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A Retrospective Case Control Study of Assessment of Association between Incidence of Ovarian Tumour and Tubal Ligation.

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Abstract
Introduction: *An incidental adnexal mass is a common finding that is routinely evaluated by gynecologists and gynecologic oncologists. In fact, in the United States nearly 5 to 10% of women at some point in their lives will undergo surgical evaluation of a suspected ovarian neoplasm.*
Materials and Methods: *The present study was conducted in the department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Belgaum during the period of September 2012 to August 2013. Data like age, age of menarche, menstrual history, menopause, gravida, surgery, OC pill and family history were noted from the records available in Department of Medical Records and recorded on a predesigned and pretested proforma.*
Results: *The present study was conducted in the department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Belgaum during the period of September 2012 to August 2013 on a total of 300 women. A total of 150 women who presented with ovarian tumor during past three years were grouped as cases and compared with 150 age, parity and use of OCP matched women with intact ovary with or without hysterectomy were grouped as controls.*
Conclusion: *In this study 63.33% of the women who belonged to controls had tubal ligation compared to 52.67% of the women among the cases. The Odds ratio was found to be 0.644 (95% CI – 0.406 to 1.022; z= 1.868; p=0.061) indicating that the tubal ligation was associated with lower odds of development of ovarian tumor. Based on these findings it may be concluded that, there is limited relation between risk of ovarian tumor and tubal ligation as the difference was statistically not significant.*
Key words: *incidental adnexal mass, OCP, ovarian tumor, hysterectomy*

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I. Introduction

An incidental adnexal mass is a common finding that is routinely evaluated by gynecologists and gynecologic oncologists. In fact, in the United States nearly 5 to 10% of women at some point in their lives will undergo surgical evaluation of a suspected ovarian neoplasm.[1]

Ovarian tumors frequently present as adnexal masses and are quiet frequent reasons for referral to gynecologist. It is the leading cause of death in women with gynecologic cancer in developing countries. A woman's lifetime risk has been estimated to be about 1 in 55, which represents an increase from the 1970 figure of 1 in 70. In the year 2005, an estimated 22,220 new cases of ovarian cancer were diagnosed in the US alone, with 16,210 deaths predicted.[2]

In India, during the period 2004-2005, proportion of ovarian cancer varied from 1.7% to 8.7% of all female cancers in various urban and rural population based registries operating under the net- work of the National Cancer Registry programme (NCRP) of Indian Council Medical Research. The proportion of this cancer was 6.0% and 7.7% of all cancers among females in rural Barshi and Ahmedabad registry areas.[3]

Over the past few years, there have been a growing number of arguments supporting the potential origin of ovarian epithelial tumors from tissues that are embryologically derived from the Mullerian ducts,

including endometrial cells, which are transported from the endometrial cavity by retrograde menstruation through fallopian tube. Hence it is suggested that tubal ligation may prevent incidence of ovarian tumour.[4]

The poor prognosis of ovarian cancer reinforces the need for research to identify modifiable risk factors for this disease. To investigate further the relation of fatal ovarian cancer to tubal ligation and to determine whether risk varies with increasing time since the procedure, the present study was designed to to assess association between incidence of ovarian tumour and tubal ligation.[5]

II. Objectives

The objectives of the present study were to assess association between incidence of ovarian tumour and tubal ligation.

III. Materials And Methods

The present study was conducted in the department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Belgaum during the period of September 2012 to August 2013.

Study Design

The study design was retrospective case control study.

Study period and duration

The present study was conducted from September 2012 to August 2013.

Place

This study was conducted at Department of Obstetrics and Gynaecology, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum a teaching hospital attached to Jawaharlal Nehru Medical College, Belgaum.

Source of data

All the ovarian tumor cases in past three years at KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum, were studied.

Sample size

A sample size of 300 was considered.

Sampling procedure

A total of 300 cases divided into two groups of 150 each as below.

Cases: Women newly diagnosed to have ovarian tumor.

Controls: Women who have undergone hysterectomy with intact ovary, no history of ovarian tumour and age more than 40 years, and those who have not undergone hysterectomy with intact ovary, no history of ovarian tumour and age less than 40 years. Controls will be matched to cases on age, parity, use of OCP's

Selection criteria

Inclusion

- Cases: Women newly diagnosed to have ovarian tumor during the past three years.
- Controls:
  - Women who have undergone hysterectomy with intact ovary
  - No history of ovarian tumour
  - Age more than 40 years (Those who have not undergone hysterectomy with intact ovary, no history of ovarian tumour and age less than 40 years).
  - Matched to cases on age, parity, use of OCP's

Exclusion

- Participants not willing to participate in the study.

Ethical clearance

Prior to the commencement, the study was approved by the Institutional Ethics Committee of Jawaharlal Nehru Medical College, Belgaum.

Permission was obtained from the Department of Medical Records to access the data of the patients who presented with ovarian tumor during the past three years.

Data collection

Data like age, age of menarche, menstrual history, menopause, gravida, surgery, OC pill and family history were noted from the records available in Department of Medical Records and recorded on a predesigned and pretested proforma (Annexure I).

Outcome variables

The comparison was done between cases and controls for the presence of risk factors.

Statistical analysis

The data obtained was coded in Microsoft Excel spread sheet (Annexure II). Categorical data was expressed in terms of rates, ratios and percentages. Chi-square test was used to find the association between the variables. The continuous data was expressed as mean ± standard deviation and the analysis was done using unpaired 't' test. A 'p' value of less than or equal to 0.05 was considered as statistically significant.

IV. Results

The present study was conducted in the department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Belgaum during the period of September 2012 to August 2013 on a total of 300 women.

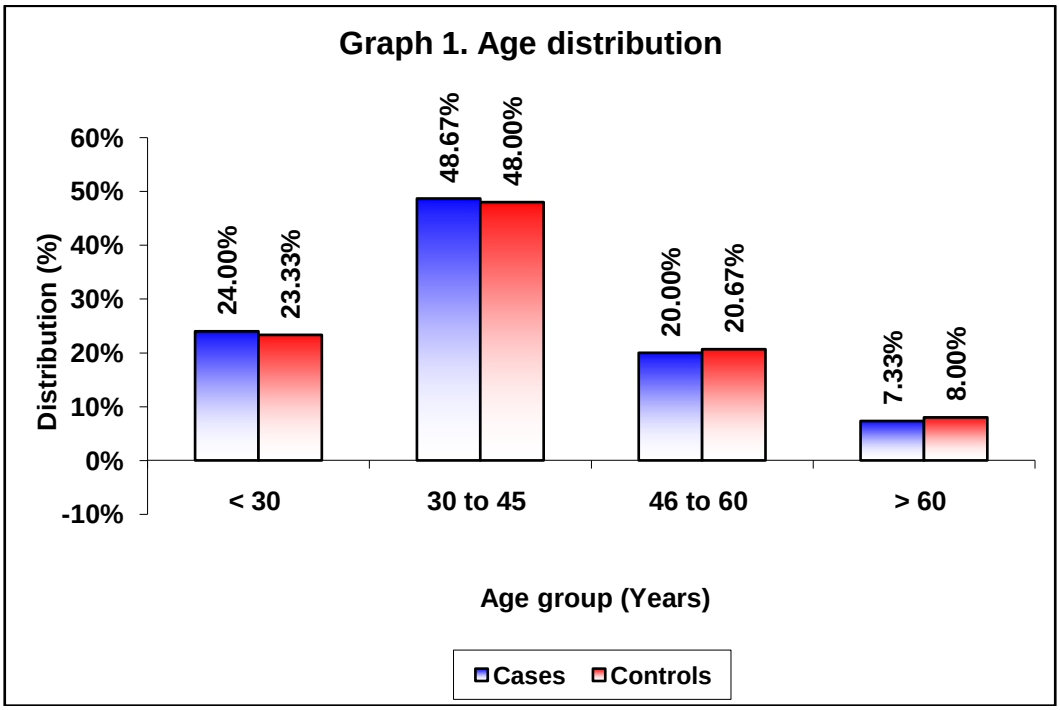
A total of 150 women who presented with ovarian tumor during past three years were grouped as cases and compared with 150 age, parity and use of OCP matched women with intact ovary with or without hysterectomy were grouped as controls.

The data obtained was coded and entered into the Microsoft Excel spreadsheet. The data was analysed and the final results and observations were tabulated as below.

Table 1. Age distribution

Age group (Years)	Cases (n=190)		Controls (n=190)	
	Frequency	Percent	Frequency	Percent
< 30	36	24.00	35	23.33
30 to 45	73	48.67	72	48.00
46 to 60	30	20.00	31	20.67
> 60	11	7.33	12	8.00
Total	**150**	**100.00**	**150**	**100.00**

p=0.994



In the present study most of the women in both the groups were aged 30 to 45 years (38.42% cases and 37.89% controls). The age distribution of the women in both the groups was comparable (p=0.994)

Table 2. Mean age

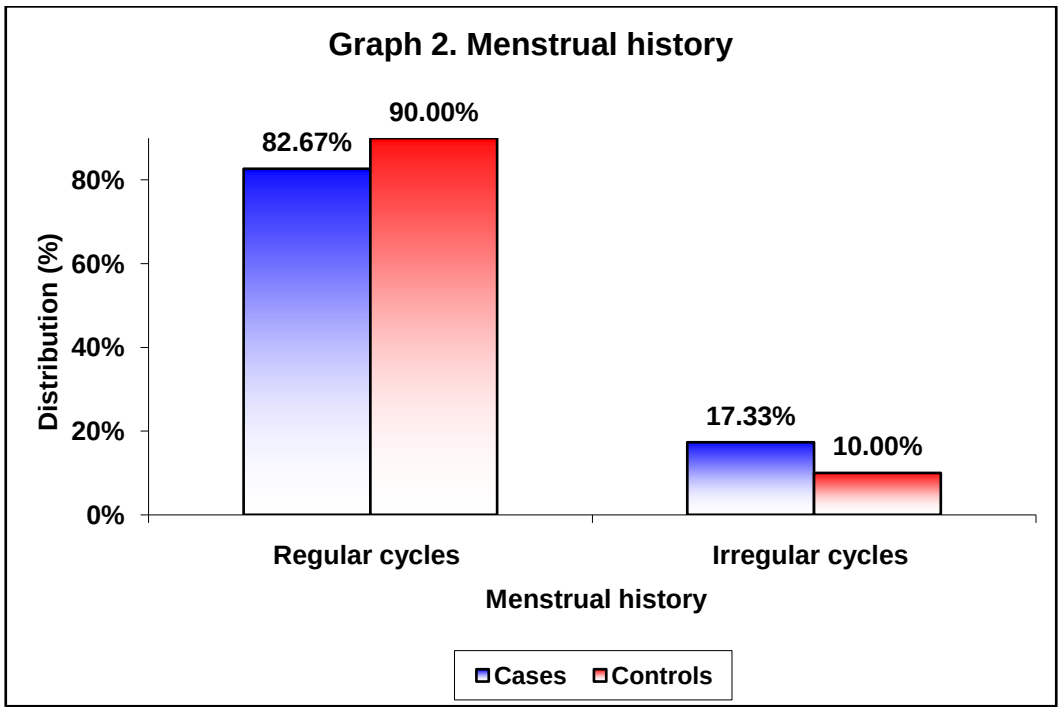
	Cases (n=150)		Controls (n=150)		p value
	Frequency	**Percent**	**Frequency**	**Percent**	
Mean age (Years)	38.70	13.35	40.11	13.41	0.340

In this study the mean age among the women who belonged cases was 38.70 ± 13.35 years compared to 40.11 ± 13.41 years.

Table 3. Menstrual history

Cycles	Cases (n=150)		Controls (n=150)	
	Frequency	**Percent**	**Frequency**	**Percent**
Regular	124	82.67	135	90.00
Irregular	26	17.33	15	10.00
Total	**150**	**100.00**	**150**	**100.00**

p=0.064

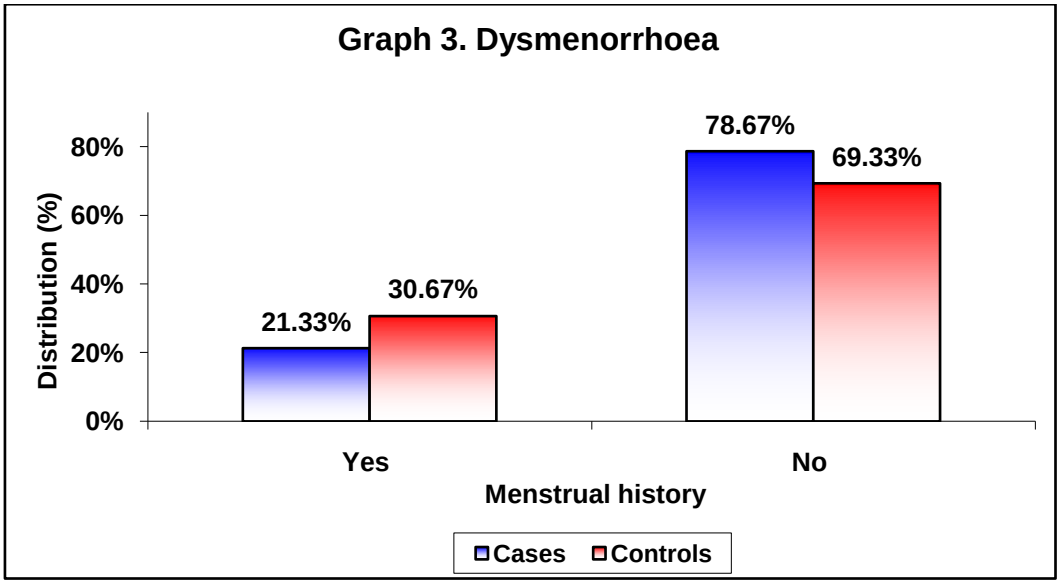


In the present study menstrual history irregular cycles was noted among 17.33% of the women in cases compared to 10% in control group. However this difference was statistically not significant (p=0.064).

Table 4. Dysmenorrhoea

Dysmenorrhoea	Cases (n=150)		Controls (n=150)	
	Frequency	**Percent**	**Frequency**	**Percent**
Yes	32	21.33	46	30.67
No	118	78.67	104	69.33
Total	**150**	**100.00**	**150**	**100.00**

p=0.065

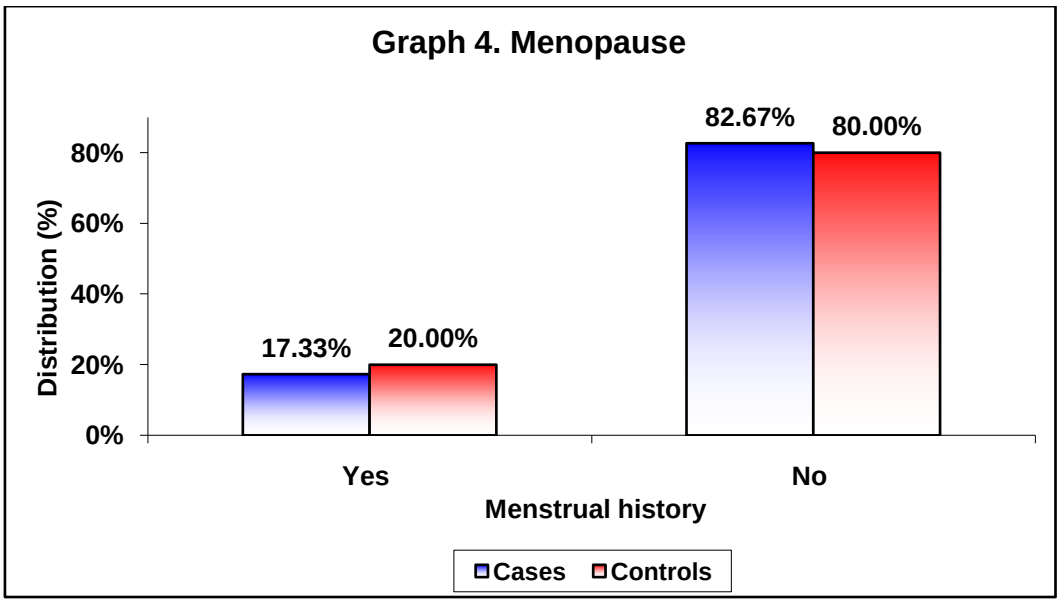


In this study, history of dysmenorrhoea was noted in 21.33% of the women in cases and 30.67% of the women among controls. However the differences was statistically not significant (p=0.065).

Table 5. Menopause

Menopause	Cases (n=150)		Controls (n=150)	
	Frequency	Percent	Frequency	Percent
Yes	26	17.33	30	20.00
No	124	82.67	120	80.00
Total	**150**	**100.00**	**150**	**100.00**

p=0.553

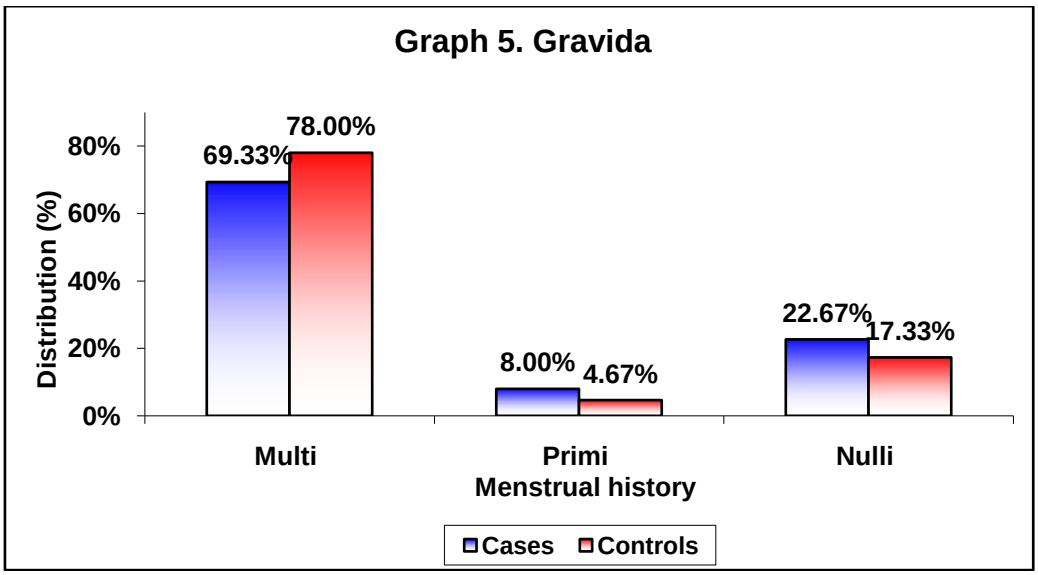


In the present study, history of menopause was reported by 17.33% of the women in cases compared to 20% of the women in control group and this difference was statistically not significant (p=0.553).

Table 6. Gravida

Gravida	Cases (n=150)		Controls (n=150)	
	Frequency	Percent	Frequency	Percent
Multi	104	69.33	117	78.00
Primi	12	8.00	7	4.67
Nulli	34	22.67	26	17.33
Total	**150**	**100.00**	**150**	**100.00**

p=0.207

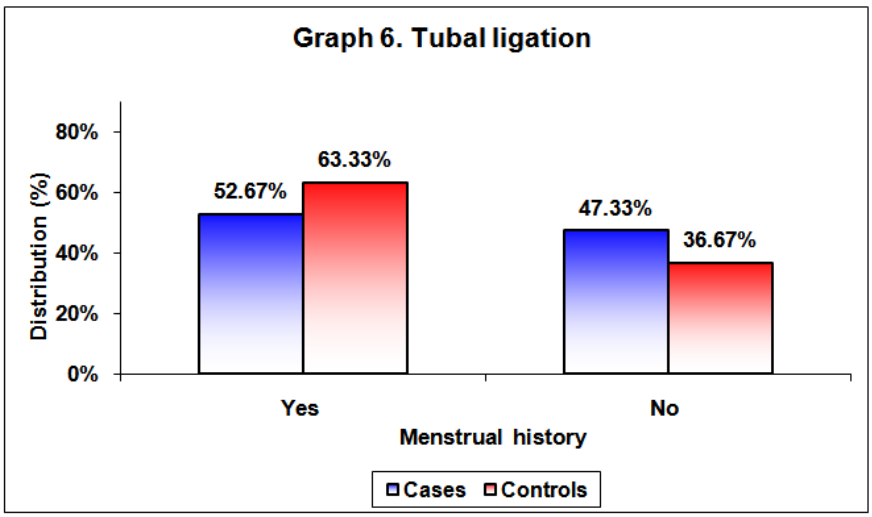


In the present study majority of the women in both the groups reported multi gravida (69.33% in cases and 78% in controls; p=0.207).

Table 7. Tubal ligation

Tubal ligation	Cases (n=150)		Controls (n=150)	
	Frequency	Percent	Frequency	Percent
Yes	79	52.67	95	63.33
No	71	47.33	55	36.67
Total	**150**	**100.00**	**150**	**100.00**

p=0.061



In this study the history of tubal ligation was noted in 52.67% of the women in cases group compared to 63.33% in control group. However the difference was statistically not significant (p=0.061).

Table 8. Histopathological pattern in cases

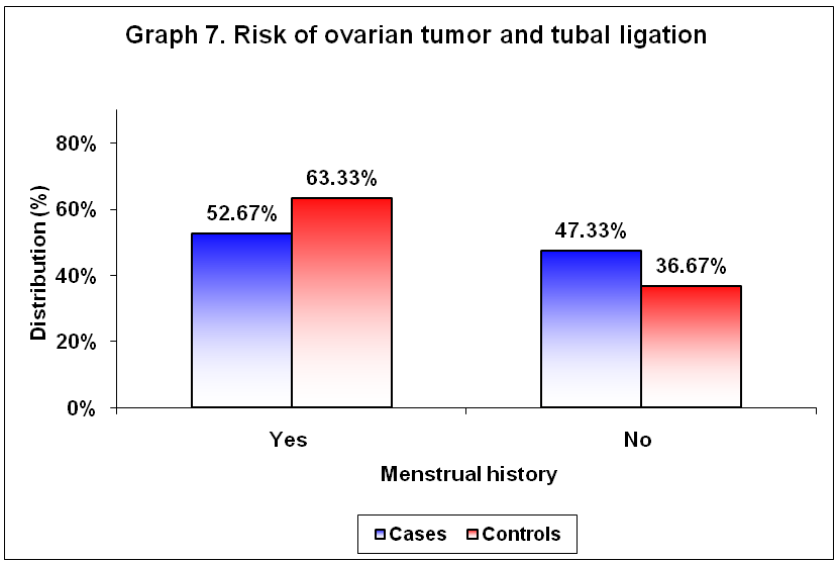
Lesions	Cases (n=150)	
	Frequency	Percent
Simple cyst	48	32.00
Mucinous cystadenoma	18	12.00
Serous cystadenoma	17	11.33
Simple serous cystadenoma	11	7.33
Papillary serous cystadenoma	9	6.00
Serous cystadenocarcinoma	7	4.67
Mucinous cystadenoma	5	3.33
Haemorrhagic cyst	4	2.67
Dernoid Cyst	3	2.00
Endometriotic cyst	3	2.00
Clear cell carcinoma	2	1.33
Haemorrgagic corpus luteal cyst	2	1.33
Corpus leuteal cyst	2	1.33
Simple ovarian cyst	2	1.33
Clear cyst	2	1.33
Mixed germ cell tumour	2	1.33
Ovarian tumor	1	0.67
Papillary adenocarcinoma	1	0.67
Haemorrgagic ovarian cyst	1	0.67
Right Chocolate Cyst	1	0.67
Benign Cystic Teratoma	1	0.67
Benign Serous cystadenoma	1	0.67
Cystadenoma	1	0.67
Cystadenocarcinoma	1	0.67
Serous mucinous cystadenoma	1	0.67
Functional cyst	1	0.67
Endometroid adenocarcinoma	1	0.67
Soft tissue tumour	1	0.67
Undifferenciated Carcinoma	1	0.67
Total	**150**	**100.00**

In the present study the histopathological findings revealed most of the women with simple cyst (32%) followed by mucinous cystadenoma (12%). The other findings are as shown in table 8.

Table 9. Risk of ovarian tumor and tubal ligation

Tubal ligation	Cases (n=150)		Controls (n=150)	
	Frequency	Percent	Frequency	Percent
Yes	79	52.67	95	63.33
No	71	47.33	55	36.67
Total	**150**	**100.00**	**150**	**100.00**

Odds Ratio – 0.644; 95% CI – 0.406 to 1.022; z= 1.868; p=0.061



In this study 52.67% of the women among the cases had history of tubal ligation compared to 63.33% of the women in controls. The Odds ratio was found to be 0.644 suggestive of exposure associated with lower odds of outcome.

V. Discussion

Gynecological surgeries including tubal ligation and hysterectomy may alter ovarian cancer risk by protecting the ovary from ascending carcinogens or damaging the utero-ovarian artery altering hormonal function. In addition, tubal ligation may increase immunity against the surface glycoprotein human mucin 1 (MUC1. While tubal ligation and hysterectomy generally have been found to be inversely associated with ovarian cancer, effect estimates vary between studies and little is known about potential effect modifiers of these associations. Hence this research was intended to investigate the relation of ovarian cancer to tubal ligation and to assess association between incidence of ovarian tumour and tubal ligation.[6]

This retrospective case control study was conducted under the Department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Belgaum from September 2012 to August 2013. A total of 300 women that is, 150 women each who presented with ovarian tumor during past three years were grouped as cases and age, parity and use of OCP matched women with intact ovary with or without hysterectomy were grouped as controls.[7]

In the present study 38.42% of the women in cases and 37.89% in controls were aged 30 to 45 years. The mean age among the women with cases was 38.70 ± 13.35 years and in controls it was found to be 40.11 ± 13.41 years. However the age distribution and mean age of the women in cases and control groups were found to be comparable ($p>0.050$).[8]

In the present study with regard to obstetric history, history of irregular cycles, dysmenorrhoea and menopause were noted among 17.33%, 21.33% and 17.33% of the women in cases compared to 10%, 30.67% and 20% of the women in control group respectively. The comparison showed no statistically significant difference ($p>0.050$). Majority of the women in both the groups reported multi gravida (69.33% in cases and 78% in controls; $p=0.207$) and the obstetric index between cases and controls was comparable. History of tubal ligation was reported by in 52.67% of the women under the cases group compared to 63.33% in control group but the difference was statistically not significant ($p=0.061$).[9]

These findings suggest that, the distribution of women in cases and control groups was comparable with respect to demographic characteristics, obstetric history and surgical history of tubal ligation. The commonest histopathological finding was simple cyst (32%) followed by mucinous cystadenoma (12%).

In this study slightly higher number of women who belonged to controls had tubal ligation that is 63.33% compared to 52.67% of the women among the cases. After the adjustment of age, obstetric and surgical history of tubal ligation, the Odds ratio was found to be 0.644 (95% CI – 0.406 to 1.022; z= 1.868; $p=0.061$) which indicated the exposure of tubal ligation was associated with lower odds of ovarian cancer. Observational epidemiologic evidence strongly suggests that there is a decreased risk of ovarian cancer among women who have had a tubal ligation or hysterectomy.[10]

VI. Conclusion

In this study 63.33% of the women who belonged to controls had tubal ligation compared to 52.67% of the women among the cases. The Odds ratio was found to be 0.644 (95% CI – 0.406 to 1.022; z= 1.868; $p=0.061$) indicating that the tubal ligation was associated with lower odds of development of ovarian tumor. Based on these findings it may be concluded that, there is limited relation between risk of ovarian tumor and tubal ligation as the difference was statistically not significant.

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