V. Conclusion

In India mortality due to cancer is expected to rise, particularly with increases in age-specific exposure to risk factors. Many are avoidable, mainly by prevention of cervical, liver, and tobacco-related cancers, and with early diagnosis of oral, cervical, and breast cancers thus enabling effective treatment. Hence, it is the need of the hour that we rise up to the challenge and implement various strategies across the country as well as in our state to improve the overall healthcare status.

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