



## A STUDY ON THE OVARIAN CANCER INCIDENCE IN SOUTHERN PART OF WEST BENGAL

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### ABSTRACT

**Background:** Ovarian cancer accounts for about 3% of cancers among women. The risk of developing ovarian cancer was related to age, genetics, race, diet, lifestyle, medications and other factors. **Objectives:** The present study was conducted to understand the ovarian cancer profile in the population of southern part of West Bengal for the last five years, from 2011-2015. **Result:** Result revealed that ovarian cancer rate was alarmingly high in females in this region. Further, the most serious issue that this disease is climbing in high rate days-after-days in the recent years. The cancer rate was climbing with 26.05% incidence in the year 2015. Though a slight decrease was noticed in the year 2013, but the frequency was negligible. The cancer frequency was moderate during 2011 to 2013, but it rises drastically from 2014 (22.22%) and reached maximum peak (26.05%) in 2015. The level of CA125 in the blood was high ( $\leq 35$  U/ml) in female having ovarian cancer. Present investigation revealed that the incidence was alarmingly high in the age group of 40-49 years in females. **Discussion:** This rise of ovarian cancer incidence is much more faster in last few years than the previous years. This scenario is really dangerous as because due to various efforts to prevent the disease we are not able to control it in mass scale. This peak cancer scenario can be altered in a positive direction by regular screening and by training the prevention measures of life style modification in a wide scale through proper way.

**KEYWORDS:** Ovarian cancer, population based study, incidental risk, West Bengal.

### INTRODUCTION

Ovarian cancer accounts for about 3% of cancers among women, but it causes more deaths than any other cancer of the female reproductive system. Globally about 160,000 people died from ovarian cancer up from 113,000 in 1990.<sup>[1]</sup> In 2012, ovarian cancer occurred in 239,000 women and resulted in 152,000 deaths worldwide. As of 2014, more than 220,000 diagnoses of epithelial ovarian cancer were made yearly.<sup>[2]</sup> In the United Kingdom as of 2014 ovarian cancer diagnoses were approximately 7000-7100 yearly and caused 4,200 deaths.<sup>[3]</sup> It is the 5th most common cancer in UK women. Globally among women, it is the 7th-most common cancer and the 8th-most common cause of death from cancer. Death from ovarian cancer is more common in North America and Europe than in Africa and Asia.<sup>[4]</sup>

Ovarian cancer is most commonly diagnosed after menopause, between the ages of 60 and 64. The 90% of ovarian cancer occurs in women over the age of 45 years and the 80% in women over 50 years of age. Treatment usually includes some combination of surgery, radiation therapy and chemotherapy. Outcomes depend on the

extent of the disease and the subtype of the cancer present.<sup>[4]</sup> The overall five-year survival rate in the United States is 45% among the cancer patients, but these outcomes are worse in the developing world. The five-year survival rate for all stages of ovarian cancer is 46%, whereas the one-year survival rate is 72% and the ten-year survival rate is 35%. For cases where a diagnosis is made early in the disease, when the cancer is still confined to the primary site, the five-year survival rate is 92.7%. About 70% of women with advanced disease respond to initial treatment, most of whom attain complete remission, but half of these women experience a recurrence 1 to 4 years after treatment.<sup>[5]</sup> Ovarian cancer survival varies significantly with subtype.

The risk of ovarian cancer increases in women who have ovulated more over their lifetime. This includes those who have never had children, those who begin ovulation at a younger age or reach menopause at an older age.<sup>[4]</sup> Other risk factors include hormone therapy after menopause, fertility medication and obesity. Factors that decrease risk include hormonal birth control, tubal ligation and breast feeding. About 10% of cases are related to inherited genetic risk, women with mutations

in the genes *BRCA1* or *BRCA2* have about a 50% chance of developing the disease. Overall, the most common gene mutations in ovarian cancer occur in *NF1*, *BRCA1*, *BRCA2*, and *CDK12*. The type-I ovarian cancers tend to be less aggressive and have microsatellite instability in several genes, including the tumor suppressor genes like *BRAF*, *KRAS*, and *PTEN*. The type-II ovarian cancers are the more aggressive type and have different mutated genes including *p53*, *BRCA1* and *BRCA2*.<sup>[2]</sup> Almost 100% of rare mucinous carcinomas have mutations in *KRAS* and amplifications of *ERBB2*, which is also known as *Her2/neu*. Moreover, 20% of ovarian cancers have mutations in *Her2/neu*.<sup>[5]</sup>

Cancer antigen 125 (CA-125) is a protein found on the surface of many ovarian cancer cells. CA125 is a glycoprotein that occurs in blood as high molecular weight entity ( $M > 200000$ ). High concentrations of this antigen are associated with ovarian cancer and a range of benign and malignant diseases. It can also be found in other cancers and in small amounts in normal tissues. CA-125 test measures the amount of this protein in the blood. CA-125 is used as a tumor marker, and the test can help to show the presence of cancer. Most often the CA-125 test is used to check the progress of ovarian cancer treatment or the reformation of ovarian cancer.

The state West Bengal is a vast area from north to south with wide socio-cultural diversity and varied life-style among people. This causes varied range of disease incidence and cancer incidental profile. To understand any disease epidemics demographic study is the basic need to know the disease profile in an area. But such type of study is really lacking in this region. The present investigation was aimed to study the ovarian cancer incidence in the population of southern part of West Bengal. The study was conducted to understand the ovarian cancer profile for the last five years, from 2011-2015.

#### MATERIAL AND METHODS

A retrospective 5-year long study on cancer cases were assessed for ovarian carcinoma from the patients attending to Barasat Cancer Research and Welfare Centre, a prime health centre covering many districts of West Bengal, for the period 2011 to 2015. The malignancy was diagnosed by symptoms, physical examination, cytology, histo-pathological examinations and various investigations by physicians. The data of the cancer staging, extent of metastasis, age, and pathophysiological status of cancer patients were collected.

Written informed consent was obtained from all in accordance with the guidelines from hospital center review board. Mortality data from official sources, and survival data from population-based studies, were used for the estimation of incidence and prevalence of ovarian cancer. A time trend of incidence pattern was analyzed with morbidity, survival and mortality during the period. The quantitative determination of Cancer Antigen 125 concentration in human serum was done by a colorimetric microplate enzyme immunoassay, using the procedure of AccuBind Elisa Microwells as per manufacturer instruction.

#### RESULTS

Among the entire cases, 261 females showed ovarian carcinoma as shown in Table 1. Present investigation revealed that ovarian cancer rate was climbing with 68 new cases in the last year, 2015. The cancer frequency was moderate during 2011 to 2013. In 2011 it was 14.56%, in 2012 and 2013 it was 19.92% and 17.24%, respectively. But the incidence frequency rises drastically from 2014 (22.22%) and reached maximum peak (26.05%) in 2015. Table 2 shows that the level of CA125 in the blood was high ( $\leq 35$  U/ml) in cases having ovarian cancer.

Comparative analysis of ovarian cancer in different age groups revealed that cancer frequency was common for age group 40 to 69 years and the frequency was alarmingly high particularly in the age group of 40-49 years in females as shown in Figure 1. The result also highlighted that women below 20 years of age never showed ovarian cancer incidence. The frequency of ovarian cancer was only 5% at age group 20-29 years. After that the frequency increased and reached 11% for the age group 30-39 years. The frequency showed in Figure 2 revealed drastic increase with maximum peak at 40-49 years of age with 42% incidence. Further gradual decline in incidence pattern was observed after this and it reached 26% in the age group 50-59 years and 16% in the 60-69 years of age.

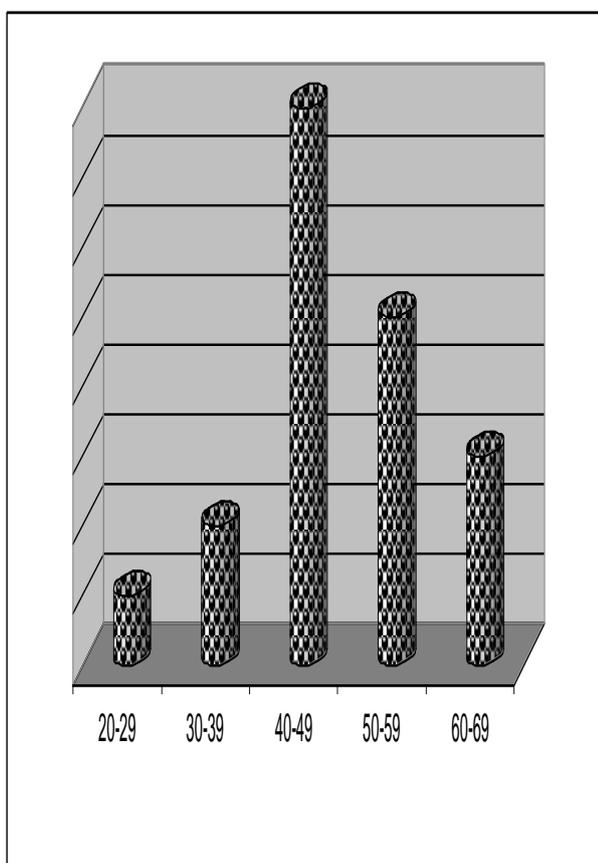
**TABLE 1: Year-wise distribution of ovarian cancer.**

Year	Number of cases	Frequency (%)
2011	38	14.56
2012	52	19.92
2013	45	17.24
2014	58	22.22
2015	68	26.05
Total	261	

**TABLE 2: Detection of ovarian cancer by CA125 value.**

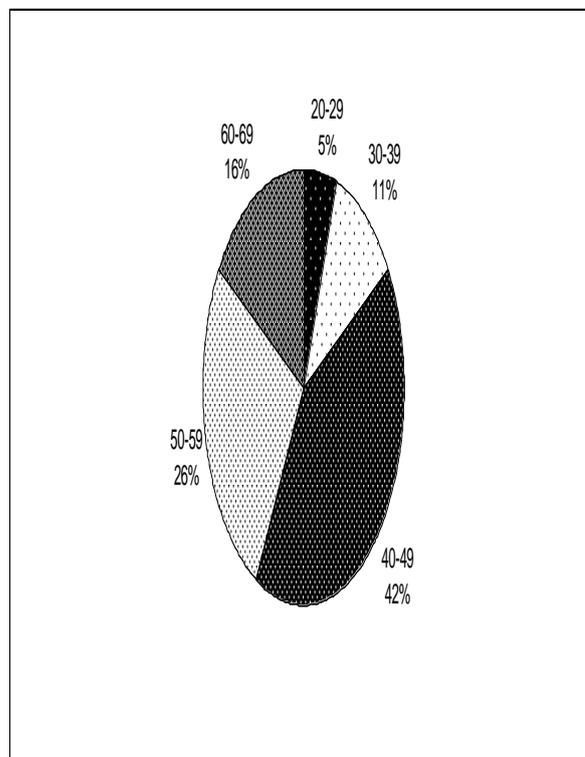
Case No.	Age (Year)	CA125 Value	Case No.	Age (Year)	CA125 Value	Case No.	Age (Year)	CA125 Value
1	65	4.5	22	40	9.0	43	60	780.0*
2	43	2.6	23	58	2.5	44	40	9.8
3	60	4.0	24	55	28.5	45	50	6.1
4	26	5.2	25	45	7.5	46	57	10.4
5	50	2.8	26	40	29.0	47	27	4.8
6	52	2.6	27	48	4.8	48	44	10.2
7	32	8.6	28	45	460.0*	49	47	5.6
8	56	440.0*	29	60	0.50	50	62	120.0*
9	60	65.7*	30	32	7.5	51	40	7.2
10	35	17.8	31	46	4.4	52	18	3.2
11	34	5.3	32	38	3.8	53	60	5.6
12	45	128.0*	33	60	4.5	54	65	5.7
13	42	81.0*	34	52	46.5*	55	26	7.8
14	52	4.1	35	45	634.0*	56	48	8.1
15	35	6.2	36	34	8.8	57	34	6.8
16	34	5.2	37	43	4.2	58	25	84.0*
17	59	360.0*	38	47	4.6	59	70	13.3
18	46	76.0*	39	22	26.0	60	50	8.5
19	50	380.0*	40	45	820.0*	61	60	5.5
20	54	7.4	41	35	41.0*	62	37	61.0*
21	45	3.8	42	45	53.6*	63	45	5.6

\*Cancer positive cases.



Age group (years)

**Figure 1: Age group distribution in different ovarian cancer positive cases.**



**Figure 2: Frequency distribution of ovarian cancer in different age group.**

**DISCUSSION**

The present investigation revealed that ovarian cancer rate was alarmingly high in females in this region. Further, the most serious issue is that this disease is climbing in high rate days-after-days in the recent years. Though a slight decrease was noticed in the year 2013,

but the frequency was negligible. In the early investigation it was found that the risk of ovarian cancer was low at early days but after 2006 it rises alarmingly and reached 42.65% in the year 2008.<sup>[6]</sup> The present study also supports the fact that this rise of ovarian cancer incidence is much more faster in last few years than the previous years. This scenario is really dangerous as because due to various efforts to prevent the disease we are not able to control it in mass scale. Many factors are contributing for this increase of cancer incidence.

Among this the major cause is that the females are generally reluctant for diagnosis of disease due to their conservativeness or other social issues. Thus majority of the disease was diagnosed in late stage when nothing can be done or the situation is worse. Further, people can not differentiate the symptom of cancer in early stage due to unawareness, and it makes them late to consult doctors. Finally, the social and psychological stigmas make the women shy and feel fear to diagnose cancer properly.

Signs and symptoms of ovarian cancer are frequently absent in early stages, even when they do exist they may be subtle. In most cases, symptoms exist for several months before being recognized and diagnosed, or they may initially be misdiagnosed as a condition such as irritable bowel syndrome.<sup>[2]</sup> The early stages of ovarian cancer tend to be painless unless the growing mass causes ovarian torsion. Ovarian cancer symptoms can vary based on the subtype.<sup>[5]</sup> Due to these causes early diagnosis is sometimes not possible. Further, in industrialized nations, with the exception of Japan, have high rates of epithelial ovarian cancer, which may be due to diet in those countries. A diet that includes large amounts of carotene, fiber and vitamins with low amounts of fat specifically, a diet with non-starchy vegetables may be protective, though research is still ongoing in this area.<sup>[7]</sup>

In the United States, five of 100 women with a first-degree relative with ovarian cancer will eventually get ovarian cancer themselves, placing those with affected family members at triple the risk of women with unaffected family members. Seven of 100 women with two or more relatives with ovarian cancer will eventually get ovarian cancer. In general, 5-10% of ovarian cancer cases have a genetic cause.<sup>[7]</sup> *BRCA* mutations are associated with high-grade serous non-mucinous epithelial ovarian cancer. The major genetic risk factor for ovarian cancer is a mutation in *BRCA1* or *BRCA2* DNA mismatch repair genes, which is present in 10% of ovarian cancer cases. Only one allele need to be mutated to place a person at high risk, because the risky mutations are autosomal dominant. The gene can be inherited through either the maternal or paternal line, but has variable penetrance.<sup>[5,7]</sup> Though mutations in these genes are usually associated with increased risk of breast cancer,<sup>[8]</sup> they also carry a 30-50% lifetime risk of ovarian cancer, a risk that peaks in a person's 40s and 50s.<sup>[5]</sup> This risk is also cited as 40-60% and 39-46%.<sup>[6]</sup>

Mutations in *BRCA2* are less risky than those with *BRCA1*, with a lifetime risk of 20-40%.<sup>[5]</sup>

A blood test for a marker molecule called CA-125 is useful in differential diagnosis and in follow up of the disease, but it by itself has not been shown to be an effective method to screen for early-stage ovarian cancer due to its unacceptable low sensitivity and specificity.<sup>[9]</sup> CA-125 levels in pre-menopausal people over 200 U/mL may indicate ovarian cancer, as may any elevation in CA-125 above 35 U/mL in post-menopausal people. CA-125 levels are not accurate in early stage ovarian cancer, as fully half of stage I ovarian cancer patients have a normal CA-125 level.<sup>[7]</sup> CA-125 may also be elevated in benign (non-cancerous) conditions, including endometriosis, pregnancy, uterine fibroids, menstruation, ovarian cysts, systemic lupus erythematosus, liver disease, inflammatory bowel disease, and pelvic inflammatory disease. Low malignant potential (LMP) tumors, also known as borderline tumors, do not cause an increase in CA125 levels and are not identifiable with an ultrasound.

In West Bengal the cancer rates are high mainly due to negligence.<sup>[10]</sup> The absolute number of new cancer cases was increasing rapidly, due to growth in size of the population, and increase in the proportion of elderly persons as a result of improved life expectancy. The risk of developing ovarian cancer was related to age, genetics, race, diet, lifestyle, medications and other factors. The life style of people also contributed to this rise as was reported in early studies.<sup>[11,12]</sup>

Particularly in rural population of West Bengal the social taboo to this disease is a factor for the hide of symptoms by the patients. This truth was also focused in the early studies with different cancer among the same population.<sup>[13]</sup> This peak cancer scenario can be altered in a positive direction by regular screening and by training the prevention measures of life style modification in a wide scale through proper way. During this study it was found that the patients considered the disease as a non-curable one and so they avoid the treatment also. Moreover, the poor people can not afford the treatment cost in many cases and thus the disease is spreading without proper diagnosis and treatment. To overcome such situation large scale awareness campaign among society is needed from every corner of government, non-government and private sectors.

## CONCLUSION

The risk of ovarian cancer has increased in the studied population of the southern part of West Bengal. Present investigation revealed that ovarian cancer rate was climbing with new cases in the last year. The incidence frequency rises drastically from 2014 and reached maximum peak in 2015. Comparative analysis of ovarian cancer in different age groups revealed that cancer frequency was common for age group 40 to 69 years, and

the frequency was alarmingly high particularly in the age group of 40-49 years in females.

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