

## Clinical and Demographic Profile of Gynaecological Malignancies in Eastern India

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### Abstract

**Introduction:** Globally Carcinoma Breast is the most commonly diagnosed cancer and it is the leading cause of death among the females and carcinoma cervix comes on the 4<sup>th</sup> position regarding the incidence and mortality (1) In India Carcinoma Cervix and Carcinoma Breast are the commonest cancer in females and it contributed 39.4% of total cancer in 2020. Worldwide female reproductive cancers are the main cause of cancer deaths in females, Common cancers are carcinoma breast, Carcinoma cervix and Carcinoma Endometrium, Carcinoma Ovary (4).

**Material and Method:** All histologically proven cases of gynaecological malignancies including Breast registered under hospital-based cancer registry were included in this. The total patient present in our hospital were distributed based on various demographic categories based on gender, age group and district of their residence.

**Result:** Total 32057 cases have been registered from year 2014 to 2021. In which 15825 cases were females. 6718 cases were of gynaecological cancers. In which 3392 cases were of Carcinoma Breast, 2039 (30.8%) cases were of Carcinoma Cervix, 1103(16.42%) cases were of Carcinoma Ovary, 68 (1.01%) cases were of Carcinoma Endometrium, 77 cases (1.5%) cases of carcinoma corpus uteri, 39 (0.5%) cases were of carcinoma vulva.

**Conclusion:** Retrospective analysis of 6718 cases was done with HBCR in the department of Radiation Oncology.

- A total of 6718 cases were analysed.
- Breast carcinoma was the most common malignancy which contributed about 10.58% of all the cancers and 50.49% of all the gynaecological malignancies.
- Year wise distribution shown carcinoma cervix was commonest malignancy in the earlier years 2014-2018, After 2019 carcinoma cervix became the 2<sup>nd</sup> commonest and carcinoma breast became the commonest malignancy among the gynaecological malignancies.
- Common age of presentation 35-64 years in all the gynaecological cancers.
- Lower Incidence shown in carcinoma breast and carcinoma ovary in elderly age group 65-85 years of age group.
- Earlier age group was 13.9% in Carcinoma Breast and Carcinoma Ovary 20.9%, Carcinoma Vulva 15.3%, and carcinoma corpus uteri 14.2%.

**Keywords:** Gynaecological Malignancies; Carcinoma Breast; Carcinoma Cervix; Carcinoma Endometrium; Carcinoma Ovary

**Introduction**

Globally Carcinoma Breast is the most commonly diagnosed cancer and it is the leading cause of death among the females and carcinoma cervix comes on the 4<sup>th</sup> position regarding the incidence and mortality [1]. In India Carcinoma Cervix and Carcinoma Breast are the commonest cancer in females and it contributed 39.4% of total cancer in 2020. According to the National Cancer Registry Programme (NCRP) [2] national centre for disease information and research centre Bengaluru 2020 report released, Age Adjusted rate per 100000 of population breast cancer rate was high in Metro and Urban cities, ranges lowest in Meghalaya 7.0 to highest in Hyderabad 48.0. Age Adjusted Rate carcinoma cervix was lowest in Dibrugarh 4.8 to highest in Papumpare 27.7 [3]. Worldwide female reproductive cancers are the main cause of cancer deaths in females, Common cancers are carcinoma breast, Carcinoma cervix and Carcinoma Endometrium, Carcinoma Ovary [4]. In India about 50-60% of cancer deaths are contributed by carcinoma breast, Carcinoma Cervix, Carcinoma Ovary and Carcinoma Endometrium [4]. In 2021 total 148338 cases were registered in India and it contributed 50.9% of total cancer registered among women. In which carcinoma breast contributed about 25.4%, Carcinoma Cervix contributed about 15.2%, Carcinoma Ovary contributed about 6.3% and Carcinoma corpus uteri 2.6% [5].

**Material and Methods**

All histologically proven cases of gynaecological malignancies including Breast registered under hospital-based cancer registry were included in this. The total patient present in our hospital were distributed on the basis of various demographic categories based on gender, age group and district of their residence.

**Results**

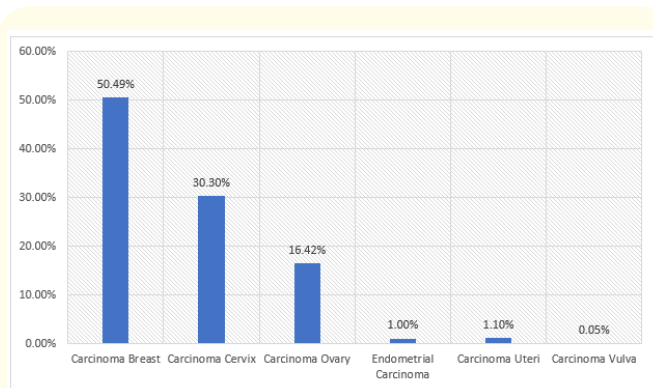
Total 32057 cases have been registered from year 2014 to 2021. In which 15825 cases were females. 6718 cases were of gynaecological cancers. In which 3392 cases were of Carcinoma Breast, 2039 (30.8%) cases were of Carcinoma Cervix, 1103(16.42%) cases were of Carcinoma Ovary, 68 (1.01%) cases were of Carcinoma Endometrium, 77 cases (1.5%) cases of carcinoma corpus uteri, 39 (0.5%) cases were of carcinoma vulva.

The commonest age group in all malignancies was 31-60 years except Carcinoma Endometrium in which peak age group was 41-70 years of age with 54 patients out of 68 patient which constitutes

of 79.41%. Peak age group was 31-60 years in Carcinoma Breast which contributed about 74.94% out of all the carcinoma breast cases, In Carcinoma Cervix peak age group was 31-60 years which constitutes of 76.36% out of total cases of Carcinoma Cervix, Carcinoma Ovary also shown peak age group of 31-60 years, Carcinoma Uterii has shown peak age group of 31-60 years which contributed of about 71.42% of the cases of Carcinoma Uterii, Carcinoma Vulva also shown peak age of 31-60 years and contributed about 71.79% of the total cases of Carcinoma Vulva, other cancer shown peak age group from 50-64 years. Common histopathology in Carcinoma Breast was Infiltrating duct carcinoma while adenocarcinoma was the most common histopathology in Carcinoma Ovary, Carcinoma Endometrium, Carcinoma corpus uteri, Squamous cell carcinoma was the most common histology in carcinoma cervix and carcinoma vulva.

Type of Carcinoma	No of Cases	Percentage
Carcinoma Breast	3292	50.49%
Carcinoma Cervix	2039	30.30%
Carcinoma Ovary	1103	16.42%
Endometrial Carcinoma	68	1.00%
Carcinoma Uterii	77	1.10%
Carcinoma Vulva	39	0.05%

**Table 1:** Type of carcinoma with total number of cases and percentage.



**Figure 1:** Distribution of type of carcinoma percentage wise.

Age Group	Carcinoma Breast	Carcinoma Cervix	Carcinoma Ovary	Carcinoma Endometrium	Carcinoma Uterii	Carcinoma Vulva	Total
<20	73	13	50	1	1	0	138
21-30	410	89	169	3	10	6	687
31-40	912	388	420	8	17	3	1753
41-50	995	614	302	15	26	17	1779
51-60	635	555	191	11	12	7	1411
61-70	288	288	100	28	11	4	719
>70	79	96	34	2	0	2	213
Total	3392	2039	1103	68	77	39	6718

Table 2: Age wise distribution of different kinds of carcinomas.

Year Type of Carcinoma	2014	2015	2016	2017	2018	2019	2020	2021	Total No of Patients	Population Growth Rate PGR = P(t) - P(t0) / (P(t0) * (t - t0))
Carcinoma Breast	303	413	435	572	476	220	441	512	3392	0.5245
Carcinoma Cervix	239	289	261	412	320	96	204	218	2039	-0.0919
Carcinoma Ovary	69	97	135	206	189	64	147	196	1103	1.0440
Endometrial Carcinoma	8	10	12	11	8	6	5	8	68	-6.00E-13 (-0.0000000000006)
Carcinoma Uterus	5	7	11	13	10	8	14	9	77	0.5877
Carcinoma Vulva	3	5	4	6	5	5	7	4	39	0.2876
Total no of Patient	627	821	858	1220	1008	399	818	947	6718	0.4123

Table 3: Year wise distribution of different kinds of carcinoma included in our study.

Population growth rate

$$PGR = \frac{P(t) - P(t_0)}{P(t_0) * (t - t_0)}$$

Population Growth Rates are used to express the annual change in a variable. A positive increase rate indicates a variable is increasing over time; a negative growth rate indicates that it is decreasing rate over time.

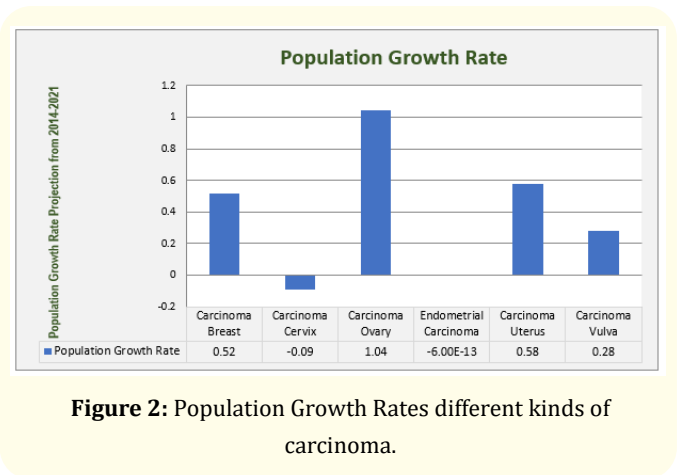


Figure 2: Population Growth Rates different kinds of carcinoma.

Common Age Group	Carcinoma Breast	Carcinoma Cervix	Carcinoma Ovary	Carcinoma Corpus Uteri	Carcinoma Endometrium	Carcinoma vulva
15-34	474	100	224	11	4	6
35-64	2475	1161	750	55	50	27
>65	341	294	108	11	14	6
Peak age group	31-60	31-60	31-60	31-60	41-70	31-60
Average Age	47.4	32.2	44.54	45.2	55.01	53.2
Max age- Min age	20-86	17-85	10-88	21-74	24-75	25-87
Percentage %	74.94%	76.36%	83.31%	71.42%	79.41%	71.79%

**Table 4:** Total number of Carcinomas based upon their common age of Incidence.

Type of Carcinoma	Common Histopathology	Total no of Cases
Carcinoma Breast ICD10 C50 (No.3392)	Infiltrating direct carcinoma	2143
	Duct Carcinoma	609
	Duct Cell Carcinoma	518
	Adenocarcinoma	72
Carcinoma Cervix (ICD-53, No.2039)	Squamous Cell Keratining	897
	Squamous Cell Carcinoma	466
Carcinoma Ovary ICD10 C56 (No. 1103)	Adenocarcinoma	1029
	Germ cell Tumour	16
Carcinoma Corpus Uteri C55.9	Adenocarcinoma	56
	Squamous Cell Carcinoma	14
Endometrial Carcinoma C54.1	Adenocarcinoma	58
	Squamous Cell Carcinoma	5
Carcinoma Vulva C51.9	Adenocarcinoma	8
	Squamous Cell Carcinoma	29

**Table 5:** Type of carcinoma with common histopathology and total number of cases.

Type of Carcinoma	District
Carcinoma Breast	Patna
	Vaishali
	Muzaffarpur
	Samastipur
Carcinoma Cervix	Patna
	Saran
	Samastipur
Carcinoma Ovary	Patna
	Samastipur
	Gaya
	Vaishali

Carcinoma Corpus Uteri	Patna
	Saran
	Samatipur
Endometrial Carcinoma	Samastipur
	Patna
	Vaishali
Carcinoma Vulva	Patna
	Nalanda
	Begusarai
	Motihari

**Table 6:** Type of carcinoma with Incidence cases district wise.

Author, Place and year of Publication	Type of Study	Number of cases N	Breast	Cervix	Endometrium	Ovarian	Vagina and Vulva
Jamal., <i>et al.</i> [26]. Pakistan, 2006	Retrospective	N = 968	-	231	229	411	96
Momtahen., <i>et al.</i> [27]. Tehran, 2009	Retrospective	N = 450	-	88	112	250	-
Rahman., <i>et al.</i> [25], Bangladesh, 2014	Retrospective	N = 185	-	120	12	44	9
Nnadi., <i>et al.</i> [24], Nigeria 2014	Retrospective	N = 404	-	274	23	46	3
Jha., <i>et al.</i> [35]. Nepal 2015	Retrospective	N = 62	-	44	7	9	-
Preeti., <i>et al.</i> [33], India, 2015	Retrospective	N = 577	-	446	53	66	8
Agrawal., <i>et al.</i> [1], Delhi, 2012	Retrospective	N = 1297	-	927	129	196	44
Hemlata., <i>et al.</i> [36], Karnataka, 2013	Retrospective	N = 475	-	358	27	71	17
Arya., <i>et al.</i> [37], Uttar Pradesh, 2013	Retrospective	N = 267	-	193	17	32	23
Ventaka lakshmi., <i>et al.</i> [38], Andhra Pradesh, 2016	Retrospective	N = 183	-	135	18	20	7
Our Study	Retrospective	N = 6641	3392	2039	68	1103	39

**Table 7:** Distribution of various female genital tract malignancies in India and Worldwide: A Comparative Analysis.

**Discussion**

We included 6718 cases of gynaecological cancers including carcinoma Breast, Carcinoma Cervix, Carcinoma Ovary, carcinoma corpus uteri Carcinoma Endometrium and Carcinoma Vulva. In India gynaecological cancer have increased and to be around 182602 by year 2020 about 30% of all female cancer [6] excluding carcinoma breast.

**Carcinoma breast**

Indian Cancer registry programme, carcinoma breast contributed 25.4% cases of all the gynaecological cancers in which 89.7% cases were infiltrating duct carcinoma, 1.8% cases of lobular carcinoma. In our registry 63.1% cases of infiltrating duct carcinoma, 17.9% ductal carcinoma, 15.2% duet cell carcinoma, 2.1% of Adenocarcinoma cases were registered.

Epidemiological studies have shown that by the year 2030 Global burden of breast cancer is expected to cross by 2 million [7]. As per GLOBOCAN data 2020, Breast Cancer accounted about 13.5% of all cancer deaths in India with 2.81 cumulative risk [8].

In our study breast carcinoma contributed a total of 3392 cases (50.49%) of all gynaecological malignancies. Most common age group was 41-50 years which contributed in 29.33% of cases. 2<sup>nd</sup> most common age group was 26.88% 31-40 years of age. Both the age group contributed 56.21% of the carcinoma breast cases.

Patients of 35-64 years of age contributed 72.96% cases, youngest age of carcinoma breast was 15 to 30 years of age which contributed about 2.1% of the cases. Oldest age group was >65 years of age which contributed 10% cases of carcinoma breast. Year wise distribution shown increasing trend of carcinoma breast from 2014 to 2021 (8.9% to 15%). Carcinoma Breast was the 2<sup>nd</sup> commonest gynaecological malignancy from 2014 to 2019, from 2019 it became most commonest gynaecological malignancy. Youngest age group (20-30) years contributed up to 2.2% of the cases. According to the National Cancer Registry Data 2021, commonest age group found 45 to 54 years of age. Which contributed 32% of all carcinoma breast cases. Elderly patients >64 years contributed 14.52% of cases.

A similar hospital based study conducted in Karnataka shown two peaks in age of Incidence of 35-39 years and 50-54 years (Chouhan, *et al.* 2011) [9]. In our study peak Incidence shown from 35 to 60 years 2250(66.8%) [9]. Patients were registered in this group. In 2013 breast cancer registry shown highest Incidence in Bangalore, majority of cases were of 33-55 years of age and Bangalore has been called as "Breast Cancer Capital"(www.siliconindia.org) [10]. Many studies have shown that survival rate is poor among young women with breast cancer (Shaver, *et al.* 2003, Mariyam, *et al.* 2004) [11,12].

Earlier it was a disease of older women and less in rural areas [13] (ICMR 2010) Study conducted in South India by Sandhu, *et al.* [14] in 2010 shown 69% cases from rural areas. Study conducted by B madhu *et al.* [15] in 2014 shown 52.4% cases from Rural areas. In India due to urbanization, screening improved health services, awareness programme. Carcinoma Cervix incidence is decreasing and Incidence of Breast carcinoma is Increasing (ICMR 2010, Jayant *et al.*) [13,16].

### Carcinoma cervix

In our study carcinoma cervix was the commonest cancer. Total 2039 cases of carcinoma cervix were registered which were 30.30% of all the gynaecological cancers. The most common age group we found were 60-64 years. Squamous cell carcinoma was the most common pathology in our registration. Study done by Maheshwari, *et al.* [17] also shown common histology of squamous cell carcinoma while other study done by Rekhi, *et al.* [18] shown most common histology small cell carcinoma (SMCA) in (42%), Large cell neuro endocrine tumour (LCNE OS) in 28% and in 8% cases shown SMCA + LCNES and 12% mixed tumour study. Analysis of all these cases done accordingly to know the epidemiology and pattern of gynaecological malignancies registered at our Institute. About 10% cases were registered in the age group 70-85 years, 0.6% cases were registered under 20 years of age.

Risk factors like multiple repeated child birth, multiple partners, poor sexual hygiene, Infection with human papilloma uterus etc are some of the factors responsible for causation of cervical cancer [19]. More than 70% of cervical cancer cases are from developing countries [20]. Improvement of female living standard and regular cervical cytology, Improvement in female education can reduce the incidence of cervical cancer [21,22] and diagnosis can be at early stage after empowering education [23].

### Ovarian carcinoma

Total ovarian malignancy cases registered at our Institute were 1103 which were 16.42% of total gynaecological tumours. Study done by Nandi, *et al.* [24]. Shown 11.40% & 11.43% cases shown by Rahman, *et al.* [25], Jamal, *et al.* [26] and Momtahan, *et al.* [27] shown little high cases of ovarian carcinoma 23.78%, 42.46% and 55.50% respectively.

A study of 957 cases of ovarian cancer shown that most of the benign tumours occurs in the early stage of life between 20-40 years of the age while the ovarian malignancies were commonly found in the age groups of 41-50 years of age [28]. The most common benign tumours were cyst adenocarcinoma in 15.9% of the cases, mucinous cyst adenocarcinoma was in 11.1% cases [28]. In an study malignant ovarian tumours most common pathology was adenocarcinoma 93.2% germ cell tumours in 1.4% cases, papillary adenocarcinoma in 1.08%. The common age group registered in our study was 41-50 years. Study done by Madhu, *et al.* [15] shown common age of presentation 41-50 years and other studies done by Rahman, *et al.* [25] and Deshpandey, *et al.* [29] shown similar result while other study done by DeSantis, *et al.* [7] common age group of presentation noted earlier age group from 31-40 years.

In younger age group less than 20 years of age incidence varies from 0.76% to 4.86% study done by Deshpandey, *et al.* [29] and Rahman, *et al.* [25]. In our study 4.5% of the cases were registered under this age group. According to the National Cancer Registry Programme 2021 6.3% cases of all gynaecological cancers were registered. NCRP 2021 [30]. Common age group of presentation was 45-60 years of age contributed about 43% of the Ovarian Cancer. Younger age group less than 20 years of age only 3.4% cases were registered in our study.

Several factors, genetic, hormonal, reproductive and behavioural factors are some of the causative factors which are responsible for ovarian cancers in which genetic factors have more association with causation [31]. Commonly ovarian cancer patients presented with advanced stage of disease with or without ascitis. After assessment of general condition Patients subjected to surgery or neoadjuvant chemotherapy followed by surgery or debulking surgery [28].

### Endometrial carcinoma

In our study only 68 (1.0%) cases of endometrial carcinoma were registered, Study done by Nnadi, *et al.* and Rahman [24,25]

shown 6.49% and 5.70% cases. Most common female malignancy in females in western world, but incidence rate is low in India due to its symptoms present generally in early stage.

About 2.6% cases of carcinoma endometrium were registered under National Cancer Registry Programme 2021. The common age group was 50-69 years of age, about 69.9% cases were registered under this age group. In elderly patients about 12% cases were registered in 70-85 years of age. In our study 6.8% cases were registered under this age group.

History of Estrogen intake, early onset of menarche, later onset of menopause, nulliparous women have higher risk of Endometrial Cancer [32].

### Ca Vulva and corpus uteri

Only 39(0.5%) cases of carcinoma vulva and 77(1.1%) cases of carcinoma corpus uteri were registered in and study which were comparable to the study done by Rehman, *et al.* and Jamal and Priti, *et al.* [33] most often occur in older age group (1-3%) Radical vulvectomy and superficial Lymphadenectomy can be suggested depending upon performance status. Radiotherapy or chemotherapy can be considered in Inoperable cases.

About 10% cases Registered with age of 70-85 years, Common pathology squamous cell carcinoma were registered.

3.8% cases were registered with corpus uterii, Common histopathology was found to be adenocarcinoma which were 89.06%, Endometrial stromal sarcoma in 3.12%, squamous cell carcinoma in 4.68%, carcinoma sarcoma in 1.56% cases.

According to the National Cancer Registry Programme 12% cases were registered from age 70-85 years. Other gynaecological tumours contributed 14.4% cases from age 70-85 years.

Breast Cancer also increases the risk of uterine corpus, taking oral contraceptives, physical activity. Soy rich diet can reduce the risk [34].

### Conclusion

Retrospective analysis of 6718 cases was done with HBCR in the department of Radiation Oncology. Distribution of various female genital tract malignancies excluding breast were analysed after confirmation of Malignancy by biopsy or fine needle aspiration.

- A total of 6718 cases were analysed.
- Breast carcinoma was the most common malignancy which contributed about 10.58% of all the cancers and 50.49% of all the gynaecological malignancies.
- Year wise distribution shown carcinoma cervix was commonest malignancy in the earlier years 2014-2018, After 2019 carcinoma cervix became the 2<sup>nd</sup> commonest and carcinoma breast became the commonest malignancy among the gynaecological malignancies.
- Common age of presentation 35-64 years in all the gynaecological cancers.
- Lower Incidence shown in carcinoma breast and carcinoma ovary in elderly age group 65-85 years of age group.
- Earlier age group was 13.9% in Carcinoma Breast and Carcinoma Ovary 20.9%, Carcinoma Vulva 15.3% and carcinoma corpus uteri 14.2%.

According to the World Cancer Report 2020 early detection and treatment is the only way to control it [10]. A systematic review of 20 Studies in 2018 reported in advanced stage disease, cost of treatment increased early diagnosis can decrease the treatment cost [10].

World age standardization incidence 13.1/100000 population and 6.9 per 10000 population mortality [1]. In India age standardized incidence rate of 14.7 per 100000 population and 9.2 per 100000 population mortality estimated [1].

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