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Association of Ovarian Cancer Risk with Other Gynaecological Diseases in Women- An Observational Study

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Abstract
Background: *The most lethal malignancy of the female reproductive system is ovarian cancer. Risk of ovarian cancer increases with age, but the rate of increase slows after the menopause. Several factors have been reported as being associated with the risk of epithelial ovarian cancer, most notably various gynaecological diseases and cancers. This observational study examines the association between ovarian cancer risk and various gynaecological diseases.*
Materials and Methods: *This study was conducted at Department of Obstetrics and Gynaecology, Government Medical College, Kottayam, Kerala for a period of one year. Data was collected from 448 women of whom 112 women were diagnosed with ovarian cancer. The chi square test was done to find the association of ovarian cancer risk with different gynaecological diseases.*
Results: *We found out significant association of PCOD, family history of ovarian cancer and fibroid with ovarian cancer. Our study couldn't find significant association of history of breast cancer and cervical cancer with ovarian cancer.*
Conclusions: *Overall these results suggest that women with PCOD are at increased risk of ovarian cancer. Family history of fibroid and ovarian cancer also increases ovarian cancer risk. Having multiple benign gynaecologic conditions had a cumulative effect on ovarian cancer risk.*
Keywords: *Ovarian cancer, fibroid, endometriosis, breast cancer.*

Introduction

Ovarian cancer is the most lethal gynaecological malignancy. It remains the sixth most common cancer in women worldwide, causing approximately 125,000 deaths annually.[1] High mortality of this disease is mainly due to late stage diagnosis for more than 70% of ovarian cancer patients. Only 19% of all ovarian cancers are diagnosed at this early stage. This poor prognosis is due to (a) the insidious asymptomatic nature of

this disease in its early onset, (b) the lack of robust and minimally invasive methods for early detection, and (c) tumor resistance to chemotherapy.[2]

Efforts at early detection and newer therapeutic approaches to reduce mortality due to ovarian cancer have been largely unsuccessful because the origin and pathogenesis are poorly understood. It has been proposed that serous tumours arise from the implantation of epithelium from fallopian tube. Most women with ovarian cancer are diagnosed at an advanced stage, with 75% diagnosed with extra-ovarian disease.[3]

Several factors have been reported as being associated with the risk of epithelial ovarian cancer, most notably various gynaecological diseases and cancers. Various studies are conducted in developed world on the relationship between gynaecological diseases and ovarian cancer risk. But very limited studied are conducted in developing nations to explore the impact of gynaecological diseases on ovarian cancer. Hence this study investigated the association of ovarian cancer risk with other gynaecological diseases.

Materials and Methods

Study population

This study was an observation study conducted at the Department of Obstetrics & Gynaecology (OB&G), Government Medical College, Kottayam. The study protocol was approved by the Regional Committee for Medical Research Ethics. The period of study was for one year, from August 2015 to July 2016. Information was collected from 112 women diagnosed with ovarian cancer as treatment group and 336 women without ovarian cancer as control group. All the participants were informed about this research and written consents were obtained from each participant.

Inclusion criteria of treatment group

Women admitted to the department of OB&G who had carcinoma ovary as defined by ultrasound and tumour markers and who were willing to participate in the study were selected.

Inclusion criteria of control group

Women admitted to the Department of OB&G who did not have carcinoma ovary and who were willing to participate in the study were selected as control group.

Statistical analysis

We calculated the descriptive statistics of the sample population and Chi Square test was carried out to study the association of ovarian cancer risk with different gynaecological diseases.

Results

The results of our study are depicted in the following tables. In the sample of 112 women with ovarian cancer, 1.8 % women had the history of breast tumours. In the control group also 1.8 % were having the history of breast tumours (table 1). The Chi square value and p value were 0.000 and 1 respectively. This implies that the history of breast tumour has no impact on the occurrence of ovarian cancer.

Table 1 Association of ovarian cancer risk with history of breast tumour

Breast tumour	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	2	1.8	6	1.8	1.0
No	110	98.2	330	98.2	
Total	112	100	336	100	

Table 2 depicts the frequency and results of chi square test of history of cancer endometrium. In the ovarian cancer group none of the patients had the history of history of cancer endometrium, whereas in control group 2.4% percentage of women had history of cancer endometrium. The result of chi square shows that history of cancer endometrium had significant association on occurrence of ovarian malignancy at 10% level of significance between two groups.

Table 2 Association of ovarian cancer risk with history of cancer endometrium

Cancer endometrium	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	0	0	8	2.4	0.099*
No	112	100	328	97.6	
Total	112	100	336	100	

*significant at 10%

Our study reveals that there was no significant relationship between history of cancer cervix and ovarian malignancy (table 3).

Table 3. Association of ovarian cancer risk with history of cancer cervix

Cancer cervix	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	0	0	5	1.5	0.194
No	112	100	331	98.5	
Total	112	100	336	100	

Table 4 shows that the history of polycystic ovarian disease (PCOD) had significant association with ovarian malignancy. In our study, 10.7% of cases and 2.1% of controls had history of PCOD.

Table 4. Association of ovarian cancer risk with history of PCOD

PCOD	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	12	10.7	7	2.1	0.000***
No	100	89.3	329	97.9	
Total	112	100	336	100	

***significant at 1%

Table 5 illustrates the results of chi square test and distribution of endometriosis in ovarian cancer group and control group. In our study 4.5% of cases and 1.8% of controls had history of endometriosis. We found no significant association between history of endometriosis and occurrence of ovarian malignancy.

Table 5. Association of ovarian cancer risk with history of endometriosis

Endometriosis	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	5	4.5	6	1.8	0.113
No	107	95.5	330	98.2	
Total	112	100	336	100	

Table 6 depicts the frequency and results of chi square test of family history of fibroids. In the ovarian cancer group, only 1.8% patients had the family history of fibroids, whereas in control group 14.6% percentage of women had the family history of fibroids. The result of chi square shows that the family history of fibroids had significant association between occurrences of ovarian malignancy.

Table 6. Association of ovarian cancer risk with family history of fibroids

Family history of fibroids	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	2	1.8	49	14.6	0.000***
No	110	98.2	287	85.4	
Total	112	100	336	100	

***significant at 1%

Table 7 shows the association of ovarian cancer with family history of ovarian cancer. 6.2% of ovarian cancer group and only 0.9% of control group women had family history of ovarian cancer. Our study reveals that there was significant relation between ovarian cancer risk and family history of ovarian cancer.

Table 7. Association of ovarian cancer risk with family history of ovarian cancer

Family history of ovarian cancer	Ovarian cancer group		Control group		P value
	Number	%	Number	%	
Yes	7	6.2	3	0.9	0.001***
No	105	93.8	333	99.1	
Total	112	100	336	100	

***significant at 1%

Discussion

The incidence of breast cancer might increase the risk of developing ovarian cancer in women. Some of the reproductive risk factors for ovarian cancer may also affect breast cancer risk. The risk of ovarian cancer after breast cancer is highest in those women with a family history of breast cancer. A strong family history of breast cancer may be caused by an inherited mutation in the $BRCA_1$ or $BRCA_2$ genes and hereditary breast and ovarian cancer syndrome, which is linked to an increased risk of ovarian cancer. In this study 1.8% each of cases and controls had previous history of breast cancer. From the analysis of the data, we found that history of breast tumour had no impact on the occurrence of cancer ovary. This disparity in the finding may be because of the small sample size.

Even though endometriosis is considered to be a benign condition, it does share common characteristics with malignant cells.[4] Sampson[5] (1925) was the first to report the case of suspected malignant transformation in endometriosis. Ever since, numerous studies have conducted on the relationship between endometriosis and ovarian cancer. Data from large case studies point out that endometriosis patient have an increased risk of ovarian cancer.[6-8] Contradictory to that, our results didn't find a significant association between endometriosis and ovarian cancer. In principle, familial aggregation of ovarian cancer may be caused by genetic factors shared within families. The study of Stratton et al. mentioned that the family history of ovarian cancer confers a three to fourfold increased risk of the disease for women with a single first-degree relative affected with ovarian cancer.[9] Few similar studies also substantiate this and our study also finds similar results.

Conclusions

Our study investigated the association between ovarian cancer and various gynaecological diseases including fibroid, PCOD, breast cancer etc. We used Chi-square test to estimate the association of ovarian cancer and gynaecological diseases. Our study proved that PCOD, family history of ovarian cancer and fibroid had a significant association with ovarian cancer risk. Being a small-scale study, we used small sample size. Therefore we recommend further studies involving large samples comparable to those done in developed countries.

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