

# Geographical distribution of cervical cancer in Odisha: A 5-year retrospective study at a regional cancer center

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## Abstract

**Background:** Cancer cervix and breast are the two major female health problems in India. A hospital-based, 5-year (2010–2014) retrospective study was conducted at a regional cancer center of Odisha to analyze the present burden of cancer cervix in this state, which has a population of more than 45.5 million at present. **Materials and Methods:** All the patients suffering from cancer cervix that was treated by radiotherapy during 2010–2014 at this center were analyzed year wise for age, stage of disease, and native area. **Results:** Based on the Census 2011 data, it was calculated and found that from the low-literacy area on an average of 4.62 cervical cancer patients per million, from the medium-literacy area 6.56 patients per million, and from high-literacy area 19.11 patients per million of population have received radiotherapy in this hospital. More than 60% of patients with cervical cancer were from stage IIIB and in the age group of 50–55 years. **Discussion:** Odisha has 83.7% female population in rural areas with literacy rate below 50%. Due to lack of awareness and unavailability of cancer care facilities at their reach, they mainly depend on various alternative medicines in unscientific manner for their health care. **Conclusion:** Strengthening of existing regional cancer center, development of oncology wings in all medical college hospitals by providing basic radiotherapy facilities, emphasizing more on district cancer control programs, decentralizing of NGO schemes, and facilitating with more cancer screening and awareness programs may help better registration, prevention, and treatment of cancer in Odisha.

**Key words:** Cervical cancer, Odisha, radiotherapy

## Introduction

Globally, about 14 million new cancer cases are detected every year, out of which 8 million people die of cancer annually.<sup>[1]</sup> There is a significant difference in the distribution of cancer sites across the globe. Cancer cervix is the most common cause of cancer death among women in developing countries.<sup>[2]</sup> Mortality due to cancer cervix is also an indicator of health inequities,<sup>[2]</sup> as 86% of all deaths<sup>[3]</sup> due to cervical cancer are in developing, low- and middle-income countries.<sup>[4]</sup> In contrast to the developed countries, cancer cervix is a public health problem in the developing countries like India, which alone accounts for one-fourth of the worldwide burden of cervical cancers.<sup>[1,4]</sup> It is one of the leading causes of cancer mortality, accounting for 17% of all cancer deaths among women aged between 30 and 70 years. As estimated, cancer cervix occurs in one in approximately 53 Indian women during their lifetime as compared with 1 in 100 women in more developed regions of the world.<sup>[4]</sup>

Unlike other sites of cancer, cervix can be subjected to screening for early diagnosis and treatment. However, despite availability of various screening methods worldwide, there is no adequate government-sponsored public health policy in India on prevention of cervical cancer by either screening or vaccination. Cancer cervix was the second most common cancer in Odisha and has increased 3.1% from 2001 to 2011.<sup>[5,6]</sup> Although good-quality population-based cancer registries are the best indicators of the extent of the problem, hospital-based registries provide information as the outcome of a complex interaction between incidence of disease and health-care-seeking behavior. Hence, a hospital-based, 5-year (2010–2014) retrospective study was planned at a regional cancer center of Odisha with an aim to report the present burden of cancer cervix in this state, which has more than 45.5 million of population at present.

## Materials and Methods

Annual reports from 2009–2010 to 2014–2015 were collected from the statistical section of this hospital. Data of Census 2011 of India were downloaded from the website of Ministry of Home Affairs, Government of India, to find out the district-wise population, and the female literacy percentage of Odisha for analysis. Out of the total 81, 442 new patients attended the hospital outpatient department from January 2010 to December 2014, only 11,008 (13.5%) were treated by radiotherapy. The male-to-female ratio in radiotherapy patients was about 1: 1.16 [Table 1]. Among the total 5912 female patients, 2631 (44.5%) patients of cancer cervix and 306 (5.2%) patients of other female genital malignancies such as ovary, endometrium, vault, vagina, and vulva were treated by radiotherapy. Age, age group, stage, and native of all the patients suffering from cancer cervix and treated by radiotherapy in this hospital during 2010–14 were tabulated year wise for this study.

## Statistical analysis

As per Census 2011,<sup>[7]</sup> Odisha has about one twenty-eighth population of India with male-to-female ratio of 1000: 978. During 2001–2011, the female population growth in Odisha was 14.43%. In this 5-year study period (2010–2014), the growth of cervical cancer patients as registered for radiotherapy treatment in this hospital was 61.28%. The ages of all the patients were in the range of 25–88, the average of which was 53.3 years [Table 2]. More than 60% patients belonged to stage IIIB followed by 26.9% from stage IIB, and above 64% of them were in the age group of 41–60 years [Table 3]. The patients of stage IB, who had not turned up for postoperative radiotherapy, were excluded in this study.

District-/area-wise distribution of cancer cervix patients is shown in Table 4a-c. The cancer cervix patients per million of population was observed to be higher in high-literacy area

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**Table 1: Distribution of cancer patients receiving radiotherapy year wise**

	Year					Total (%)	<Age>
	2010	2011	2012	2013	2014		
Number of male	784	839	991	1127	1355	5096 (46.3)	49.8
Number of female	919	1013	1137	1271	1572	5912 (53.7)	49.6
Total	1703	1852	2128	2398	2927	11,008 (100)	49.7

**Table 2: Distribution of cancer-cervix patients with stage year wise**

	Year					Total (%)	<Age>
	2010	2011	2012	2013	2014		
Cx-IB	27	24	33	38	44	166 (6.3)	48.6
Cx-IIA	15	14	15	7	17	68 (2.3)	52.1
Cx-IIB	149	155	125	112	166	707 (26.9)	53.7
Cx-IIIA	17	25	14	3	15	74 (2.8)	58.1
Cx-IIIB	230	242	353	315	461	1601 (60.8)	53.5
Cx-IV	1	2	2	5	5	15 (0.6)	48.4
Total	439	462	542	480	708	2631 (100)	53.3
Others FGM	49	50	57	66	84	306	56.4

FGM=Female genital malignancies

**Table 3: Distribution of cancer-cervix patients (2010–2014) with age group versus stage**

	Age group						
	21-30	31-40	41-50	51-60	61-70	71-80	81-100
Cx-IB	3	41	65	40	11	3	3
Cx-IIA	0	9	24	26	5	2	2
Cx-IIB	5	91	217	226	133	34	1
Cx-IIIA	2	2	18	20	24	8	0
Cx-IIIB	6	203	517	531	263	75	6
Cx-IV	0	4	6	4	1	0	0
Total (%)	16 (0.6)	350 (13.3)	847 (32.2)	847 (32.2)	437 (16.6)	122 (4.6)	12 (0.5)
Other FGM	4	16	77	114	74	17	4

FGM=Female genital malignancies

**Table 4a: Distribution of cancer-cervix patients in high literacy districts**

Districts	Population in million (2011)	2010	2011	2012	2013	2014	Total	<Age>	<Patients per million>
Cuttack*	2.62	59	59	72	52	95	337	54.0	25.7
Puri	1.70	29	38	38	49	59	213	54.7	25.1
Kendrapara	1.44	31	27	38	34	49	179	55.5	24.9
Jagatsinghpur	1.14	25	28	27	22	36	138	53.9	24.3
Bhadrak	1.51	24	32	43	25	47	171	55.9	22.7
Balasore	2.32	42	46	50	42	67	247	53.8	21.3
Khurdha <sup>#</sup>	2.25	40	43	34	38	44	199	55.0	17.7
Jajpur	1.83	26	30	28	30	37	151	54.7	16.5
Dhenkanal	1.19	16	18	17	18	20	89	53.9	14.9
Nayagarh	0.96	13	8	13	15	20	69	50.5	14.3
Jharsuguda	0.58	0	0	1	5	2	8	54.5	2.8

\*Having two radiotherapy centres, <sup>#</sup>Having one radiotherapy centre

with the mean age of about 53 years and lower in low-literacy region with the mean age of about 49 years.

## Results and Discussion

Current data from the National Cancer Registry Program indicates that the most common sites of cancer among women are the breast and the cervix.<sup>[8]</sup> In India, the peak age for cervical cancer incidence is 55–59 years.<sup>[9]</sup> As per Census 2011, Odisha has 83.7% female population in the rural areas with literacy rate below 50%, where the ages of more than 90% of patients with cervical cancer were found to be in the range of 50–55 years. Due to lack of awareness and unavailability of cancer care facilities at their reach, they mainly depend on various alternative medicines in unscientific manner for their health care. Hence, accurate registration of cancer cases from this area has also become a difficult task. Based on the census data, South Asian Journal of Cancer ♦ Volume 7 ♦ Issue 1 ♦ January-March 2018

it was calculated and found that from the low-literacy area on an average of 4.62 cervical cancer patients per million of population in advanced stage, from medium-literacy area 6.56 patients per million, and from high-literacy area 19.11 patients per million of population have received radiotherapy in this hospital. More than 60% of patients with cervical cancer were mainly from stage IIB of cancer cervix who were at an average age of 53.5 years. This sample of patients suffered from cervical cancer can be taken as a representative sample of the state of Odisha as majority of its patients suffering from cancer are being treated here. About 75% of cancer cervix patients attending this hospital are in advanced stages, who are treated by radiotherapy primarily and half of the rest 25%, who undergo Wertheim's hysterectomy again come back to receive adjuvant radiotherapy because of various high-risk factors.

**Table 4b: Distribution of cancer-cervix patients in low literacy districts (having no radiotherapy centres)**

Districts	Population in million (2011)	2010	2011	2012	2013	2014	Total	<Age>	<Patients per million>
Mayurbhanja	2.52	25	29	30	21	40	145	51.0	11.5
Boudh	0.44	1	1	3	4	6	15	49.6	6.8
Kalahandi	1.58	4	7	9	8	13	41	46.2	5.2
Malkangiri	0.61	4	2	3	1	4	14	51.0	4.6
Koraput	1.38	6	5	6	7	6	30	49.3	4.3
Bolangir	1.65	4	6	8	5	9	32	48.9	3.9
Kandhamal	0.73	1	2	3	2	4	12	49.1	3.3
Rayagada	0.97	4	4	1	2	2	13	45.9	2.7
Nabarangapur	1.22	1	1	5	3	5	15	46.0	2.5
Gajapati	0.58	0	0	1	1	2	4	55.5	1.4

**Table 4c: Distribution of cancer-cervix patients in medium literacy districts/area**

Districts	Population in million (2011)	2010	2011	2012	2013	2014	Total	<Age>	<Patients per million>
Angul	1.27	22	17	21	14	29	103	54.6	16.2
Keonjhar	1.80	14	14	17	21	22	88	54.7	9.8
Sambalpur*	1.04	4	4	8	6	8	30	51.7	5.8
Deogarh	0.31	0	0	3	2	4	9	55.4	5.8
Nuapara	0.61	1	1	4	3	4	13	45.2	4.3
Ganjam*	3.53	11	11	18	9	21	70	49.4	4.0
Bargarh	1.48	3	3	7	5	7	25	50.7	3.4
Sundargarh	2.09	6	4	5	10	9	34	51.4	3.2
West Bengal	-	19	18	21	24	29	113	49.8	-
Jharkhand	-	2	2	3	2	3	12	47.4	-
Chhatisgarh	-	1	1	3	0	3	8	48	-
Andhra Pradesh	-	1	1	2	0	2	4	55	-

\*Having one radiotherapy department in the Medical College hospitals

## Conclusion

Out of 396 radiotherapy centers (about 30 centers/100 million of population) licensed by the Atomic Energy Regulatory Board, Government of India, as on May 31, 2016<sup>[10]</sup> for the treatment of cancer, there are only five centers for 45.5 million of population of Odisha including one RCC, two radiotherapy departments in two medical colleges, and two private institutes cater the need of its own and its neighboring areas of West Bengal, Jharkhand, Chhattisgarh, and Andhra Pradesh. This regional cancer center is the only full-fledged cancer institute under the State Government of Odisha, bears the maximum patient load of this state because of delivering radiotherapy treatment at a very highly subsidized rate.

Strengthening of existing regional cancer center, development of oncology wings in all medical college hospitals and district headquarter hospitals by providing basic radiotherapy facilities, emphasizing more on district cancer control programs, decentralizing of NGO schemes, and facilitating with more cancer screening and awareness programs may help better registration, prevention, and treatment of cancer in Odisha.

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## Conflicts of interest

There are no conflicts of interest.

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