



## UNCOVERING HIDDEN CAUSES OF FEMALE INFERTILITY THROUGH DIAGNOSTIC HYSTERO-LAPAROSCOPY: A RETROSPECTIVE STUDY

### Obstetrics & Gynecology

**Dr. Patel Mit  
Alpeshkumar\***

Department of Obstetrics and Gynecology, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India. \*Corresponding Author

**Dr. Prof Madhu  
Jain**

Prof and Head, Department of Obstetrics and Gynecology, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India.

### ABSTRACT

**Introduction:** Hystero-laparoscopy is a diagnostic and therapeutic procedure for evaluating female infertility. By integrating hysteroscopy and laparoscopy, it provides a thorough examination of uterine, ovarian, and tubal factors, facilitating accurate diagnosis and management of infertility-related conditions.

**Aims and Objectives:** **Aim:** To evaluate the role of diagnostic hystero-laparoscopy in identifying pelvic and uterine pathologies among women presenting with infertility.

#### Objectives

1. To assess the spectrum of uterine, tubal, ovarian, and pelvic abnormalities detected by diagnostic hystero-laparoscopy in infertile women.
2. To determine the diagnostic value of hystero-laparoscopy in the comprehensive evaluation of female infertility.

**Methodology:** A retrospective observational study was conducted at Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, over two years. The study included 50 women aged 20–40 years diagnosed with primary or secondary infertility. Exclusion criteria comprised male factor infertility and contraindications for laparoscopy. Data were collected from medical records and classified based on hysteroscopy, laparoscopy, and chromopertubation findings. **Statistical Analysis:** Quantitative data were analyzed using independent t-tests, while categorical variables were represented as frequencies and percentages. Statistical significance was set at a p-value <0.05, using SPSS (version 25.0). **Results:** Of the participants, 56% had primary infertility, and 44% had secondary infertility. Women with secondary infertility were older (mean age 31.32 ± 4.26 years) compared to those with primary infertility (mean age 28.32 ± 4.05 years, p=0.014). Tubal abnormalities were the most common findings, with chromopertubation revealing bilateral free spillage in 64% of cases. Conception rates were higher among women with secondary infertility (13.6%) compared to primary infertility (7.1%). **Conclusion:** Hystero-laparoscopy is a vital tool for infertility management, enabling the identification and treatment of reproductive abnormalities. Its dual diagnostic and therapeutic role significantly improves fertility outcomes.

### KEYWORDS

Hystero-laparoscopy, female infertility, tubal abnormalities, chromopertubation, diagnostic tool, therapeutic intervention.

#### INTRODUCTION:

Infertility is a global health concern that affects approximately 10-15% of couples of reproductive age. Defined as the inability to achieve a clinical pregnancy after 12 months of regular unprotected intercourse, infertility imposes significant psychological and social burdens on affected individuals. The causes of infertility are multifaceted, with female factors accounting for 40-50% of cases<sup>1</sup>. These factors include tubal abnormalities, uterine anomalies, ovarian dysfunction, and peritoneal adhesions.

Despite the advancements in imaging modalities such as ultrasonography and hysterosalpingography, many pelvic pathologies remain undetected through conventional diagnostic methods. Hystero-laparoscopy, an innovative technique combining hysteroscopy and laparoscopy, provides a minimally invasive approach to evaluating and treating infertility-related abnormalities. It enables the comprehensive assessment of uterine, ovarian, tubal, and peritoneal factors in a single procedure, often facilitating immediate therapeutic interventions<sup>2,3</sup>.

The significance of hystero-laparoscopy lies in its ability to improve diagnostic accuracy and optimize therapeutic outcomes. This study explores the role of diagnostic hystero-laparoscopy in managing female infertility, focusing on its diagnostic findings, therapeutic potential, and overall impact on conception rates.

#### Review Of Literature:

The application of hystero-laparoscopy in infertility management has been extensively studied. **Puri et al.**<sup>4</sup> emphasized its importance in detecting abnormalities that traditional imaging modalities fail to identify. **Nayak et al.**<sup>5</sup> and **Mishra et al.**<sup>1</sup> further highlighted its utility in diagnosing conditions such as polycystic ovary syndrome (PCOS), endometriosis, uterine fibroids, and tubal blockages.

Chromopertubation, performed during laparoscopy, plays a crucial role in assessing tubal patency. It provides real-time visualization of dye flow through the fallopian tubes, ensuring accurate diagnosis of tubal blockages<sup>6,7</sup>. Similarly, hysteroscopy aids in detecting intrauterine abnormalities such as polyps, adhesions, and septa, which are often missed during ultrasonographic evaluations<sup>8</sup>.

Combining these two modalities enhances diagnostic precision and therapeutic efficiency, reducing the time required for treatment and improving patient outcomes. Studies by **Mishra et al.**<sup>1</sup> and **Kabadi et al.**<sup>9</sup> underscore the dual diagnostic and therapeutic benefits of hystero-laparoscopy in managing infertility.

#### AIMS & OBJECTIVES:

##### Aim

To evaluate the role of diagnostic hystero-laparoscopy in identifying pelvic and uterine pathologies among women presenting with infertility.

##### Objectives

1. To assess the spectrum of uterine, tubal, ovarian, and pelvic abnormalities detected by diagnostic hystero-laparoscopy in infertile women.
2. To determine the diagnostic value of hystero-laparoscopy in the comprehensive evaluation of female infertility.

#### Methodology:

##### Study Design

This study follows a retrospective observational design.

##### Study Type

Hospital-based analysis of women undergoing diagnostic hystero-laparoscopy for infertility management.

##### Population

The study includes women aged 20-40 years diagnosed with primary or secondary infertility.

##### Sample Size

Fifty participants were included in the study over a two-year period. Inclusion and Exclusion Criteria

##### Inclusion Criteria:

- Women with infertility lasting more than 12 months.
- Patients with a normal hormonal profile.
- Absence of male factor infertility.

##### Exclusion Criteria:

- Patients with active pelvic infections.

- Cases with contraindications for laparoscopy.

**Data Collection Methods**

Data were collected retrospectively from hospital records. Demographic details, clinical findings, and surgical outcomes were documented.

**Procedure**

Hystero-laparoscopy was performed during the follicular phase of the menstrual cycle. The procedure involved evaluating the uterine cavity, ovarian morphology, and tubal patency using chromopertubation. Therapeutic interventions such as polypectomy, adhesiolysis, and ovarian drilling were performed when indicated.

**Data Analysis**

Data were analyzed using SPSS software (version 25.0). Student's t-tests compared means, and chi-square tests assessed categorical variables. Statistical significance was set at  $p < 0.05$ .

**OBSERVATIONS & RESULTS:**

**Demographic And Clinical Characteristics**

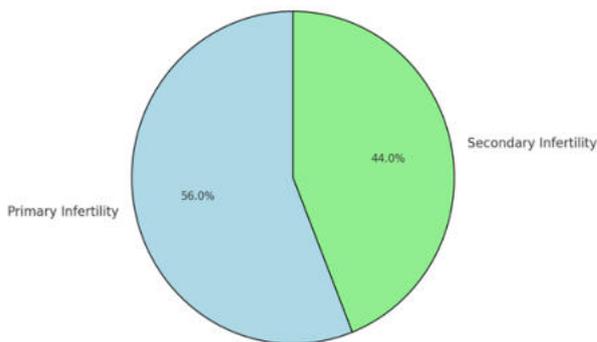
**Distribution According To Type Of Infertility**

**Table 1: Distribution According To Type Of Infertility**

Type of Infertility	Frequency	Percentage (%)	P- Value
Primary	28	56.0	0.396
Secondary	22	44.0	
Total	50	100.0	

**Interpretation:** The table shows the distribution of participants based on the type of infertility. Among the 50 women included in the study, 28 (56%) were diagnosed with primary infertility, and 22 (44%) had secondary infertility. The chi-square test yielded a p-value of 0.396, indicating that the difference in the proportions of primary and secondary infertility was not statistically significant. This suggests that both types of infertility were almost equally prevalent in the study population.

**Distribution of Infertility Types Among Participants**



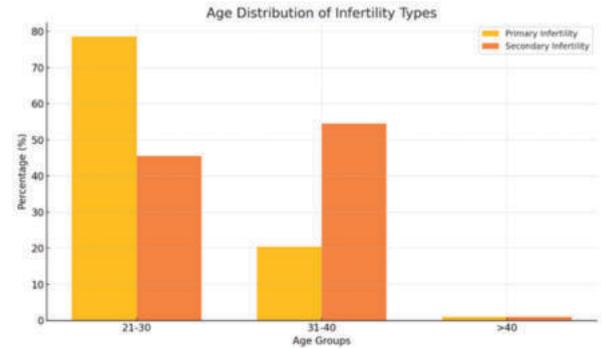
**Graph Interpretation:** The pie chart visually represents the distribution of infertility types among participants. Primary infertility forms a larger segment (56%), while secondary infertility accounts for 44%. The nearly proportional sizes of the segments illustrate the comparable prevalence of both conditions in the population, aligning with the statistical findings of no significant difference.

**Table 2: Distribution According To Age**

Age Group (Years)	Primary Infertility (%)	Secondary Infertility (%)	Total (%)
19-20	1 (3.6%)	0 (0.0%)	1 (2.0%)
21-30	22 (78.6%)	9 (40.9%)	31 (62.0%)
31-40	5 (17.9%)	12 (54.5%)	17 (34.0%)
>40	0 (0.0%)	1 (4.5%)	1 (2.0%)
Total	28 (100.0%)	22 (100.0%)	50 (100.0%)
Mean Age (Years)	28.32 ± 4.05	31.32 ± 4.26	
P- Value	0.014		

**Interpretation:** The table presents the distribution of participants by age group and type of infertility. The majority of women with primary infertility (78.6%) were in the 21-30 age group, while most secondary infertility cases (54.5%) were in the 31-40 age group. Only one case of secondary infertility was recorded above 40 years. The mean age of women with primary infertility was  $28.32 \pm 4.05$  years, significantly

lower than  $31.32 \pm 4.26$  years for secondary infertility ( $p$ -value = 0.014), indicating a statistically significant age difference.

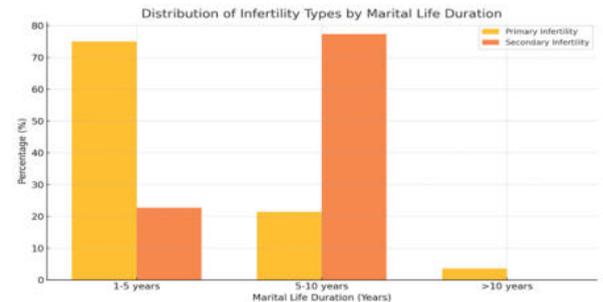


**Graph Interpretation:** The bar chart illustrates the age distribution for primary and secondary infertility. It highlights that primary infertility is predominantly seen in younger age groups (21-30 years), while secondary infertility is more prevalent in older age groups (31-40 years). The graphical trend underscores the significant age-related disparity between the two infertility types.

**Table 3: Distribution According To Marital Life**

Marital Life (Years)	Primary Infertility (%)	Secondary Infertility (%)	Total (%)
1-5	21 (75.0%)	5 (22.7%)	26 (52.0%)
5-10	6 (21.4%)	17 (77.3%)	23 (46.0%)
>10	1 (3.6%)	0 (0.0%)	1 (2.0%)
Total	28 (100.0%)	22 (100.0%)	50 (100.0%)
Mean Marital Life	4.50 ± 3.01	7.59 ± 2.19	
P-Value	0.001		

**Interpretation:** The table displays the distribution of participants based on marital life duration and infertility type. Most cases of primary infertility (75.0%) were observed in the 1-5 years group, whereas secondary infertility (77.3%) predominantly occurred in the 5-10 years of marital life. Only one case of primary infertility exceeded 10 years of marital life. The mean marital life for primary infertility was  $4.50 \pm 3.01$  years, significantly shorter than  $7.59 \pm 2.19$  years for secondary infertility ( $p$ -value = 0.001), indicating a notable association.



**Graph Interpretation:** The bar chart highlights marital life distribution across infertility types. Primary infertility is predominantly observed in couples with shorter marital life (1-5 years), while secondary infertility is more common in longer durations (5-10 years). This emphasizes the influence of marital life on infertility patterns, consistent with statistical findings.

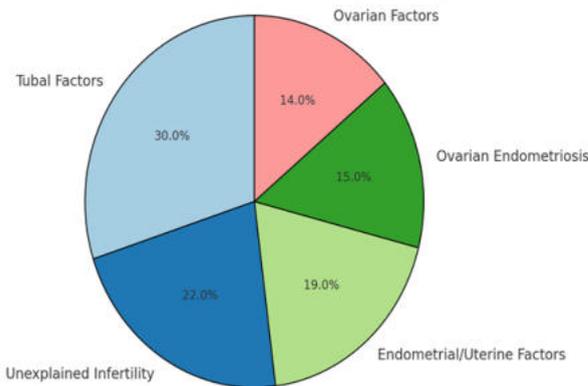
**Table 4: Distribution According To Clinical Diagnosis**

Clinical Diagnosis	Primary Infertility (%)	Secondary Infertility (%)	Total (%)	P- Value
Endometrial/ Uterine Factor	3 (10.7%)	6 (27.3%)	9 (18.0%)	0.429
Ovarian Endometriosis	0 (0.0%)	2 (9.1%)	2 (4.0%)	
Ovarian Factor	2 (7.1%)	1 (4.5%)	3 (6.0%)	
PCOS	3 (10.7%)	2 (9.1%)	5 (10.0%)	
Tubal Factor	8 (28.6%)	7 (31.8%)	15 (30.0%)	
Unexplained	7 (25.0%)	4 (18.2%)	11 (22.0%)	
Total	28 (100.0%)	22 (100.0%)	50 (100.0%)	

**Interpretation:** The table illustrates the distribution of clinical diagnoses among primary and secondary infertility cases. Tubal

factors were the most prevalent, accounting for 30% of all cases, followed by unexplained infertility at 22%. Endometrial/uterine factors were significantly more common in secondary infertility (27.3%) compared to primary infertility (10.7%). Ovarian endometriosis and ovarian factors were less frequent. The chi-square test for the overall distribution yielded a p-value of 0.429, indicating no statistically significant difference between the two infertility groups.

Distribution of Clinical Diagnoses Among Infertility Cases

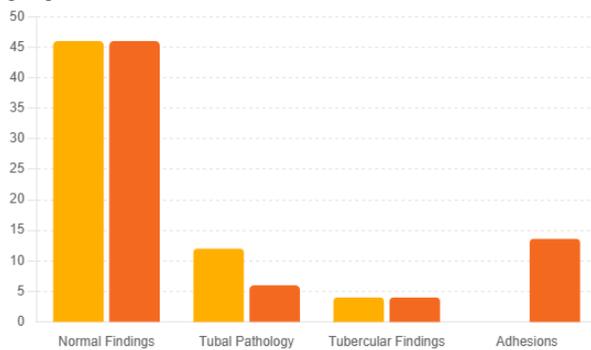


**Graph Interpretation:** A clustered Pie chart represents the distribution of clinical diagnoses for primary and secondary infertility. It highlights the dominance of tubal factors in both groups, while unexplained infertility and endometrial/uterine factors are also prominent. The graph visually depicts the higher prevalence of endometrial/uterine factors in secondary infertility cases compared to primary infertility, aligning with the tabulated data.

Table 5: Distribution According To Findings On Laparoscopy

Findings	Primary Infertility (%)	Secondary Infertility (%)	Total (%)	P-value
Adhesions	0 (0.0%)	3 (13.6%)	3 (6.0%)	0.220
Normal	13 (46.4%)	10 (45.5%)	23 (46.0%)	
Tubal Pathology	5 (17.9%)	4 (18.2%)	9 (18.0%)	
Tubercular	3 (10.7%)	1 (4.5%)	4 (8.0%)	

**Interpretation:** The table presents the distribution of findings on laparoscopy among primary and secondary infertility cases. Normal findings were the most common (46%), observed nearly equally in both groups. Tubal pathology accounted for 18% of cases, followed by tubercular findings (8%). Adhesions were seen only in secondary infertility cases (13.6%). The chi-square test yielded a p-value of 0.220, indicating no statistically significant difference between the groups.



**Graph Interpretation:** A clustered bar chart illustrates the laparoscopy findings for primary and secondary infertility. The chart highlights that normal findings were equally prevalent in both groups, while tubal pathology and tubercular cases showed similar proportions. Adhesions were exclusively observed in secondary infertility cases, reflecting a potential group-specific trend, though not statistically significant.

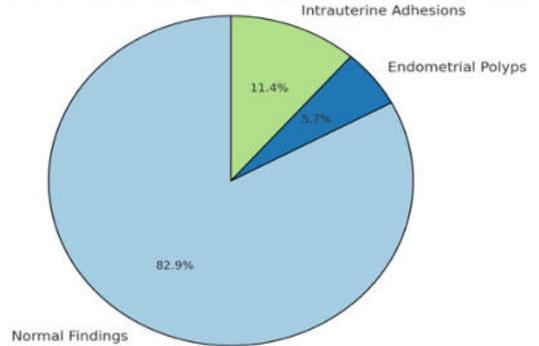
Table 6: Distribution According To Findings On Hysteroscopy

Findings	Primary Infertility (%)	Secondary Infertility (%)	Total (%)	P-Value
Normal	16 (57.1%)	13 (59.1%)	29 (58.0%)	0.718
Endometrial Polyp	1 (3.6%)	1 (4.5%)	2 (4.0%)	

Intrauterine Adhesions	1 (3.6%)	2 (9.1%)	3 (6.0%)	

**Interpretation:** The table illustrates findings on hysteroscopy among primary and secondary infertility cases. Normal findings were the most prevalent, observed in 58% of participants, with similar proportions in both groups (57.1% in primary and 59.1% in secondary infertility). Endometrial polyps were detected in 4% of cases, equally distributed between the groups. Intrauterine adhesions were slightly more common in secondary infertility (9.1%) than primary infertility (3.6%). The chi-square test yielded a p-value of 0.718, indicating no statistically significant difference.

Distribution of Hysteroscopy Findings Among Infertility Cases



**Graph Interpretation:** A pie chart depicts the distribution of hysteroscopy findings by infertility type. Normal findings dominate both groups, forming the largest segment. Intrauterine adhesions show a slightly higher prevalence in secondary infertility, while endometrial polyps are evenly distributed. The visual representation confirms the lack of significant differences between the groups, as supported by the statistical analysis.

**DISCUSSION**

Hystero-laparoscopy has emerged as a vital and indispensable tool in the evaluation and management of female infertility. Its unique combination of hysteroscopy and laparoscopy allows for a comprehensive, minimally invasive approach to diagnosing complex reproductive abnormalities. Studies, including those by Mishra et al. and Nayak et al., validate its efficacy in identifying common causes of infertility, such as tubal blockages and polycystic ovary syndrome (PCOS). These conditions often remain undetected through conventional imaging modalities, making hystero-laparoscopy an essential component of infertility assessment.

The inclusion of chromopertubation during laparoscopy significantly enhances diagnostic accuracy by allowing real-time evaluation of tubal patency or blockage. This technique plays a critical role in identifying tubal factors, which are responsible for a significant proportion of infertility cases. Similarly, hysteroscopy provides high-resolution visualization of the uterine cavity, enabling the identification of abnormalities such as polyps, fibroids, adhesions, or septa, which can impede conception.

The integration of these two modalities not only reduces diagnostic time but also offers the advantage of immediate therapeutic interventions. Procedures such as adhesiolysis, polypectomy, or septal resection can be performed during the same session, minimizing the need for additional surgeries. This dual diagnostic and therapeutic capability not only enhances patient convenience but also significantly improves conception rates. As such, hystero-laparoscopy remains a cornerstone in modern infertility management, offering both clinicians and patients a reliable, effective, and efficient approach to addressing infertility.

**Implications For Clinical Practice**

The results of this study indicate that Hystero-laparoscopy is a cornerstone tool in the evaluation and management of female infertility, combining diagnostic precision with therapeutic interventions in a single procedure. Its ability to provide a comprehensive assessment of uterine, ovarian, and tubal factors, along with real-time evaluation of abnormalities, makes it indispensable in clinical practice. By addressing conditions such as tubal blockages, polyps, and endometrial or ovarian pathologies, hystero-laparoscopy reduces the time to treatment and enhances the likelihood of successful conception. The integration of this minimally invasive technique as a

first-line investigation ensures a more efficient infertility workup, reducing the need for multiple diagnostic tests. Furthermore, the procedure's dual capability to diagnose and treat during the same session significantly improves patient outcomes, making it a valuable resource for clinicians in optimizing infertility management strategies.

### Limitations

This study has several limitations. One of the key limitations of this study is its retrospective design, which restricts the ability to establish causal inferences. The reliance on previously recorded data can also lead to potential biases or incomplete information, which may affect the overall interpretation of the findings. Additionally, the small sample size of 50 participants limits the generalizability of the results to a broader population. A larger cohort would provide more robust data and enhance the reliability of the conclusions drawn. Another significant limitation is the lack of long-term follow-up data to assess the outcomes of the diagnostic and therapeutic interventions performed during hystero-laparoscopy. Without long-term data, it is challenging to evaluate the sustained effectiveness of the procedures, particularly in terms of conception rates and recurrence of underlying abnormalities. Addressing these limitations in future research through prospective study designs, larger sample sizes, and comprehensive follow-up protocols would provide more definitive insights into the role of hystero-laparoscopy in infertility management.

### CONCLUSION

Diagnostic hystero-laparoscopy is a highly effective, safe, and minimally invasive approach for the thorough evaluation and treatment of female infertility. Its dual ability to perform both diagnostic assessments and therapeutic procedures within a single session provides a distinct advantage, minimizing the need for multiple interventions. This method enables the accurate identification and immediate management of various reproductive issues, including abnormalities in the uterus, fallopian tubes, and ovaries, which are common causes of infertility.

The incorporation of techniques like chromopertubation further enhances its diagnostic accuracy, especially in determining tubal patency. Additionally, the procedure facilitates therapeutic interventions such as the removal of polyps, adhesiolysis, and the correction of uterine septa, significantly improving patient outcomes. By addressing multiple infertility factors in one procedure, hystero-laparoscopy accelerates treatment timelines, increases conception rates, and reduces the overall burden on patients. This efficient and versatile tool has become a cornerstone in modern infertility care, ensuring better reproductive outcomes and streamlining treatment processes.

### Acknowledgment

The authors sincerely extend their gratitude to the Department of Obstetrics and Gynecology at Heritage Institute of Medical Sciences, Varanasi, for their invaluable support and cooperation throughout the course of this study. The unwavering assistance provided by the medical and administrative staff was instrumental in the smooth execution of this research. Their commitment to maintaining high standards of clinical care and data management greatly facilitated the study's progression. The authors also express their heartfelt thanks to the patients who participated in this study. Their willingness to share their medical information and undergo diagnostic and therapeutic procedures was critical to the success of this research. The insights gained from their experiences have contributed significantly to the understanding and advancement of infertility management. Finally, the authors acknowledge the technical team and data analysts who ensured the accuracy of results and analysis, enabling meaningful conclusions to be drawn. Without the collective effort of all involved, this study would not have been possible.

### REFERENCES:

1. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: Potential need and demand for infertility medical care. *Hum Reprod.* 2007;22:1506-12.
2. Dyer SJ. International estimates on infertility prevalence and treatment-seeking potential need and demand for medical care. *Hum Reprod.* 2009;24(9):2379-80.
3. Miller JH, Weinberg RK, Canino NL, Klein NA, Soules MR. The pattern of infertility diagnoses in women of advanced reproductive age. *Am J Obstet Gynecol.* 1999;181:952-7.
4. Bosteels J, Van Herendael B, Weyers S, D'Hooghe T. The position of diagnostic laparoscopy in practice. *Hum Reprod Update.* 2007;13:477-85.
5. Puri S, Jain D, Puri S, Deol SK. Laparohysteroscopy in female infertility: A diagnostic cum therapeutic tool in Indian setting. *Int J App Basic Med Res.* 2015;5:46-8.
6. Nayak PK, Mahapatra PC, Mallick JJ, Swain S, Mitra S, Sahoo J. Role of diagnostic hystero-laparoscopy in the evaluation of infertility. *J Hum Reprod Sci.* 2013;6:32-4.

7. Jayakrishnan K, Koshy AK, Raju R. Role of laparo-hysteroscopy in women with normal pelvic imaging and failed ovulation stimulation with intrauterine insemination. *J Hum Reprod Sci.* 2010;3:20-4.
8. Kabadi YM, Harsha. Hysteroscopy in the evaluation and management of female infertility. *J Obstet Gynecol India.* 2016.
9. Wallach EE. The uterine factor in infertility. *Fertil Steril.* 1972;23:138-58.
10. Brown SE, Coddington CC, Schnorr J, Toner JP, Gibbons W, Oehninger S. Evaluation of outpatient hysteroscopy, saline infusion hysterosonography, and hysterosalpingography in infertile women: A prospective, randomized study. *Fertil Steril.* 2000;74:1029-34.
11. Romano F, Cicinelli E, Anastasio PS, Epifani S, Fanelli F, Galantino P. Sonohysteroscopy versus hysteroscopy for diagnosing endometrial abnormalities in fertile women. *Int J Gynaecol Obstet.* 1994;45:253-60.
12. Mooney SB, Milki AA. Effect of hysteroscopy performed in the cycle preceding controlled ovarian hyperstimulation on the outcome of in vitro fertilization. *Fertil Steril.* 2003;79:637-8.
13. Homer HA, Li TC, Cooke ID. The septate uterus: A review of management and reproductive outcome. *Fertil Steril.* 2000;73:1-14.
14. Mishra S, Sudhir S. Diagnostic hysteroscopy in evaluation of female infertility in a rural medical college. *Indian J Obstet Gynecol Res.* 2016;3(3):196-8.