ASSOCIATION BETWEEN OVARIAN CANCER RISK AND CONTRACEPTIVE METHODS- AN OBSERVATIONAL STUDY
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ABSTRACT

BACKGROUND
Ovarian cancer is the most lethal malignancy of the female reproductive system. Risk of ovarian cancer increases with age, but the rate of increase slows after the menopause. Use of contraceptives confers long-term protection against ovarian cancer. This observational study examines the correlation between ovarian cancer risks with different contraceptive methods.

MATERIALS AND METHODS
This study was conducted at Department of Obstetrics and Gynaecology, Government Medical College, Kottayam, Kerala, for a period of one year. Information was collected from 112 women diagnosed with ovarian cancer as treatment group and 336 women without ovarian cancer as control group. The Chi-square test was done to find the association of ovarian cancer risk with different contraceptive methods.

RESULTS
In the sample of 112 women with ovarian cancer, 53.6% women were using any of the contraceptive methods, whereas in the control group, only 5.1% women were using contraceptive methods. Our study found out a significant association of ovarian cancer risk with oral contraceptives and tubal ligation. There was no significant association of ovarian cancer risk with IUCD, sheath and vasectomy.

CONCLUSION
Tubal ligation and oral contraceptives reduce the risk of ovarian cancer. The dual benefits of tubal ligation need to be made aware among the public and tubal sterilisation rates have to be enhanced. Oral contraceptive pill use has to be propagated as a temporary contraceptive method due to its added advantage. We recommend future research on the association of ovarian cancer risk and contraceptive methods using large samples comparable to those done in developed countries.

KEYWORDS
Ovarian Cancer, Tubal Ligation, Oral Contraceptive Pill, Contraceptives.

developing nations are less studied. In order to fill the above-mentioned research gap, the present study was conducted to examine the correlation between the risk of ovarian cancer and contraceptive methods.

**OBJECTIVES**

1. To study the association of duration of contraceptive usage and risk of ovarian cancer.
2. To study the association between risk of ovarian cancer and contraceptive methods.

**MATERIALS AND METHODS**

**Study Population**

This study was an observation study conducted at the Department of Obstetrics and Gynaecology (OB-GYN), 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. The study tools included the semi-structured questionnaire, ultrasound report, tumour marker measurements and statistical analysis software (SPSS).

**Inclusion Criteria of Treatment Group**

Women admitted to the Department of OB-GYN who had carcinoma of 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-GYN who did not have carcinoma of ovary as excluded by ultrasound and tumour markers and who were willing to participate in the study were selected as control group.

Important anthropometric details were recorded from the patients using a standard questionnaire. Methods and duration of usage of contraceptives were collected in detail.

**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 contraceptive methods.

**RESULTS**

In the sample of 112 women with ovarian cancer, 53.6% women used any of the contraceptive methods. In the control group, only 5.1% were using contraceptive methods (Figure 1). Chi-square value was 138.9 and there was significant association between contraception usages and ovarian cancer risk, which implies that the lack of contraceptive use significantly increases the risk of cancer ovary.

Table 1 to 6 shows the association of ovarian cancer with various contraceptive methods. 10.7% of ovarian cancer group and 45.5% of control group women had tubal ligation. Our study reveals that there is significant relation between ovarian cancer risk and use of tubal ligation (Table 2).
***Significant at 0.01, Chi-square=43.7, odd ratio = 0.085, 95% CI= 0.034-0.212.

In the analysis of association between ovarian cancer and use of sheath, we obtained the Chi-square value as 3.1, but there is no significant association between sheath use and causation or protection against cancer ovary (Table 3).

The occurrence of ovarian cancer is significantly more in group with Oral Contraceptive Pills (OCP) usage. The odds ratio indicates that when compared to people who don't use OCP, the risk of developing ovarian cancer is 0.057 times more in those who take OCP (Table 4).

Only very few of the patients’ partners had undergone vasectomy in the control group, and in the ovarian cancer group, none of the patients’ partners had undergone vasectomy. However, there is no statistical significant different between two groups (Table 6), which means vasectomy neither predisposes nor protects against cancer ovary.

**DISCUSSION**

A risk factor is anything that changes an individual’s chance of getting a disease-like cancer. Many people who get the disease may not have had any known risk factors. Even if a woman with ovarian cancer has a risk factor, it is very hard to know how much that risk factor may have contributed to the cancer. Researchers have discovered several specific factors that change a woman's likelihood of developing epithelial ovarian cancer. These risk factors don't apply to other less common types of ovarian cancer like germ cell tumours and stromal tumours.

Collaborative group on epidemiological studies of ovarian cancer reports that the ovarian cancer risk is less in those women who had used contraceptives for longer durations. Our results also showed a similar trend. Women who used oral contraceptives had a lower risk of ovarian cancer. The mechanisms underlying this noticeable reduction have not been well-defined. However, many studies confirm that ovulation with its associated disruption and subsequent repair of the ovarian epithelium can lead to the acquisition of genetic damage in ovarian epithelial cells and in turn to ovarian cancer in susceptible individuals.14,15,16 We also found a similar result. In our study, the lower risk is seen only after 3 to 6 months of using the pill and the risk is lower as the duration of the pills usage increases. This reduced risk continues for many years even after the pill is stopped.

Tubal ligation may reduce the chance of developing ovarian cancer by up to two-thirds. Our study also showed that tubal ligation reduces ovarian cancer risk. Several mechanisms have been proposed to explain the protective effects of tubal ligation on ovarian cancer risk. Tubal ligation has been hypothesised to reduce blood flow to the ovary resulting in altered levels of hormones and growth factors, block the retrograde flow of carcinogenic or inflammatory agents from the vagina into the peritoneal cavity and induce immunity to mucins, which are over expressed in ovarian cancer.17-21

Many researches indicate that most ovarian cancers arise from tissues embryologically derived from the

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**Table 2. Association of Ovarian Cancer Risk with Adoption of Tubal Ligation**

<table>
<thead>
<tr>
<th>Tubal Ligation</th>
<th>Ovarian Cancer Group</th>
<th>Control Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
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<tr>
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<td>12</td>
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</tr>
<tr>
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<td>100</td>
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</table>

**Table 3. Association of Ovarian Cancer Risk with Adoption of Sheath**

<table>
<thead>
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<th>Sheath</th>
<th>Ovarian Cancer Group</th>
<th>Control Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
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</tr>
<tr>
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<td>101</td>
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**Table 4. Association of Ovarian Cancer Risk with OCP Usage**

<table>
<thead>
<tr>
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<th>Control Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
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<td>%</td>
<td>Number</td>
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<tr>
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<td>95.5</td>
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**Table 5. Association of Ovarian Cancer Risk with Adoption of IUCD**

<table>
<thead>
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<th>Ovarian Cancer Group</th>
<th>Control Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
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<td>26</td>
<td>20.5</td>
<td>64</td>
</tr>
<tr>
<td>No</td>
<td>89</td>
<td>79.5</td>
<td>272</td>
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**Table 6. Association of Ovarian Cancer Risk with Adoption of Vasectomy**

<table>
<thead>
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<th>Ovarian Cancer Group</th>
<th>Control Group</th>
<th>P value</th>
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<td>Number</td>
<td>Percentage</td>
<td>Number</td>
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<td>0.0</td>
<td>5</td>
</tr>
<tr>
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<td>112</td>
<td>100.0</td>
<td>331</td>
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Mullerian ducts. Ovarian cancer cells are believed to originate from exfoliated endometrial cells and are associated with endometriosis and mutations in the ARID1A gene. In contrast, many serous high-grade cancers are assumed to originate from the distal fimbrial end of the fallopian tube. Tubal ligation is significantly more protective for endometrioid and clear cell cancers than for serious high-grade cancer because the location of the ligation near the ureterotubal junction prevents retrograde transport and ovarian seeding by cells originating from the endometrium, but not the distal tubes.

**CONCLUSION**

Our study investigated the association between ovarian cancer and contraceptive methods including tubal ligation, OCP, IUCD, sheath and vasectomy. We used Chi-square test to estimate the association of ovarian cancer and contraceptive methods. Our study proved that use of contraceptives, duration of contraceptive use, tubal ligation and OCP had a significant association with ovarian cancer risk.

People should make aware regarding the prevalence, symptomatology, screening/diagnostic techniques, treatment modalities and prognosis of ovarian cancer. The dual benefits of tubal ligation need to be made aware among the public and tubal sterilisation rates have to be enhanced. We recommend the promotion of tubal ligation as a permanent method of contraception in those who have completed their families. Oral contraceptive pill use has to be propagated as a temporary contraceptive method due to its added advantage. We recommended further studies involving large samples comparable to those done in Western countries.

**REFERENCES**


