



## UNVEILING THE CHARACTERISTICS OF PREVALENCE, DEMOGRAPHIC FACTORS AND HISTOPATHOLOGICAL PATTERN OF BENIGN OVARIAN CYSTS (>6CM) IN WOMEN AGED 20-60 YEARS- A RETROSPECTIVE ANALYSIS IN UNION TERRITORY.

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### ABSTRACT

**Background-** Benign ovarian cysts are indeed common in women of reproductive age and can be asymptomatic, often discovered incidentally during physical examination or imaging tests. However, if left untreated, they can lead to gynaecological emergencies, such as ovarian torsion, Rupture of cyst and Haemorrhage. Prompt diagnosis and management ensure the best possible outcomes. **Aim-** This Retrospective study aimed to analyze the characteristics of Prevalence, Demographic factors and Histopathological pattern of Benign Ovarian cysts(>6 cm) in women aged 20-60 years. **Materials And Methods-** This Retrospective study was conducted in Department of Obstetrics and Gynaecology in Sri Venkateshwara Medical college and Hospital and Research centre, Puducherry over a period of 6 months from September, 2024 to February, 2025, where only Benign ovarian cysts as per Histopathological findings were included. **Results-** Our study of 20 ovarian cyst cases found that 60% were in the reproductive age group, with 40% aged 20-30. Common presentations included ovarian torsion (35%), abdominal pain (25%), and menstrual irregularities (50%). Associated comorbidities were diabetes (20%), hypertension (10%), and hypothyroidism (10%). Treatment consisted of elective (60%) and emergency (40%) procedures, utilizing laparoscopy (45%) and laparotomy (55%). Histopathological examination revealed torsion (35%), follicular cysts (25%), and serous cystadenoma (20%) as frequent findings. **Conclusion-** Our study highlights the diverse characteristics and management of ovarian cysts, emphasizing the importance of tailored approaches considering age, presentation, comorbidities, and histopathology to optimize patient outcomes.

**KEYWORDS :** Benign Ovarian cyst, Torsion, Haemorrhage, CA 125, Ovarian Hyper stimulation syndrome (OHSS), Risk of Malignancy Index (RMI), Oral contraceptive pills(OCPs), Serous Cystadenoma.

### INTRODUCTION

Benign ovarian cysts may occur as simple or complex fluid-filled sac-like structures, often diagnosed incidentally on imaging techniques and clinical examination (>6 cm). The lifetime risk of a woman developing a benign ovarian cyst is 20%, whereas 7.8% of asymptomatic cysts develop in women aged 24-40 years, and 2.5% of simple unilocular cysts occur in postmenopausal women.<sup>1/2/3</sup> On transvaginal sonography, 46.7% of adnexal masses are diagnosed incidentally in premenopausal and postmenopausal women, with spontaneous resolution of 63.2% on subsequent sonography.<sup>2</sup> Ovarian cysts may occur at any age, more frequently due to excessive endogenous hormone production in reproductive and menarchal ages, ranging from physiologically normal cysts (follicular cysts/corpus luteal cysts) to malignant lesions. Age is considered the most significant independent risk factor for ovarian cysts due to their higher propensity for malignancy at extremes of age; hence, detailed evaluation and prompt treatment are required for all age groups.<sup>3</sup>

The predisposing factors for ovarian cysts include smoking, using drugs like gonadotropins/ovulation-inducing agents in infertility treatment (due to OHSS), tubal ligation (leading to functional cysts), pregnancy-associated corpus luteal cysts due to trans placental transfer effects of maternal gonadotropins and elevated hCG levels, hypothyroidism, and a positive family history.<sup>4</sup> The most common type of benign ovarian cyst is serous cystadenoma, occurring in women aged 30-50 years. Life-threatening gynaecological emergency conditions like ovarian torsion, cyst rupture, and hemorrhage may occur in untreated cases of ovarian cysts.<sup>5</sup>

Therefore, this study aimed to analyze the characteristics of the prevalence, demographic factors, and histopathological pattern of benign ovarian cysts (>6 cm) in women aged 20-60 years.

### MATERIALS AND METHODS

This Retrospective study was conducted in Department of Obstetrics and Gynaecology in Sri Venkateshwara Medical college and Hospital and Research centre, Puducherry over a period of 6 months from September, 2024 to February, 2025, where only Benign ovarian cysts as per Histopathological findings were included.

#### Inclusion Criteria

For evaluating Demographic factors, the following parameters were considered.

- Age
- Parity
- Marital status
- Body Mass Index (kg/m<sup>2</sup>)
- Menstrual status

Clinical presentations were evaluated by using following considerations.

- Asymptomatic
- **Symptoms-** Menstrual irregularities ( Amenorrhea/ Abnormal vaginal bleeding), Abdominal pain, Nausea, Vomiting,
- **Infertility-** Type of treatment (Medical/ surgical- Laparoscopic/Laparotomy)
- Cyst /Mass(>6cm) diagnosed by using Ultrasound (Trans abdominal/ Trans vaginal with Doppler studies), CT/ MRI abdomen.
- Recurrent Benign ovarian cysts (>6cm).
- Significant past Medical and Surgical disorders related to Thyroid / Gastrointestinal/ Bone/ Renal/ Cardiovascular/ Central nervous system.
- **Tumor Markers-** CA 125, CA 19-9, Carcinoembryonic antigen(CEA), BHCG, Alpha fetoprotein (AFP), LDH.
- Pregnancy associated with Benign ovarian cysts (>6cm).
- Gynaecological Emergency conditions like Ovarian Torsion/Ruptured Cyst/ Haemorrhage.
- **Surgical interventions-** Elective /Emergency and Laparoscopic/ Laparotomy.

- Histopathological findings were grouped into 5 classes namely, Functional cysts, Epithelial, Germ cell, Sex cord stromal tumors and Mixed tumors.

#### Exclusion Criteria

- Ovarian cyst size <6cm.
- Histopathologically diagnosed Borderline and Malignant tumors.

#### Statistical Analysis

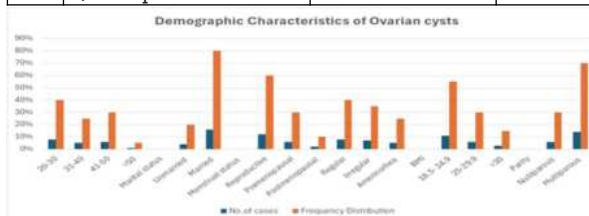
In our study, data were analysed by using SPSS Statistics. Appropriate Categorical variables were expressed by chi-squared test and Continuous variables were expressed as Mean  $\pm$  Standard deviation.  $P < 0.05$  was considered to be statistically significant.

#### RESULTS

In our study, out of 20 cases of Ovarian cyst, 40% cases belongs to 20-30 years age group ( $n=8$ ), 25% belongs to 30-40 years age group ( $n=5$ ), 30% of cases belongs to 40-50 years age ( $n=6$ ) and 5% of cases belongs to 50-60 years ( $n=1$ ). Based on BMI, Parity, Menstrual and Marital status, cases were distributed as Table 1. Of these cases, 60% ( $n=12$ ) of cases belongs to Reproductive age group, 10% belongs to Postmenopausal age group and 30% belongs to Premenopausal age group. Also 8 cases had regular menses(40%), 7 cases had irregular cycles(35%) and 5 cases had Amenorrhea (25%). Out of 20 cases, 20% cases were Unmarried( $n=4$ ) and 80% cases were Married( $n=16$ ). According to BMI, 55% of cases belongs to 18.5- 24.9 ( $n=11$ ), 30% of cases belongs to 25-29.9 ( $n=6$ ) and 15% of cases belongs to  $>30$  ( $n=3$ ).

**Table 1. Demographic Characteristics Of Ovarian Cysts.**

| S.no | Demographic characteristics | No. of cases (n= 20 ) | %   |
|------|-----------------------------|-----------------------|-----|
| 1.   | Age ( in years)             |                       |     |
|      | a. 20-30                    | 08                    | 40% |
|      | b. 30-40                    | 05                    | 25% |
|      | c. 40-50                    | 06                    | 30% |
|      | d. 50-60                    | 01                    | 5%  |
| 2.   | Menstrual status-           |                       |     |
|      | 1) Reproductive group       | 12                    | 60% |
|      | 2) Premenopausal            | 06                    | 30% |
|      | 3) Postmenopausal           | 02                    | 10% |
|      | a. Regular                  | 08                    | 40% |
|      | b. Irregular                | 07                    | 35% |
|      | c. Amenorrhea               | 05                    | 25% |
| 3    | Marital status              |                       |     |
|      | a) Unmarried                | 04                    | 20% |
|      | b) Married                  | 16                    | 80% |
| 4    | BMI                         |                       |     |
|      | a) 18.5-24.9                | 11                    | 55% |
|      | b) 25.29.9                  | 06                    | 30% |
|      | c) $>30$                    | 03                    | 15% |
| 5    | Parity                      |                       |     |
|      | a) Nulliparous              | 06                    | 30% |
|      | b) Multiparous              | 14                    | 70% |

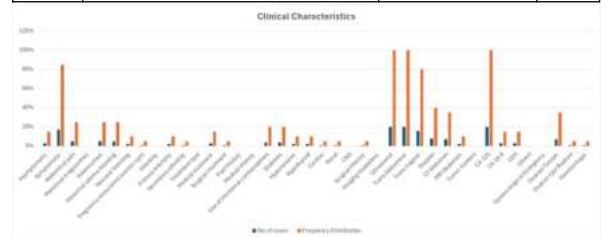


**Figure 1.1. Demographic factors of Ovarian cysts.**

**Table 2. Clinical Characteristics Of Ovarian Cysts.**

| S.no | Clinical parameters | No. of cases (n= 20 ) | % |
|------|---------------------|-----------------------|---|
|------|---------------------|-----------------------|---|

|   |                                    |    |      |
|---|------------------------------------|----|------|
| 1 | Asymptomatic                       | 3  | 15%  |
| 2 | Symptoms                           |    |      |
|   | a) Abdominal pain                  | 17 | 85%  |
|   | b) Menstrual irregularities        | 05 | 25%  |
|   | Amenorrhea                         | 05 | 25%  |
|   | Abnormal vaginal bleeding          | 05 | 25%  |
|   | c) Nausea / Vomiting               | 02 | 10%  |
| 3 | Infertility                        |    |      |
|   | a) Primary infertility             | 02 | 10%  |
|   | b) Secondary infertility           | 01 | 5%   |
|   | c) Treatment type-                 |    |      |
|   | Medical                            | 03 | 15%  |
|   | Surgical                           | 01 | 5%   |
| 4 | Pregnancy associated Ovarian cysts | 01 | 5%   |
| 5 | Past History                       |    |      |
|   | a) Medical disorders               |    |      |
|   | Use of Hormonal contraceptives     | 04 | 20%  |
|   | Diabetes                           | 4  | 20%  |
|   | Hypertension                       | 2  | 10%  |
|   | Hypothyroid                        | 2  | 10%  |
|   | Renal                              | 1  | 5%   |
|   | Cardiac                            | 1  | 5%   |
|   | CNS                                | 0  | 0    |
|   | b) Surgical history                | 1  | 5%   |
| 6 | Imaging modalities                 |    |      |
|   | I. Ultrasound-                     |    |      |
|   | Trans abdominal                    | 20 | 100% |
|   | Transvaginal                       | 20 | 100% |
|   | Doppler studies                    | 16 | 80%  |
|   | II. CT abdomen                     | 8  | 40%  |
|   | III. MRI abdomen                   | 7  | 35%  |
|   |                                    | 2  | 10%  |
| 7 | Tumor markers                      |    |      |
|   | a) CA 125                          | 20 | 100% |
|   | b) Ca 19-9                         | 3  | 15%  |
|   | c) LDH                             | 3  | 15%  |
|   | d) Others                          | 0  | 0    |
| 8 | Gynaecological Emergency           |    |      |
|   | A) Ovarian torsion                 | 07 | 35%  |
|   | B) Ruptured Ovarian cyst           | 01 | 5%   |
|   | C) Haemorrhage                     | 01 | 5%   |



**Figure 2.1. Clinical characteristics of ovarian cysts.**

Out of 20 cases, 7 cases were presented with ovarian torsion, 1 case presented as ruptured Ovarian cyst with clinical features of Abdominal pain (25%), Nausea and vomiting ( 10%). Asymptomatic presentations were reported to be 15% ( $n=3$ ), Menstrual irregularities were reported as Amenorrhea (25%) and Abnormal uterine bleeding (25%). Infertility was reported in 3 cases, whereas 2 cases belongs to Primary Infertility group(10%) and 1 case belongs to secondary infertility group(5%). In our study period, only one case was reported during pregnancy and 20% of cases used Hormonal contraceptives( $n=4$ ). The associated co-morbidities were reported as 20% of Diabetes( $n=4$ ), 10% of cases with Hypertension ( $n=2$ ), 10% of cases had Hypothyroid( $n=2$ ), 5% had CKD ( $n=1$ ), 5% had Cardiac disease (CAD) and only one case reported after Abdominal hysterectomy (5%). Almost all cases had undergone Ultrasound Abdomen, both transabdominal (100%) and transvaginally (80%) and CT Abdomen was performed in 7 cases (35%) and MRI Abdomen

was performed in 2 cases(10%).Tumor markers like CA 125 was performed in all 20 cases, CA 19-9 in 3 cases.

Table 3. Surgical Approaches for Ovarian cyst

| S.no | Surgical intervention                                    | No.of cases (n=20) | %                 |
|------|----------------------------------------------------------|--------------------|-------------------|
| 1    | a) Elective<br>b) Emergency                              | 12<br>08           | 60%<br>40%        |
| 2    | c) Laparoscopic approach<br>d) Laparotomy                | 09<br>11           | 45%<br>55%        |
| 3    | Side predominance<br>1. Right<br>2. Left<br>3. Bilateral | 10<br>7<br>3       | 50%<br>35%<br>15% |

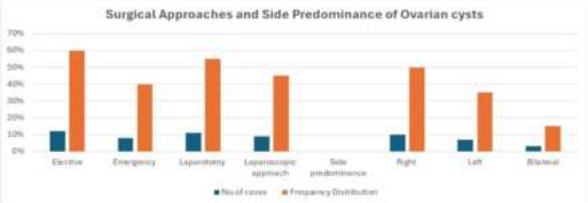


Figure 3.1. Surgical interventions for Ovarian cysts

Out of 20 cases, 12 cases were managed by Elective procedure (60%) and 8 cases were surgically managed by Emergency procedure. Laparoscopic approach was performed for 9 cases(45%) and Laparotomy was performed for 11 cases(55%) as Table 3. Side Predominance of Ovarian cysts were 50% Right side(n=10), 35% Left side (n=7), 15% Bilateral (n=3).

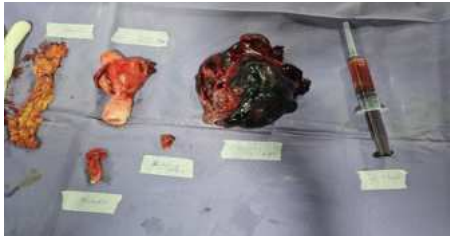


Figure 3.2. Specimen showing Total Abdominal Hysterectomy with Bilateral Salpingo-oophorectomy done for Right Ovarian torsion in Post Menopausal woman

In our study, HPE findings of 20 cases were reported as follows: 7 cases belongs to Torsion features( 35%), 5 cases were Follicular variety(25%), 4 cases were Serous Cystadenoma (20%) and 1 cases reported as Mucinous cystadenoma (5%). Adenofibroma (n=1), Germ cell tumor (n=1) and Sex cord stromal tumor (n=1) were also reported as Table 4. Out of 7 torsion cases, Detorsion was performed for 4 cases and Oophorectomy was performed for 3 cases.

Table 4. Histopathological findings of Ovarian cysts.

| S.no | Histopathological findings                                            | No.of cases( n=20) | %         |
|------|-----------------------------------------------------------------------|--------------------|-----------|
| 1    | Functional Cyst                                                       | 5                  | 25%       |
| 2    | Epithelial tumors<br>1. Serous cystadenoma<br>2. Mucinous cystadenoma | 4<br>1<br>5        | 20%<br>5% |
| 3    | Germ cell tumors                                                      | 01                 | 5%        |
| 4    | Sex cord stromal tumors                                               | 01                 | 5%        |
| 5    | Adenofibroma                                                          | 1                  | 5%        |
| 6    | Torsion                                                               | 7                  | 35%       |

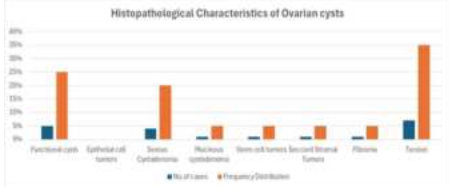


Figure 4.1. Histopathological findings of Ovarian cysts.

DISCUSSION

Ovarian cysts are a common gynaecological concern affecting women across all age groups, with varying characteristics and causes throughout their reproductive lives. The majority of these cysts are benign and functional, particularly in premenopausal women. Functional ovarian cysts are most prevalent in women of reproductive age due to normal ovulation processes. According to ACOG, 2021, up to 20% of premenopausal women may have asymptomatic ovarian cysts at any given time, often during the luteal phase of their menstrual cycle.<sup>6</sup> In contrast, ovarian cysts in postmenopausal women, although less common, are more concerning due to a higher risk of malignancy. According to Berek & Novak (2020) 5-10% of ovarian cysts in postmenopausal women can be malignant, highlighting the importance of thorough evaluation, including tumor markers and imaging studies.<sup>7</sup>

Our study reported that the majority of women affected were aged 20-50 years, with 40% falling within the 20-30 age group. In our study, 60% of cases belongs to Reproductive age group which was mainly due to ovulation related functional cysts. Our results were consistent with results of Bandi et al., Bhagde AD et al., Kant RH et al studies revealed higher prevalence of Benign Ovarian cysts in Reproductive-age women.<sup>8,9,10</sup>

Irregular cycles and amenorrhea increase ovarian cyst risk due to anovulation. Our study found that 60% of cases had menstrual disturbances often associated with PCOS-related ovulatory dysfunction and reported Menstrual patterns were 40% regular, 35% irregular, 25% amenorrhea consistent with reports of Teede et al.study.<sup>11</sup> Also our study revealed balanced BMI distribution with lower obesity rates, despite obesity's known link to irregular cycles. As per Barrett et al study, Obesity (BMI ≥25) increases ovarian cyst risk due to insulin resistance and hyperinsulinemia. Conditions like diabetes, hypothyroidism, and PCOS can exacerbate cyst pathology.<sup>12</sup>

Our study's BMI distribution was 55%( Normal weight), 30%( Overweight), 15% (Obese). This differs from national trends, where Indian reproductive-age women often have higher obesity rates (~50%). Notably, PCOS studies in India typically report a mean BMI of 27 kg/m<sup>2</sup>, with 75% of participants being overweight/obese. <sup>13</sup> The lower obesity rate in our study may have contributed to fewer cases of menstrual irregularities and metabolic issues. In our study, 70% of women were multiparous and 80% were married. Similarly, a Abduljabbar et al., study reported an average parity of 2.2 and a married status in 67% of patients. <sup>14</sup> These demographic trends suggest that parity and marriage status may be associated with the prevalence of benign ovarian cysts, although the literature does not consistently establish a causal relationship.

Ovarian cysts can manifest with diverse symptoms, from being asymptomatic to causing severe abdominal pain due to complications like torsion or rupture. According to a retrospective study by Mashiaich et al., ovarian torsion occurs in approximately 3-16% of adnexal masses, with a higher incidence on the right side, possibly due to anatomical factors.<sup>15</sup> Our study revealed various comorbidities associated with ovarian cysts, including Type 2 Diabetes (20%), Hypertension (10%), Hypothyroidism (10%), Chronic Kidney Disease (5%), Coronary Artery Disease (5%), and post-hysterectomy status (5%). These comorbidities, particularly in PCOS patients, are linked to shared metabolic and hormonal disruptions. Integrated screening for fasting glucose, lipid profile, TSH, and blood pressure can enable early detection

and management, highlighting the importance of comprehensive care for women with ovarian cysts.

In our study, 35% of cases involved torsion, reflecting the high-risk nature of cases seen in tertiary care settings. The majority (85%) of patients were symptomatic, primarily presenting with abdominal pain (85%) and menstrual irregularities (25%), while 15% were asymptomatic. These findings were consistent with results of Abduljabbar et al study (58%) and Kaur et al study (39%).<sup>13, 14</sup> The higher incidence of pain in our study may be attributed to the tertiary hospital setting, which often sees more complex cases.

As per Society of Radiologists in Ultrasound consensus statement, TVUS is the preferred initial imaging for ovarian cysts due to its high sensitivity (80-90%) for detecting cysts <5 cm.<sup>16</sup> CT and MRI are used for complex cases, while CA-125 testing follows best practices, especially in postmenopausal women and complex cysts according to Moore et al. study.<sup>17</sup>

According to Li C et al., study reports endometriomas and PCOS-related cysts, contribute to subfertility in up to 30% of cases.<sup>18</sup> Most cysts are benign and resolve during pregnancy, but large or symptomatic cysts may require surgical intervention in the second trimester. In our study period, only one case was reported during pregnancy and cystectomy was performed during Caesarean section.

The choice between laparoscopy and laparotomy for ovarian cysts depends on cyst size, complexity, and emergency status. As per Thakur et al study, Laparoscopy is preferred for its minimally invasive nature and faster recovery, while laparotomy may be necessary for larger cysts or complications.<sup>19</sup> Elective surgery is recommended for symptomatic or persistent cysts >5 cm. In our study, 60% of cases were surgically managed by Elective procedure and 45% of cases were managed by Laparoscopic intervention whereas Laparotomy was performed in 55% of cases due to its acute presentation. Postoperative period was uneventful in all cases.

Our study found a distribution of ovarian cysts as 50% on the right side, 35% on the left side, and 15% bilateral. This pattern is consistent with Abduljabbar et al study, which also showed a right-sided predominance (~63%).<sup>14</sup>

The histological findings of our study revealed the prevalence of Functional cysts (25%) premenopausal women, Epithelial tumors like Serous cystadenoma (20%), Mucinous cystadenoma (5%) in Reproductive-age women and Germ cell tumors (5%) and Stromal tumors (5%) were less common in Union territory. Although, Torsion (35%) contributed to majority of gynaecological emergencies and these results were similar to Kurman et al, Kaur et al studies and WHO Classification of ovarian cysts.<sup>13, 20</sup>

## CONCLUSION

Our study reveals that ovarian cyst occurrence in women is largely influenced by demographic factors, specifically Reproductive age, Hormonal imbalances and irregular periods and High BMI and also emphasizes the importance of awareness, early detection, and tailored management strategies for women in high-risk groups.

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