"ROLE OF HYSTEROLAPAROSCOPY FOR THE DIAGNOSIS OF FEMALE INFERTILITY – A ONE-YEAR HOSPITAL BASED OBSERVATIONAL STUDY."

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LIST OF ABBREVIATIONS USED

No.	Abbreviation	Full Form
1	WHO	World Health Organization
2	CDC	Centers for Disease Control and Prevention
3	HSG	Hysterosalpingography
4	DHL	Diagnostic Hysterolaparoscopy
5	TVS	Transvaginal Ultrasound
6	HLD	Hysterolaparoscopy with Dye Test
7	BMI	Body Mass Index
8	FSH	Follicle-Stimulating Hormone
9	LH	Luteinizing Hormone
10	TSH	Thyroid-Stimulating Hormone
11	AMH	Anti-Müllerian Hormone
12	AFC	Antral Follicle Count
13	PCOS	Polycystic Ovary Syndrome
14	PID	Pelvic Inflammatory Disease
15	IVF	In Vitro Fertilization
16	IUI	Intrauterine Insemination
17	ART	Assisted Reproductive Technology
18	SLE	Systemic Lupus Erythematosus

19	**GA**	**General Anesthesia**
20	**NBM**	**Nil By Mouth**
21	**DVT**	**Deep Vein Thrombosis**
22	**FGTB**	**Female Genital Tuberculosis**
23	**ARSM**	**American Society for Reproductive Medicine**

ABSTRACT

Background: Infertility, defined by the World Health Organization (WHO) as the inability to conceive after 12 months of unprotected intercourse, affects 10–15% of couples globally. In India, regional prevalence ranges from 3.9% to 16.8%. Female infertility is often multifactorial, involving ovarian, tubal, uterine, and endocrine causes. Although conventional methods like ultrasound and hysterosalpingography are commonly used, they may fail to detect subtle or complex pelvic pathologies. Hysterolaparoscopy, a minimally invasive modality, enables direct visualization and simultaneous management of both intrauterine and pelvic abnormalities.

Objective: To evaluate the diagnostic role of hysterolaparoscopy in identifying etiologies of female infertility and to correlate endoscopic findings with clinical characteristics.

Methods: This prospective observational study was conducted from December 2023 to December 2024 at KLES Dr. Prabhakar Kore Hospital, Belagavi. Sixty-two women aged 18–45 years with primary or secondary infertility underwent diagnostic hysterolaparoscopy. Standardized preoperative assessments included clinical history, hormonal profiling, pelvic imaging, and semen analysis. Hysteroscopy evaluated the cervical canal, endometrial cavity, and tubal ostia, while laparoscopy assessed uterine, ovarian, tubal, and peritoneal abnormalities with chromopertubation. Data were analyzed using SPSS v24.0.

Results: Among 62 patients, 66.1% had primary and 33.9% secondary infertility. Most (58.1%) were aged ≤30 years, with a mean infertility duration of 5.8 years. A significant association was found between infertility type and duration ($p = 0.024$). Ovarian pathology was the most common laparoscopic finding (66.1%), with PCOM being the most prevalent (38.7%). Other findings included tubal pathology (14.5%), pelvic adhesions (27.4%), and endometriosis (9.7%). Chromopertubation showed bilateral patency in 69.4%. Hysteroscopy detected abnormalities in 35.4%, including endometrial polyps (12.9%), uterine anomalies (8%), and intrauterine adhesions (4.8%). Additionally, 48.4% of patients were overweight and 21.0% obese; 19.4% had hypothyroidism.

Conclusion: Hysterolaparoscopy is an effective and safe modality for comprehensive infertility evaluation. It facilitates the detection and management of intrauterine and pelvic abnormalities not identifiable via conventional imaging. Given its dual diagnostic-therapeutic advantage and cost-effectiveness, especially in resource-limited settings, hysterolaparoscopy should be incorporated into routine infertility workups to enhance reproductive outcomes and reduce the burden of prolonged infertility.

Keywords: Female infertility, hysterolaparoscopy, laparoscopy, hysteroscopy, tubal patency, ovarian pathology, endometriosis, uterine anomalies, reproductive health, minimally invasive surgery

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INTRODUCTION

The World Health Organization (WHO) defines infertility as "a medical condition of the reproductive system that is marked by failure to establish a clinical pregnancy even after engaging in frequent, unprotected sexual intercourse for a period of 12 months or more"[1]. Globally, approximately 10–15% of couples experience infertility, meaning that over 60–80 million couples face significant challenges in conceiving[2]. In India, the incidence of primary infertility is reported to vary between 3.9% and 16.8%, underscoring the considerable impact of this condition in different regions of the country[3]. According to the World Health Organization (WHO), infertility affects one out of every four couples in developing countries[4]. This prevalence emphasizes the urgent need for intervention, especially since many infertility cases are possibly preventable.

The etiology of infertility is diverse and often influenced by both male and female factors. In women, infertility may stem from ovulatory dysfunction, tubal obstructions, uterine anomalies, endometriosis, and peritoneal adhesions . Infective causes like pelvic inflammatory disease and genital tuberculosis, along with systemic illnesses such as thyroid disorders, diabetes, and autoimmune diseases, can disrupt hormonal balance, damage reproductive organs, and increase the risk of pregnancy loss , hence leading to infertility. Additionally, lifestyle factors such as advanced maternal age, obesity, smoking, stress, and the growing trend of delayed marriages have been increasingly linked to reduced fertility potential.[5,6,7,8] Male infertility is often associated with issues in sperm production and motility.

The evaluation of infertility requires a comprehensive and meticulous approach, as conventional pelvic examinations and standard diagnostic methods often fail to detect

many underlying pelvic disorders[9]. These traditional methods, while useful for preliminary assessments, may not reveal subtle diseases or abnormalities that can significantly affect fertility. In contrast, advanced diagnostic techniques such as laparoscopy and hysteroscopy have emerged as critical tools in the assessment of female infertility. Laparoscopy allows for the direct visualization and manipulation of the pelvic organs, including the uterus, fallopian tubes, and ovaries, thereby facilitating the detection of conditions such as endometriosis, adhesions, and tubal blockages[10]. Meanwhile, hysteroscopy provides a detailed examination of the uterine cavity, enabling the identification of intrauterine abnormalities such as polyps, submucosal fibroids, intrauterine adhesions, and septal defects that might otherwise remain undiagnosed[11]

Hysterolaparoscopy integrates the benefits of both hysteroscopy and laparoscopy into a single, minimally invasive procedure, representing a significant advancement in the diagnostic evaluation of female infertility[12]. By offering simultaneous visualization of intrauterine and extrauterine structures, it enhances diagnostic accuracy and allows for immediate therapeutic interventions whenever necessary. The current one-year hospital-based observational study aims to assess the role of hysterolaparoscopy in diagnosing female infertility. It intends to evaluate its efficacy in recognizing various pelvic diseases that contribute to infertility ,thereby providing a more comprehensive understanding of the underlying factors and offering valuable insights through systematic observation and detailed analysis, enhancing diagnostic tests and protocols for women experiencing infertility.

Need of the Study

Infertility remains a significant clinical challenge that demands efficient diagnostic and therapeutic interventions. Traditional investigations such as basic laboratory tests, routine pelvic examinations, sonography, and hysterosalpingography (HSG) are invaluable in ruling out gross intrauterine pathology; however, they often fall short in detecting subtle abnormalities like small polyps, adhesions, and seedling fibroids[9].

Hysteroscopy offers enhanced visualization of the uterine cavity, enabling the identification of these minor yet clinically significant lesions that could contribute to infertility[13]. Additionally, laparoscopy is crucial for diagnosing extra-uterine conditions including tubal diseases, peritoneal pathologies, endometriosis, and ovarian pathologies that might remain undetected with conventional imaging techniques[14]. The American Society of Reproductive Medicine recommends laparoscopy prior to initiating aggressive empirical treatments that incur high costs and potential risks[15]. Moreover, integrating hysterolaparoscopy permits simultaneous diagnostic evaluation and therapeutic intervention which procedures such as polypectomy, myomectomy, septal resection, and adhesiolysis to be performed [16]. This combined approach minimizes patient burden, reduces overall costs, and expedites treatment planning[17]. In a resource-limited setting like India, such an innovative one-setting procedure is essential for optimizing infertility management and significantly improving patient outcomes[11]. Infertility is a medical condition that can lead to psychological, physical, emotional, and medical challenges for the patient. What makes this condition unique is its impact on both, the individual and their partner. While male infertility remains an essential aspect of any discussion on infertility, this observational study focuses on evaluating the cause of female infertility using Diagnostic hysterolaparoscopy.

AIMS AND OBJECTIVES

Primary objective: To evaluate the cause of female infertility by Diagnostic Hysterolaparoscopy (DHL)

REVIEW OF LITERATURE

Recent global health initiatives have yielded notable progress in maternal and child health over the past decade, largely due to an increased focus on reproductive health[17,18]. Nonetheless, female infertility remains a significant global health concern, affecting an estimated 48 million women worldwide, with the highest prevalence noted in South Asia, Sub-Saharan/North Africa, Middle East, and Central/Eastern Europe and Central Asia[19]. Even upon diagnosis, pinpointing a single causative factor remains challenging, as the condition is inherently multifactorial[4]. Extensive research into its etiology, prevalence, and management continues to illuminate the complex interplay of biological, environmental, and lifestyle factors, underscoring its profound impact on women's health and overall well-being[4].

Global Impact & Prevalence in India

Infertility rates are increasing at an alarming pace, affecting approximately one in every six individuals of reproductive age[20]. Socioeconomic disparities, particularly in low- and middle-income countries, further exacerbate the complexity of this condition[21]. According to the World Health Organization (WHO), there is a pressing need for accessible and high-quality infertility treatment[1] The Centers for Disease Control and Prevention (CDC) reports that approximately 19% of heterosexual women aged 15 to 49 years in the United States are unable to conceive after one year of trying, underscoring the substantial burden of infertility even in high-income settings[22].

As the world's most populous country, India has historically prioritized population control as a key demographic objective[23]. However, with a substantial proportion of its population in the reproductive age group and evolving lifestyle factors, the nation

significantly contributes to the global infertility burden. A nationally representative study reported an infertility prevalence of 17.9%, a rate that has remained stable over the past two decades[24] [25]. Despite its high prevalence, infertility remains largely overlooked in primary healthcare settings, as it is not integrated into any national health programs.

Findings from the National Family Health Survey (NFHS), which analyzed data from 491,484 currently married women aged 15–49 years, estimated an infertility prevalence of 18.7 per 1,000 women among those married for at least five years and currently in union. A state-wise analysis revealed that regions such as Goa, Lakshadweep, and Chhattisgarh exhibit the highest infertility burdens, whereas lower prevalence rates were observed in regions such as Ladakh[26].

Definition

The World Health Organization (WHO) defines infertility as the inability to conceive after 12 months or more of regular unprotected sexual intercourse. This definition is used in the International Classification of Diseases (ICD 11).[27]

According to the World Health Organization (WHO), primary infertility refers to a woman who has never conceived, while secondary infertility describes the inability of a couple to conceive again after having at least one successful pregnancy in the past.[27]

According to, American Society for Reproductive Medicine, In the absence of exigent history or physical findings, evaluation and treatment for infertility should be initiated after 12 months of unprotected intercourse in women under 35 years of age and after 6 months in women aged 35 years and older. In women over 40, more immediate evaluation and treatment may be warranted[28]. However, diagnostic testing for

infertility should begin without delay when a condition known to cause infertility is identified.

Such conditions include, [2][9,30,31,32,33]:

- Irregular menstrual cycles, including a cycle length of less than 25 days[34], intermenstrual bleeding[35], oligomenorrhea, or amenorrhea
- Known or suspected uterine, tubal, or peritoneal disease, including endometriosis
- Known or suspected male subfertility
- Sexual dysfunction
- Genetic or acquired conditions that predispose to diminished ovarian reserve (e.g., following chemotherapy, radiation exposure, or the presence of an FMR1 premutation)

Causes of Female Infertility

In the female reproductive system, infertility may be caused by:

1. Ovulatory Disorders

- Polycystic Ovary Syndrome (PCOS)
- Hypothalamic dysfunction
- Premature Ovarian Insufficiency
- Hyperprolactinemia
- Luteal phase defect

2. Tubal Factors

- Blocked or damaged fallopian tubes
- Pelvic Inflammatory Disease (PID)
- Endometriosis-related tubal damage

- Previous pelvic or abdominal surgery
- Ectopic pregnancy history

3. Uterine Causes

- Fibroids affecting implantation
- Congenital uterine anomalies (e.g., septate uterus)
- Asherman's Syndrome (intrauterine adhesions)
- Endometrial dysfunction

4. Endometriosis

- Implantation failure due to inflammatory changes
- Ovarian endometriomas

5. Cervical Causes

- Cervical stenosis
- Insufficient cervical mucus
- Anti-sperm antibodies in cervical mucus

6. Age-related Infertility

- Reduced ovarian reserve
- Poor oocyte quality
- Increased aneuploidy risk

7. Autoimmune Disorders

- Systemic Lupus Erythematosus (SLE)
- Antiphospholipid Syndrome
- Thyroid disorders affecting fertility

8. Lifestyle and Environmental Factors

- Smoking
- Excessive alcohol consumption
- Obesity affecting hormonal balance
- High stress levels
- Exposure to environmental toxins (e.g., pesticides, heavy metals)

Infertility results from diverse factors affecting both partners, including ovulatory disorders, diminished ovarian reserve, endometriosis, tubal damage, and cervical issues in females, and impaired spermatogenesis or structural problems in males, with the relative importance of these causes varying from country to country. Comprehensive evaluation is crucial for accurate diagnosis and effective treatment planning.

Evaluation of infertility

Heterosexual women attempting pregnancy should undergo infertility evaluation if conception has not occurred after 12 months of unprotected intercourse or donor insemination. For women over 35 years, evaluation is recommended after six months, and for those over 40, immediate assessment is warranted. Early evaluation is also advised for women with irregular menstruation, known or suspected uterine, tubal, or peritoneal pathology (including advanced endometriosis), and for male partners with suspected infertility. Approximately 85% of infertility cases have identifiable causes such as ovulatory dysfunction, tubal disease, or male factor infertility, while 15% remain unexplained despite thorough investigation.[36]

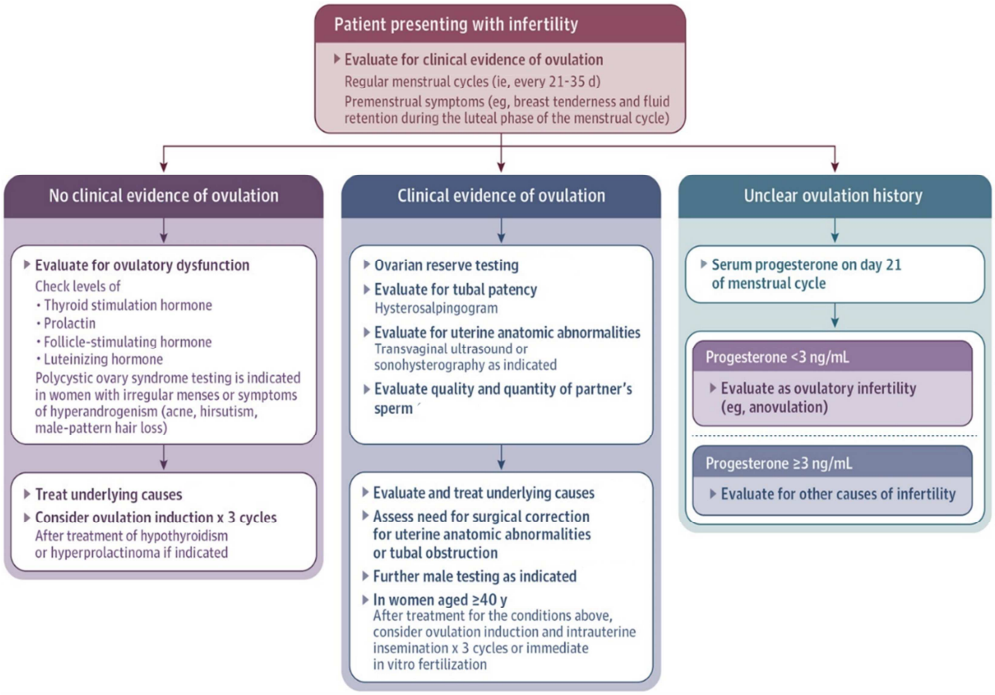

Fig 1: Evaluation of infertility[36]

Investigations in the Evaluation of Infertility

The evaluation of infertility involves a systematic and comprehensive approach to identify underlying causes in both partners. Initial investigations are guided by a detailed medical, sexual, and reproductive history along with physical examination. The investigations can be categorized into female, male, and couple-based assessments.

Female Partner Evaluation

1. Ovulation Assessment: Ovulatory function is assessed through menstrual history, mid-luteal serum progesterone levels, basal body temperature charts, and serial transvaginal ultrasonography. In women with irregular cycles, hormonal profiles including FSH, LH, TSH, and prolactin are essential.

2. Ovarian Reserve Testing : Common tests include anti-Müllerian hormone (AMH), antral follicle count (AFC) by ultrasound, and day 2–3 FSH and estradiol levels, particularly in women over 35.[37]

3. **Tubal Patency and Uterine Evaluation**:
    - Hysterosalpingography (HSG) assesses tubal patency and uterine contour.
    - Saline infusion sonography (SIS) evaluates intrauterine pathology.
    - Hysteroscopy allows direct visualization and treatment of uterine abnormalities.
    - Laparoscopy with chromopertubation is the gold standard for diagnosing tubal block, endometriosis, and pelvic adhesions.[37]

4. **Imaging**:

    Pelvic ultrasound helps identify fibroids, polycystic ovaries, or ovarian cysts.

Male Partner Evaluation

1. Semen Analysis: Performed after 2–7 days of abstinence to assess sperm count, motility, morphology, and volume.
2. Hormonal Testing: In abnormal semen parameters, FSH, LH, testosterone, and prolactin are measured.
3. Scrotal Ultrasound: Indicated for suspected varicocele, obstruction, or testicular abnormalities.[37]

Couple-Based Tests

- Genetic screening (e.g., karyotyping or Y chromosome microdeletion analysis) IS used in select cases.
- Infectious disease screening may also be part of pre-treatment evaluation.

Role of Hysteroscopy and Laparoscopy

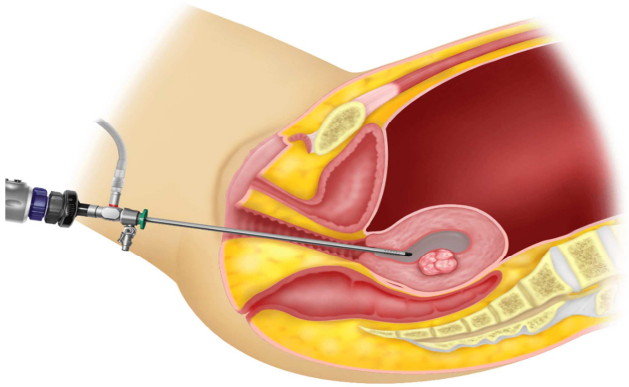

Fig 2: Hysteroscopy

Hysteroscopy is a minimally invasive procedure that allows direct visualization of the uterine cavity using a thin, lighted telescope called a hysteroscope. It was first performed in 1869 by Pantaleon[38], who treated an endometrial polyp using Desormeaux's cystoscope in a 60-year-old woman with postmenopausal bleeding[38]. Initially limited, hysteroscopy gained prominence in the 1960s and by the 1970s, became widely used for both diagnostic and therapeutic purposes, including polyp removal, biopsy, and myomectomy.

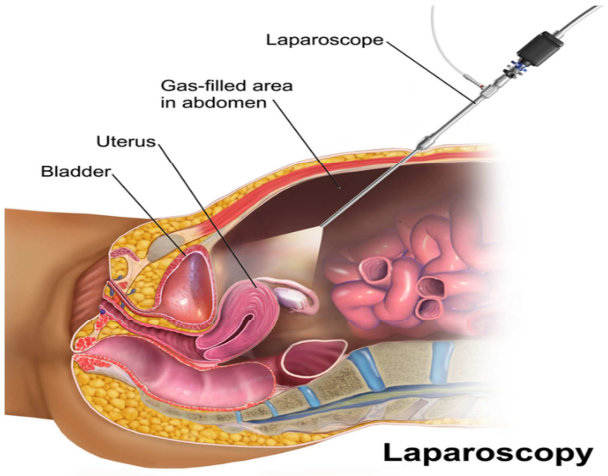

Fig 3: Laparoscopy

Laparoscopy is a minimally invasive surgical technique used to visualize pelvic organs, including the uterus, fallopian tubes, and ovaries, through small abdominal incisions. First attempted by Dr. Georg Kelling in 1901, it evolved significantly by the 1970s when Dr. Kurt Semm performed the first laparoscopic appendectomy, establishing its clinical utility[39].

Hystero-laparoscopy, a combined approach of laparoscopy and hysteroscopy, became popular in the 1990s[39]. Together, hysteroscopy and laparoscopy provide a comprehensive approach to diagnose and treat female infertility. While hysteroscopy focuses on the uterine cavity and its internal structures, laparoscopy offers an external perspective on the pelvic organs, especially the fallopian tubes and ovaries[40]. Their combined use in a clinical setting can significantly enhance diagnostic accuracy, leading to more targeted and effective treatment strategies for women experiencing infertility[41].

PROCEDURE

Preliminary Studies

Before performing hysterolaparoscopy, a comprehensive evaluation of the female partner **is** conducted. This includes a detailed medical, menstrual, marital, family, and treatment history. A thorough physical examination **is** performed, including breast, thyroid, external genitalia, per-speculum, and bimanual pelvic assessment. Baseline investigations such as hemoglobin, urine analysis, blood sugar, serum TSH, renal function tests, serology, chest X-ray, and ECG **are** obtained. Medical and anesthetic fitness clearance **is** secured. Informed written consent **is** taken after explaining the procedure, associated risks, and potential complications to the patient.

Operation theatre - Anasthesia – Under GA or/and IV ketamine by an anaesthetist

Patient positioning

The operating table must accommodate various positions essential for gynecological surgery, with the ability to return to a horizontal position immediately. The patient is placed in the dorsal lithotomy position, with legs flexed at 45° and buttocks positioned at the edge of the table.

Hysteroscopy - Procedure

The patient is positioned, painted, and draped under aseptic conditions. A Sim's speculum is used to retract the posterior vaginal wall, and the anterior cervical lip is grasped with a vulsellum. A uterine sound is used to measure uterocervical length, followed by gradual cervical dilation using Hegar's dilators. The hysteroscope is then introduced and connected to fluid channels, a light source, and a fiberoptic cable for video monitoring. As the hysteroscope passes through the cervical canal, the distending medium separates the endocervical walls, enhancing visibility. Upon reaching the internal os, the flow rate is increased to 60 cc/min. The uterine cavity is systematically examined, including the anterior and posterior walls, side walls, fundus, and both cornua where the tubal ostia are located. After the examination, the hysteroscope is withdrawn, and a cervical dilator is inserted to facilitate uterine elevation during laparoscopy, enhancing pelvic visualization and surgical access. Most hysteroscopes have an operative channel for instruments like graspers or scissors. Normal saline is preferred as the distending medium for its clarity and safety, with fluid deficit limits set at 2500 ml for isotonic solutions to prevent overload.

Laparoscopy - Procedure

The anterior abdominal wall is elevated, and a 1 cm supraumbilical incision is made using an 11 mm blade. A Veress needle is inserted toward the coccyx to enter the peritoneal cavity, confirmed by an aspiration test. Pneumoperitoneum is created by insufflating 1–2 liters of CO_2. The needle is withdrawn, and a trocar and cannula are inserted. A laparoscope with a light source and camera is introduced, providing a magnified view of pelvic organs. Additional trocar sites may be created for instrumentation as needed.

The laparoscopic examination includes:

a) A general survey of internal reproductive organs and peritoneal spaces.

b) Inspection of the uterus for congenital anomalies, fibroids, and tubercles; anterior, posterior, and lateral views are examined.

c) Detailed evaluation of ovarian morphology, cysts, tubo-ovarian relations, and endometriotic lesions; manipulation is done carefully to avoid vascular injury.

d) Assessment of fallopian tubes along their entire length, with attention to fimbriae, adhesions, and nodules suggestive of salpingitis isthmica nodosa. The uterosacral and broad ligaments, omentum, and bowel are checked for adhesions or endometriosis. Adhesiolysis is performed if needed for clear visualization.

Methylene blue dye is injected through the cervix to assess tubal patency, with dye flow from tubes. After examination, the laparoscope is withdrawn, pneumoperitoneum is released, and instruments are removed. Incisions are closed with 3-0 Monocryl. Postoperative vitals are monitored, NBM is broken after 6 hours, soft diet is initiated after 12 hours, and the patient is discharged after 24 hours.

Benefits of Diagnostic Hystero-Laparoscopy in Infertility

Hystero-laparoscopy is increasingly recognized as a gold-standard approach in the diagnostic and therapeutic workup of female infertility. This combined procedure offers detailed insight into intrauterine and pelvic anatomy, allowing simultaneous correction of structural or functional abnormalities that impair fertility.

1. Accurate and Comprehensive Diagnosis

Hysteroscopy allows direct visualization of the uterine cavity to detect abnormalities such as submucosal fibroids, endometrial polyps, adhesions, or congenital anomalies. Simultaneously, laparoscopy enables the assessment of pelvic organs for endometriosis, tubal disease, adhesions, and ovarian cysts—pathologies often implicated in infertility and undetectable through imaging alone .

2. Simultaneous Therapeutic Intervention

A key advantage of hystero-laparoscopy is its therapeutic utility. Uterine septa, fibroids, or adhesions can be removed during the same procedure. Laparoscopic treatment also includes endometriosis excision, ovarian cystectomy, and chromopertubation to assess and potentially restore tubal patency.

3. Minimally Invasive with Rapid Recovery

Compared to open surgery, hystero-laparoscopy is less invasive, causing minimal tissue trauma, less postoperative pain, faster recovery, and reduced hospital stay. It is often performed as a day-care procedure with high patient satisfaction.

4. Improved Fertility and ART Success

Numerous studies confirm that the correction of uterine or pelvic abnormalities improves spontaneous conception rates and enhances outcomes in IVF and IUI cycles. For example, surgical management of endometriosis via laparoscopy significantly improves fecundity.

5. Diagnostic Utility in Unexplained Infertility

In patients with unexplained infertility—where routine imaging is inconclusive—diagnostic hystero-laparoscopy often reveals subtle lesions such as early-stage endometriosis, tubal adhesions, or pelvic inflammatory disease.

6. Low Complication Rates and Fertility Preservation

As a minimally invasive technique, hystero-laparoscopy carries a lower risk of bleeding, infection, or adhesion formation compared to laparotomy. Moreover, early treatment of reproductive tract conditions like endometriosis can prevent long-term complications and preserve fertility potential.

7. Broader Gynecologic and Quality-of-Life Benefits

Beyond infertility, hystero-laparoscopy plays a role in managing abnormal uterine bleeding, chronic pelvic pain, and retained foreign bodies, thereby improving the patient's overall gynecological health and quality of life.

Complications of hysterolaparoscopy

Hysterolaparoscopy, the combination of hysteroscopy and laparoscopy, is a crucial procedure for diagnosing and managing female infertility. Despite its apparent benefits,various obstacles prevent its widespread application and effectiveness.

1. Hemorrhage:

    - Internal Bleeding: Injury to major blood vessels during trocar insertion may result in internal hemorrhage, occasionally requiring surgical intervention[44].

    - External Bleeding: Minor bleeding from incision sites is common and generally manageable; however, persistent bleeding may need medical attention.

2. Infection:

    - Superficial Infection: Postoperative wound infections can present as erythema, swelling, or discharge at the incision sites and are typically treated with antibiotics.

    - Deep Infection: In rare cases, intra-abdominal infections or abscesses may develop, necessitating prompt medical management.

3. Visceral Injury:

    - Bowel Perforation: Unintentional injury to the intestines can lead to peritonitis due to leakage of bowel contents, requiring urgent surgical repair.

    - Urinary Tract Injury: Accidental damage to the bladder or ureters may occur, sometimes requiring corrective procedures.

    - Reproductive Organ Injury: In gynecologic laparoscopy, the uterus, ovaries, or fallopian tubes may sustain inadvertent injury.

4. Anaesthetic Complications:
    - Respiratory Issues: Adverse reactions to general anesthesia, such as hypoxia or respiratory depression, can occur.
    - Postoperative Nausea and Vomiting: Common side effects following anesthesia, typically managed with antiemetic medications.
    - Allergic Reactions: Though rare, hypersensitivity reactions to anesthetic agents or perioperative medications may arise.
5. Thromboembolic Events:
    - Prolonged immobility post-surgery increases the risk of deep vein thrombosis (DVT), with the potential for pulmonary embolism, which requires immediate intervention.
6. Postoperative Pain:
    - Carbon dioxide insufflation used to create pneumoperitoneum can irritate the diaphragm, leading to referred shoulder pain and abdominal discomfort, which typically resolves within 24–48 hours.
7. Incisional Hernia:
    - Though uncommon, hernias at the trocar insertion sites can develop due to inadequate closure of the fascial layers, occasionally necessitating surgical correction.
8. Cost and Accessibility
    - The requirement for specialized equipment and trained personnel makes hysterolaparoscopy an expensive procedure. In low-resource

settings, this often limits its accessibility and availability, creating disparities in infertility care[44].

9. Adhesion Formation:

    - Intra-abdominal adhesions may develop postoperatively, potentially leading to chronic pain, bowel obstruction, or fertility complications.

10. Allergic Reactions to Dyes:

    - During procedures like chromopertubation, dyes such as methylene blue are used, which can cause allergic-like reactions or methemoglobinemia. Symptoms range from blue discoloration of body fluids to anaphylactic shock.

10. Cornual Spasms:

    - Rapid injection of dye during chromopertubation can cause cornual spasms, leading to a false diagnosis of proximal tubal occlusion.

11. Electrical Burns:

    - Unseen electrical burns can occur if electrosurgical instruments leak current into surrounding tissues, potentially resulting in perforated organs and peritonitis.

12. Post-Operative Recovery and Psychological Impact

    - Post-surgical recovery may involve pain and physical discomfort, while the emotional burden of infertility often intensifies stress and anxiety. Comprehensive counselling and psychological support are essential components of post-operative care to mitigate these impacts[45].

13. Operator Dependency and Variability in Outcomes

- The success and accuracy of hysterolaparoscopy are highly dependent on the surgeon's expertise. Inexperienced practitioners may face difficulties in identifying and managing reproductive pathologies, leading to inconsistent diagnostic and therapeutic outcomes[44].

Addressing these challenges through enhanced surgical training, patient education, and technological innovations can improve the effectiveness and accessibility of hysterolaparoscopy. As advancements continue, a more patient-centered approach can help optimize outcomes and provide better fertility care.

REVIEW OF OTHER STUDIES

A prospective observational study by Shinde et al. aimed to identify and analyze the various etiological factors contributing to female infertility in a clinical setting. Conducted at South Central Railway Hospital, Secunderabad, the study included 100 women aged 18 to 40 years presenting with either primary or secondary infertility between August 2016 and February 2018. A thorough clinical, hormonal, radiological, and endoscopic evaluation was performed, including history-taking, pelvic examinations, ultrasonography, hysterosalpingography, hormonal assays (FSH, LH, TSH, prolactin), and hysterolaparoscopy with chromopertubation where indicated. Among the participants, 62% had primary infertility and 38% had secondary infertility. Ovarian factors were the most common cause of infertility, accounting for 50% of cases, followed by tubal (22%), uterine (20%), peritoneal (19%), and unexplained factors (20%). Among ovarian causes, polycystic ovarian syndrome (PCOS) was the most prevalent, affecting 40% of participants, especially those from urban and sedentary backgrounds. Laparoscopic findings revealed bilateral

and unilateral tubal blocks, hydrosalpinx, ovarian cysts, endometriosis, pelvic adhesions, and tuberculosis. Uterine factors included fibroids, congenital anomalies, and hypoplastic uterus. Endocrine disorders such as hypothyroidism (25%) and hyperprolactinemia (3%) were also documented. The study found that 66% of infertile women had been trying to conceive for 1–5 years, and many exhibited high BMI, with 61% being overweight or obese. Among secondary infertility cases, a significant number had a history of abortions, often associated with intrauterine adhesions or uterine trauma. The authors concluded that a multifactorial approach is essential in evaluating female infertility, with ovarian dysfunction—especially PCOS—emerging as the leading cause, and emphasized the value of early diagnosis, lifestyle modification, and individualized treatment planning[46].

A cross-sectional study by Nourag et al. aimed to evaluate the diagnostic utility of hysteroscopy in women with unexplained infertility, conducted over six months on 100 women aged 20–35 years at Al-Hussein and Sayed Galal hospitals. All patients had a confirmed diagnosis of unexplained infertility following normal ovulation, tubal patency, and semen analysis. Transvaginal ultrasound (TVS) was performed prior to hysteroscopy, which was scheduled between the 7th and 11th day of the menstrual cycle. The mean age was 28.63 ± 5.12 years, and most patients (68%) had primary infertility, with an average infertility duration of 6.74 years. Hysteroscopy revealed intrauterine abnormalities in 89% of cases, significantly higher than detection rates via TVS. The most common findings were endometrial polyps (30%), endometrial hyperplasia (14%), endometritis (13%), submucous myoma (9%), intrauterine synechiae (8%), and congenital uterine anomalies such as septate, bicornuate, and arcuate uterus (totaling 8%). Other notable findings included cervical polyps and cervical stenosis. Diagnostic performance of hysteroscopy showed high accuracy,

with sensitivity of 97.8%, specificity of 100%, a positive predictive value (PPV) of 100%, negative predictive value (NPV) of 84.6%, and overall diagnostic accuracy of 98%. These results highlight hysteroscopy's superior ability to detect intrauterine abnormalities often missed by non-invasive techniques like TVS or HSG. The study supports integrating diagnostic hysteroscopy into the routine infertility work-up, particularly before confirming a diagnosis of unexplained infertility. It emphasizes that hysteroscopy is not only effective for diagnosis but also allows for immediate therapeutic intervention[47].

This prospective cross-sectional study by Igbodike et al., investigated the diagnostic accuracy of hysterosalpingography (HSG) compared to hysterolaparoscopy with dye test (HLD), aiming to determine which should serve as the first-line evaluation for utero-tubal infertility. Conducted at the Obafemi Awolowo University Teaching Hospitals Complex in Nigeria, the study included 96 women of reproductive age diagnosed with utero-tubal infertility who underwent both HSG and DHL. Using DHL as the gold standard, the researchers assessed sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy of HSG in identifying tubal blockages, hydrosalpinx, and intrauterine pathologies. Results revealed that HSG had an overall diagnostic accuracy of 77.4% for tubal blockages. For hydrosalpinx, the accuracy was higher at 83%, while intrauterine lesion detection accuracy was notably lower at 68.5%. HSG demonstrated lower sensitivity and specificity, particularly for bilateral tubal blockage, likely due to tubal spasm or misinterpretation of radiographic findings. Furthermore, HSG frequently failed to detect small intrauterine abnormalities, such as polyps or adhesions, which were later confirmed by hysteroscopy. The study emphasized that DHL offers a more reliable “see-and-treat” advantage, combining diagnostic and

therapeutic capabilities, unlike HSG which may produce false positives or negatives. Despite HSG's benefits in terms of cost and lower invasiveness, its diagnostic limitations suggest that it should not be the default first-line investigation.

A prospective observational study by Shruti and Sen aimed to evaluate laparoscopic findings in infertile women attending a tertiary care hospital in Udaipur, Rajasthan. Conducted over one year, the study included 100 women aged 18–40 years presenting with either primary or secondary infertility, following prior non-invasive evaluation and consent for diagnostic laparoscopy. Of the 100 patients, 62% had primary infertility and 38% had secondary infertility. The majority of women (81%) had experienced infertility for 1 to 5 years. The most affected age group was 26–30 years, followed by 21–25 years. Laparoscopy revealed a wide range of abnormalities, with ovarian pathology being the most common finding—observed in 55% of patients. Among these, 42% had polycystic ovaries, 5% had simple ovarian cysts, 4% had chocolate cysts, and others had hemorrhagic cysts or ovarian adhesions. Uterine findings included fibroids (7%), bulky uterus (2%), arcuate uterus (1%), and hypoplastic uterus (1%). Tubal pathologies were observed in 33% of cases; these included congested or inflamed tubes (9%), tubercular tubes (8%), peritubal adhesions (6%), hydrosalpinx (4%), and beaded tubes (5%). Additionally, pelvic adhesions and fluid accumulation in the pouch of Douglas were reported in 24% of cases. Importantly, laparoscopy facilitated real-time diagnosis and management of these conditions through procedures like ovarian drilling, adhesiolysis, and chromopertubation.

A prospective study by Sharma et al. evaluated the diagnostic and therapeutic role of combined laparoscopy and hysteroscopy—referred to as hysterolaparoscopy in women with infertility, conducted at Jaipur National University Hospital over two

years. Seventy-five infertile women aged 18 to 40 were enrolled and underwent both procedures during the follicular phase of their cycle. Among them, 64% had primary infertility and 36% had secondary infertility. The study aimed to determine the effectiveness of hysterolaparoscopy in identifying intrauterine, tubal, and pelvic abnormalities and to compare findings between primary and secondary infertility groups. Chromopertubation revealed that 49.33% of women with primary infertility and 21.33% with secondary infertility had bilateral tubal patency. Bilateral tubal blockage was found in 9.33% and 8% of primary and secondary infertility cases, respectively. Hysteroscopy identified abnormalities in 40% of the cases, with intrauterine adhesions, fibrosed ostia, septate uterus, and polyps being the most common findings. Laparoscopy revealed additional pelvic pathologies, including polycystic ovarian disease (21.33%), endometriosis (10.66%), myomas (4%), and pelvic adhesions. A total of 20 patients underwent hysteroscopic interventions, with adhesiolysis and cannulation being the most frequent procedures. Laparoscopic interventions included ovarian drilling (22.66%) and endometriosis surgery (10.66%). While statistical analysis found no significant correlation between hysteroscopic and laparoscopic uterine findings ($p > 0.05$), the study emphasized the complementary role of both modalities. The authors concluded that hysterolaparoscopy is a safe, effective, and comprehensive one-step diagnostic and therapeutic tool for infertility evaluation. It offers superior diagnostic accuracy over conventional imaging and allows simultaneous treatment of correctable conditions, thereby reducing time, cost, and the emotional burden of infertility. The study supports the integration of hysterolaparoscopy into standard infertility workups, particularly in tertiary care settings.

A descriptive interventional study by Gaur et al. evaluated the diagnostic effectiveness of combined hysterolaparoscopy in 80 infertile women aged 20 to 40 years attending the Department of Obstetrics and Gynaecology at SMS Medical College, Jaipur. The study aimed to explore the role of simultaneous hysteroscopy and laparoscopy in identifying intrauterine and pelvic abnormalities among women with primary and secondary infertility. Excluding male factor infertility and hormonal disorders, patients underwent hysterolaparoscopy during the early proliferative phase of their menstrual cycle under general anesthesia. Among the participants, 70% had primary infertility and 30% had secondary infertility. The mean duration of infertility was significantly higher in secondary infertility cases (7.8 years) than in primary cases (4.7 years). Overall, abnormal findings were more frequent on laparoscopy (77.5%) than hysteroscopy (52.5%), and the difference was statistically significant ($p = 0.002$). Tubal pathologies, including bilateral tubal block, peritubal adhesions, and dilated tubes, were the most common laparoscopic findings, especially in primary infertility. Pelvic inflammatory disease, endometriosis, and uterine fibroids were also observed, along with ovarian abnormalities such as endometrioma, polycystic ovaries, and tubo-ovarian masses. On hysteroscopy, abnormalities like endometrial polyps, hyperplastic or atrophic endometrium, intrauterine adhesions, and congenital uterine anomalies (septum, unicornuate uterus) were detected. The study also highlighted the therapeutic potential of this approach, as operative procedures such as adhesiolysis, polypectomy, cystectomy, and septal resection were successfully performed during the same session.

A study was conducted by Ajjammanavar et al. This group assessed effect of probable etiological factors on infertility .Main modality for evaluation was hysterolaparoscopy. This work was conducted in JSS Medical College, Mysuru, from

November 2014 to October 2016, .The subjects were diagnosed provisionally as suffering from Infertility and included 90 women aged 18–40 years.Written consent and Ethics committee clearance was obtained in all study groups.Hysterolaparoscopy was performed under general anesthesia .75.6% (68) of the cases had normal findings. Endometrial polyps were found in 11.1% (10), septate uterus in 5.6% (5), hyperplastic endometrium in 3.3% (3), rest had submucous fibroid, atrophic endometrium, intrauterine adhesions, and hypoplastic uterus.

Laparoscopic examination showed normal uterine findings in 78% (74) of cases, 13.3% (12) had fibroid uterus, and rest were unicornuate and hypoplastic uterus. Endometriosis was seen in 27 cases and 12.9% had omental adhesions. Fallopian tube showed 74.4% (67) with bilateral spillage, 16.7% with unilateral spillage, and 8.9% with tubal block. Laparoscopic treatment was done in 64.4% of cases, like ovarian drilling (28.8%), ovarian cystectomy (18.8%), myomectomy (7.7%), and excision of endometriosis nodules (4.4%). Hysteroscopic procedures included polypectomy and septal resection in 5.5% of cases. Hyserolaparoscopy was concluded as safe diagnostic and therapeutic tool for infertility evaluation and management

This prospective hospital-based study by Mehta et al. evaluated the role of diagnostic hysterolaparoscopy (DHL) in identifying intrauterine and pelvic pathologies contributing to female infertility. Conducted over two years across two tertiary care centers in Gujarat, India, the study included 300 infertile women aged 20 to 40 years with normal hormonal profiles and male partner semen analysis. Of the participants, 206 (69%) had primary infertility, while 94 (31%) had secondary infertility. Laparoscopic abnormalities were detected in 35% of cases, while hysteroscopic abnormalities were observed in 17%, with a combined detection rate of 26%. The most common laparoscopic findings were endometriosis (15%) in the primary

infertility group and adnexal adhesions (12%) in the secondary group. Other notable findings included myomas, tubal blockages, and ovarian abnormalities. On hysteroscopy, the most prevalent abnormality was a uterine septum (10%), followed by polyps (5%) and submucosal myomas (3%). Many of these findings, especially uterine anomalies like septate uterus, were not detected by prior ultrasonography or HSG, highlighting the added diagnostic value of DHL. Tubal evaluation via chromopertubation showed unilateral block in 10% and bilateral block in another 10% of patients across both groups. While some patients exhibited abnormalities on both hysteroscopy and laparoscopy, many had isolated findings, reinforcing the necessity of using both modalities in tandem. Minor complications were reported in 9% of patients, primarily due to gaseous distension, with no major surgical issues.

This retrospective case series aimed to evaluate hysteroscopic and laparoscopic findings in subfertile women that may be predictive of female genital tuberculosis (FGTB). Conducted at a tertiary hospital in India, the study analyzed a large cohort of 16,784 subfertile women who underwent diagnostic hysterolaparoscopy (DHL) between February 2014 and June 2021. Diagnosis of FGTB was confirmed using a combination of histopathology, acid-fast bacilli (AFB) staining, culture, and GeneXpert MTB/RIF assay.

Among the total patients, 1,083 presented with hysteroscopic and laparoscopic features suggestive of tuberculosis, and 309 were microbiologically or histologically confirmed to have FGTB. Using binary logistic regression, the study identified several laparoscopic and hysteroscopic features significantly associated with FGTB. The strongest predictors included tuberculous abdomino-pelvic adhesions (various grades), isthmo-ampullary block, tubercles, tubo-ovarian mass, tuberculous hydrosalpinx, complete tubal destruction, tubal diverticula, and rigid tubes. These

findings were determined to have high predictive value in differentiating tubercular etiology from other causes of subfertility. This study demonstrates the utility of minimally invasive procedures like DHL in identifying tuberculosis-related reproductive pathology, even in the absence of overt clinical symptoms. The findings suggest that early recognition of specific laparoscopic and hysteroscopic signs can support the prompt initiation of antitubercular therapy, potentially improving fertility outcomes in affected women. The large sample size and robust diagnostic criteria strengthen the evidence, offering a reliable diagnostic framework for clinicians managing unexplained or resistant infertility in endemic regions.

This hospital-based observational study by Pande et al. aimed to evaluate uterine anomalies in infertile women using diagnostic hysterolaparoscopy (DHL) at the Veer Surendra Sai Institute of Medical Science and Research (VIMSAR), Burla, Odisha. Conducted over two years (November 2017 to October 2019), the study included 100 women aged 20–40 years with primary or secondary infertility of more than one-year duration. Exclusion criteria included pelvic inflammatory disease, genital tuberculosis, and severe medical comorbidities. DHL was performed in the proliferative phase to examine the uterus, tubes, and ovaries. Of the 100 participants, 83% had primary infertility and 17% had secondary infertility. The majority of primary infertility cases (47%) were between 20–25 years, while secondary infertility was more common in the 26–30 age group. Most patients had normal menstrual cycles, but oligomenorrhoea and hypomenorrhoea were also noted. DHL findings revealed no abnormalities in 68.7% of primary and 52.9% of secondary infertility cases. Among detected anomalies, septate uterus was the most common, found in 24.1% of primary and 17.6% of secondary infertility cases. Other abnormalities included fibroids (3.6% in primary, 17.6% in secondary), polyps (1.2% each),

Asherman's syndrome, synechiae, and a single case of bicornuate uterus. Chromopertubation revealed bilateral tubal patency in 74.7% of primary and 58.8% of secondary infertility cases, with unilateral or no spillage in the remainder. The study underscores the value of DHL in identifying intrauterine pathologies that are frequently missed by conventional imaging like ultrasound or HSG. It allows for both diagnosis and immediate treatment in the same setting. The authors concluded that diagnostic hysterolaparoscopy is a safe, effective, and minimally invasive day-care procedure, essential for evaluating structural uterine and tubal factors in infertility. They advocate its routine use in well-selected patients, as it significantly enhances the diagnostic accuracy of infertility work-up and supports targeted therapeutic intervention, ultimately improving reproductive outcomes.

A retrospective study by Nayak et al., evaluated the diagnostic role of hystero-laparoscopy (DHL) in the comprehensive assessment of female infertility. Conducted at two tertiary care centers in Odisha, India, the study involved 300 women aged 20–40 years who had experienced primary or secondary infertility for more than one year. Women with hormonal disorders or male factor infertility were excluded. The aim was to determine the effectiveness of DHL in identifying treatable pelvic and intrauterine abnormalities that are often missed through routine pelvic examinations and conventional imaging techniques. Among the participants, 206 (69%) had primary infertility and 94 (31%) had secondary infertility. Laparoscopic evaluation revealed abnormalities in 34% of cases, while hysteroscopic findings were noted in 18%, with a combined diagnostic yield of 26%. The study found that laparoscopic abnormalities were more common in women with primary infertility, whereas hysteroscopic abnormalities were slightly more prevalent in those with secondary infertility. The most frequent laparoscopic findings included endometriosis (14%) in

the primary infertility group and adnexal adhesions (12%) in the secondary group, along with fibroids, ovarian pathologies, and tubal issues. In terms of hysteroscopic abnormalities, the most common was a septate uterus (10%), which had not been detected through prior ultrasonography. Other findings included endometrial polyps (5%), submucous myomas (3%), synechiae, and retained foreign bodies. Tubal blockage, as assessed by chromopertubation, was observed in 10% of patients and was evenly distributed between unilateral and bilateral cases. The study underscores that DHL not only enhances diagnostic accuracy but also enables therapeutic intervention in the same sitting, making it a dual-purpose procedure. Moreover, the approach was reported to be safe, with no major surgical or anesthetic complications observed. The study showed DHL was effective in identifying treatable causes like endometriosis, tubal blockages, and uterine septa.[11]

MATERIALS AND METHODS

The Materials and Methods section outlines the approach and procedures followed in the study to investigate the diagnostic outcomes of hysteroscopy and laparoscopy in infertile women. This section provides a detailed description of the study design, participant selection criteria, data collection techniques, and statistical analysis methods. This section ensures transparency and reproducibility of the study, while ensuring that the results obtained are valid and reliable for drawing meaningful conclusions about infertility treatments and diagnostic procedures.

Study Population

The study population consists of women with infertility, who were between the age of 18 and 45 years, scheduled for a diagnostic procedure known as hysterolaparoscopy for diagnosis of infertility at KLES Dr. Prabhakar Kore Hospital, Belagavi . These women underwent DHL during the study period, which spans from December 2023 to December 2024.

Study Setting

The study was conducted at Dr. Prabhakar Kore Charitable Hospital and the Medical Research Centre located in Belagavi, specifically within the Department of Obstetrics and Gynecology.

Study Design

This was an observational study with a hospital-based design, and the duration of the study was one year. The hospital setting will provide an opportunity to observe the participants and collect the necessary data as they undergo the procedure.

Sample Size

The minimum sample size required for the study is based on the prevalence rate of abnormal findings in hysterolaparoscopy among infertility patients. The formula used for determining the sample size is: $n = \frac{z_\alpha^2 P(1-P)}{d^2}$

Where: P is the percentage of prevalence.

d is the difference in the prevalence.

$z\alpha$ is the Z value associated with the level of significance. For a 5% significance level, $z\alpha = 1.96$.

Based on previous studies showing a prevalence rate of 67.4% for abnormal findings during hysterolaparoscopy in infertility patients, and using a margin of error of 20% (d = 20%), the minimum required sample size is calculated as approximately 51.1, which is rounded to 52 participants.

Inclusion and Exclusion Criteria

- Inclusion Criteria
- All women with infertility who are between 18 and 45 years of age.
- These women underwent diagnostic hysterolaparoscopy for infertility purposes during the study period.
- Exclusion Criteria
- Women who were not willing to participate in the study were excluded from the research.

Data Collection Procedure

The data for this study was collected from the Department of Obstetrics and Gynecology at KLE's Dr. Prabhakar Kore Hospital in Belagavi. All infertile patients scheduled for diagnostic hysterolaparoscopy during the study period were included.

The collected data focused on several aspects such as demographic factors (e.g., age, duration, and type of infertility), baseline hormonal profiles, and male evaluation records related to infertility.

Additionally, intraoperative data were collected, including surgical findings and specific parameters such as tubal occlusion, peri-tubal, dense pelvic adhesions, endometriosis, abnormalities in the cervical canal, issues within the uterine cavity, ovarian and uterine abnormalities, and endometrial issues observed during the hysteroscopy procedure.

Statistical Analysis

As an observational study, the analysis was aimed to explore the relationship between different variables and cause for infertility. Continuous quantitative variables, such as age, years of infertility and BMI , will be summarized using mean and standard deviation. Discrete variables, such as the presence or absence of certain findings, will be expressed using the median. The categorical data will be presented as percentages.

To examine the association between clinical and demographic characteristics and outcomes, Data was collected by using a structure proforma. Data thus was entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of percentages and proportions .Quantitative data was expressed in terms of Mean and Standard deviation. Association between two

qualitative variables was seen by using Chi square/Fischer's exact test . Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

Visual representations of the data will be provided through graphs and charts to effectively depict comparisons between the different study groups. The aim of this methodology is to offer valuable insights into the diagnostic outcomes of hysteroscopy and laparoscopy for infertility management, ensuring robust statistical analysis and thorough data collection.

RESULTS

In this observational study total 62 cases of infertility which met inclusion criteria were evaluated for cause by Diagnostic Hysterolaparoscopy.

Table 1: Type of Infertility Among Patients (n=62)

Type of infertility	Number of Patients (n)	Percent (%)
Primary	41	66.1
Secondary	21	33.9
Total	62	100.0

Figure 4: Pie chart of Type of Infertility Among Patients (Primary vs. Secondary)

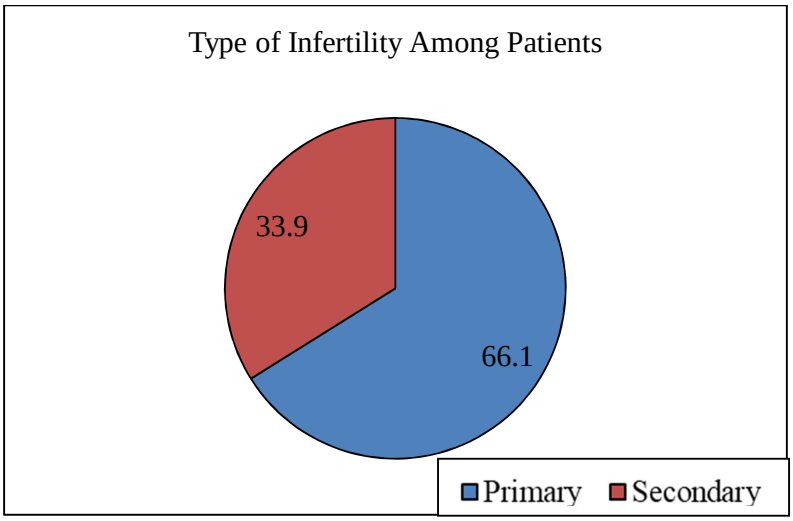

Table 1 & Figure 4 categorizes patients based on infertility type. 66.1% of patients have primary infertility, while 33.9% have secondary infertility.

Table 2: Association of Age Distribution by Type of Infertility (Primary vs. Secondary)

Age group in years	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
<=30	25	61.0	11	52.4	36	58.1	0.7
31-35	11	26.8	5	23.8	16	25.8	
36-40	4	9.8	4	19.0	8	12.9	
>40	1	2.4	1	4.8	2	3.2	
Total	41	100.0	21	100.0	62	100.0	

Figure 5: Bar chart of Age distribution by Type of Infertility (Primary vs. Secondary)

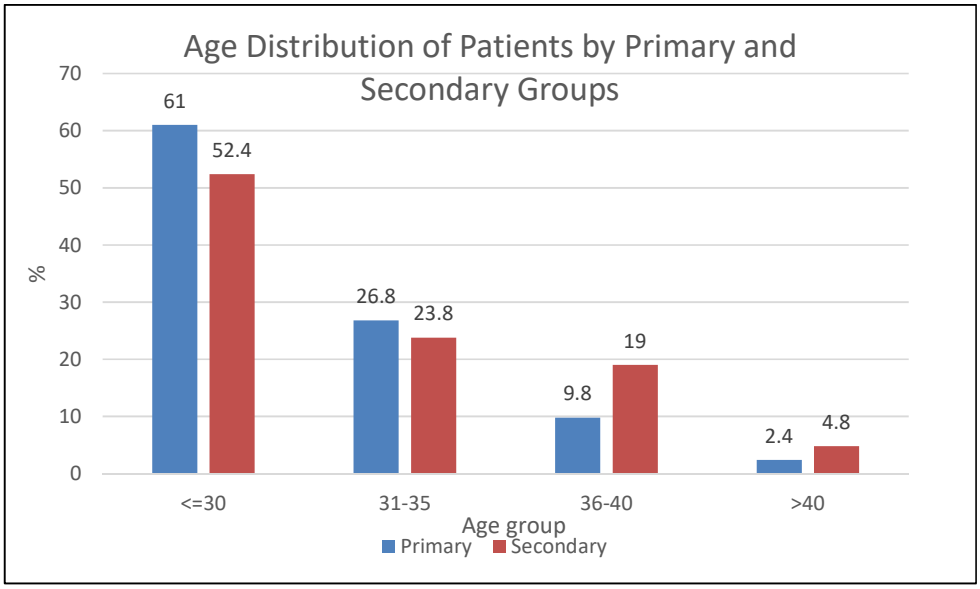

Table 2 & Figure 5 represents the distribution of patients across different age groups. The majority (58.1%) of patients are aged ≤30 years, followed by 25.8% in the 31-35 years group. It represents the age distribution of patients classified into primary and secondary infertility groups. The majority of patients in both groups are aged ≤30 years (61.0% in primary, 52.4% in secondary). The ratio of primary to secondary patients is approximately equal in each age group.

Table 3: Duration of years of Infertility by Type of Infertility (Primary vs. Secondary)

Years of Infertility	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
< 5	24	58.5	5	23.8	29	46.8	0.024
6 to 10	13	31.7	14	66.7	27	43.5	
>10	4	9.8	2	9.5	6	9.7	
Total	41	100.0	21	100.0	62	100.0	

Figure 6: Bar chart of Duration (years) of Infertility by Type of Infertility (Primary vs. Secondary)

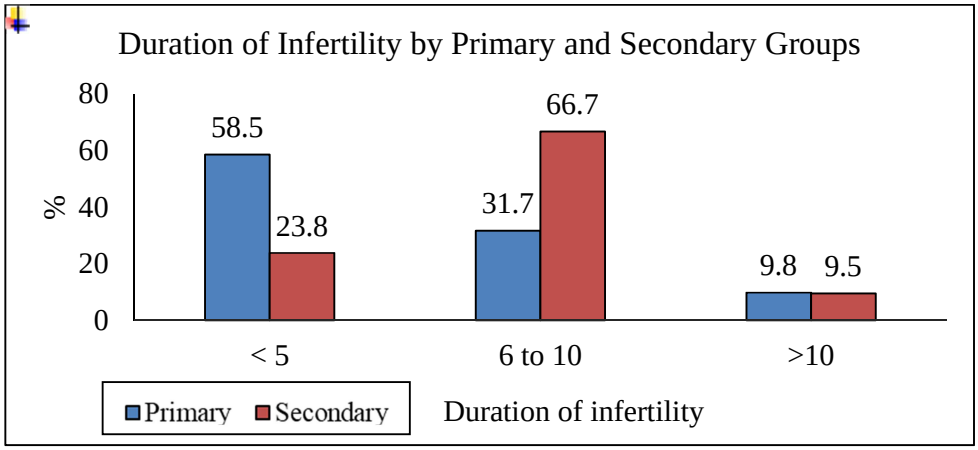

Table 3 & Figure 6 categorizes patients based on the years of infertility. 46.8% of patients have been suffering from infertility for less than 5 years, 43.5% of the patients have been suffering from infertility for 6 to 10 years, and 9.7% have been married for more than 10 years. The difference between groups is statistically significant (p = 0.024). The p-value of 0.024 indicates that the distribution of primary and secondary patients significantly varies across different durations of years of infertility.

Table 4: Consanguinity Status of Patients by Type of Infertility (Primary vs. Secondary)

Consanguinity	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Non consanguinity	37	90.2	20	95.2	57	92	0.405
2nd degree consanguinity	3	7.3	0	0.0	3	4.8	
3rd degree consanguinity	1	2.4	1	4.8	2	3.2	
Total	41	100.0	21	100.0	62	100.0	

Figure 7: Bar chart of Consanguinity Status of Patients by Type of Infertility (Primary vs. Secondary)

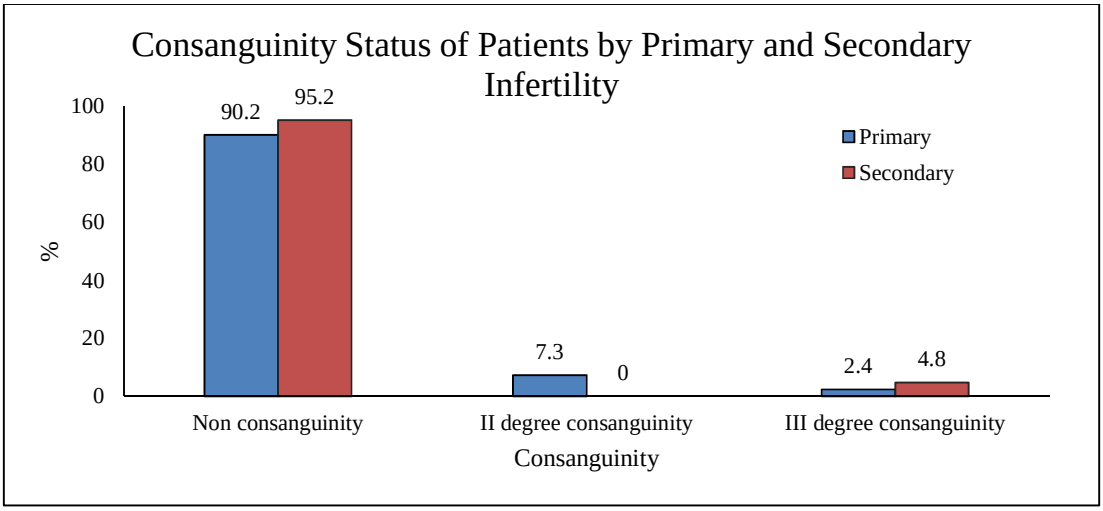

Table 4 & Figure 7 categorizes patients based on consanguinity. 92% of patients are from non-consanguineous marriages, while 4.8% have II-degree consanguinity, and 3.2% have III-degree consanguinity. It compares consanguinity in primary and secondary infertility cases. The majority of patients (90.2% in primary, 95.2% in secondary) are from non-consanguineous marriages. II-degree consanguinity is present in 7.3% of primary infertility cases, but absent in secondary cases.

Table 5: Menstrual Pattern by Type of Infertility (Primary vs. Secondary)

Menstrual irregularities	Primary		Secondary		Total		p value
	n (n=41)	%	n(n=21)	%	n (n=62)	%	
REGULAR	21	51.2	16	43.2	37	59.7	0.093
IRREGULAR	20	43.9	5	18.2	25	40.3	
TOTAL	41	100.0	21	33.9	62	100.0	

Figure 8: Bar chart of Menstrual Pattern by Type of Infertility (Primary vs. Secondary)

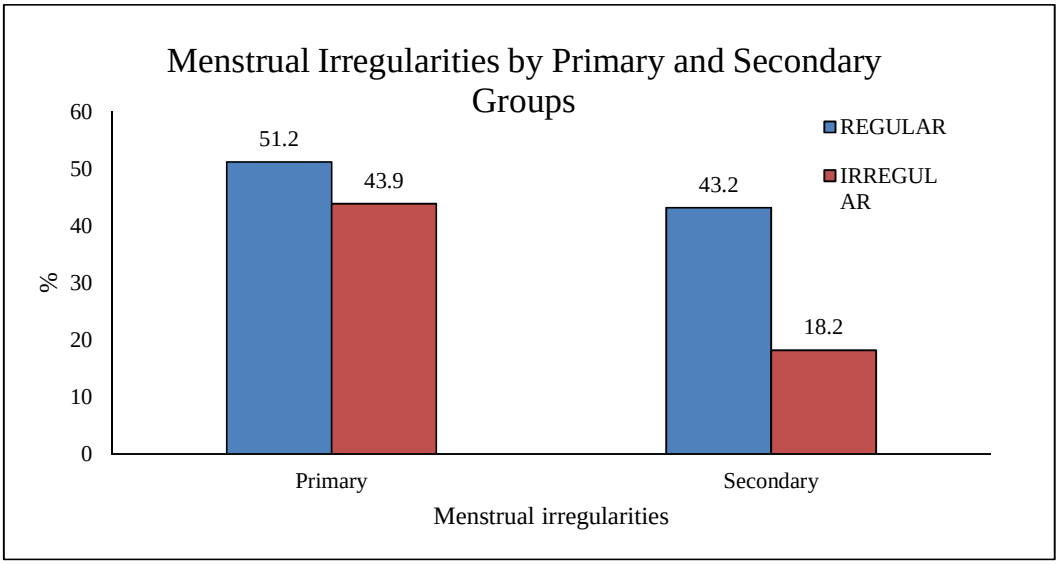

Table 5 & Figure 8 represents the menstrual patterns of patients. 59.7% of patients have regular menstrual cycles, while 40.3% report irregular menstrual cycles. This suggests that a majority of the patients have regular menstrual cycles, with a significant portion facing irregularities. Menstrual irregularities are more common in primary infertility (43.9%) than in secondary infertility (18.2%).

Table 6: Association of BMI Distribution by Type of Infertility (Primary vs. Secondary)

BMI grades	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
18.5-24.9	12	29.3	7	33.3	19	30.6	0.82
25.0-29.9	21	51.2	9	42.9	30	48.4	
>30.0	8	19.5	5	23.8	13	21.0	
Total	41	100.0	21	100.0	62	100.0	

Figure 9: Bar chart of BMI Distribution by Type of Infertility (Primary vs. Secondary)

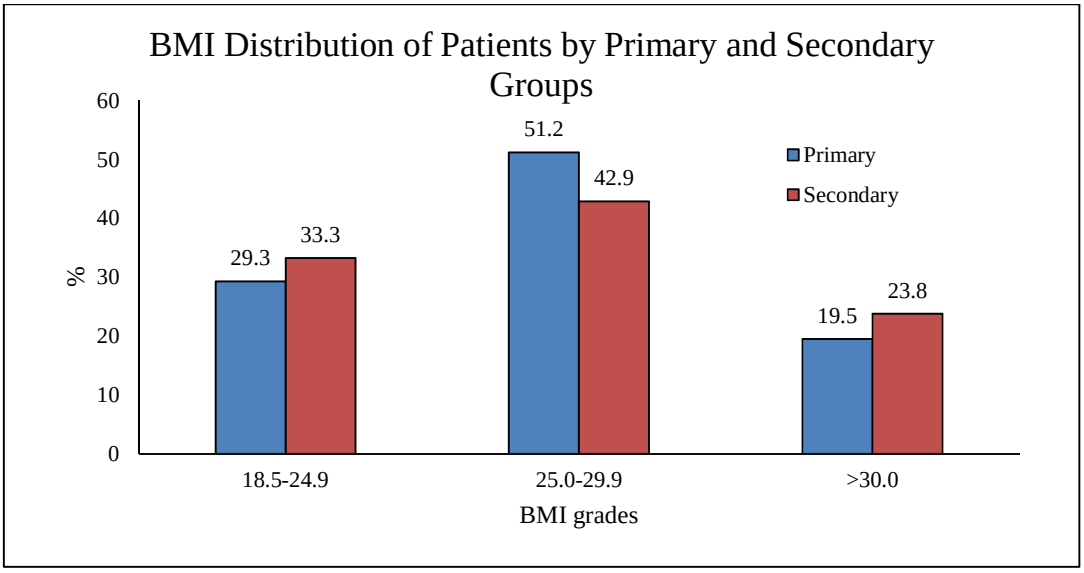

Table 6 & Figure 9 represents the BMI classification of patients. 48.4% fall into the overweight category (BMI 25.0-29.9), while 30.6% have a normal BMI (18.5-24.9). The remaining 21.0% are classified as obese (BMI >30.0). Comparing BMI categories between primary and secondary infertility groups. In both groups, the majority of patients fall in the overweight category (51.2% in primary, 42.9% in secondary). Obesity is slightly higher in secondary infertility cases (23.8%) than in primary cases (19.5%).

Table 7: Association of Comorbidities Status by Type of Infertility (Primary vs. Secondary)

Comorbidities	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Hypothyroid	8	19.5	4	19.1	12	19.4	0.66
Nil	33	80.5	17	80.9	50	80.6	
Total	41	100.0	21	100.0	62	100.0	

Figure 10: Bar chart of Hypothyroidism Status by Type of Infertility (Primary vs. Secondary)

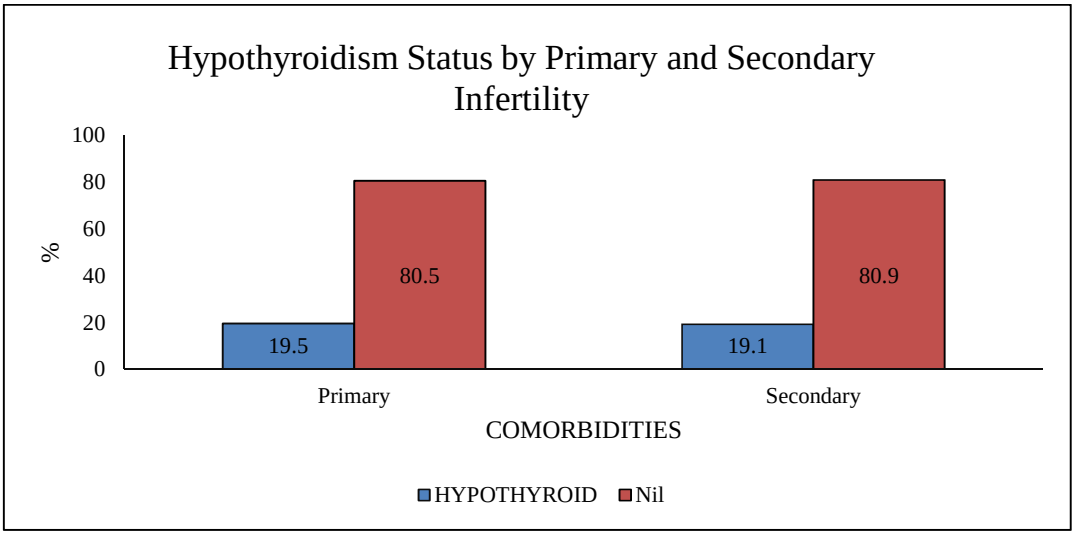

Table 7 & Figure 10 categorizes patients based on comorbid conditions. 19.4% of patients have hypothyroidism, while 80.6% have no recorded comorbidities. It compares hypothyroidism prevalence in primary and secondary infertility groups. 19.5% of primary infertility cases and 19.1% of secondary infertility cases have hypothyroidism. The majority of patients in both groups have no comorbidities (80.5% in primary, 80.9% in secondary).

Table 8: Laparoscopy findings among patients (n=62)

Laparoscopic findings	Number of Patients (n)	Total (%)
Fibroid	9	14.5
Uterine anomaly	2	3.2
Ovarian pathology	41	66.1
Hydrosalpinx	6	9.7
Tubal pathology	9	14.5
Peritoneum / adnexal Adhesion	17	27.4
Endometriosis	6	9.7

Figure 11: Bar chart of Distribution of Patients by Laparoscopic Findings

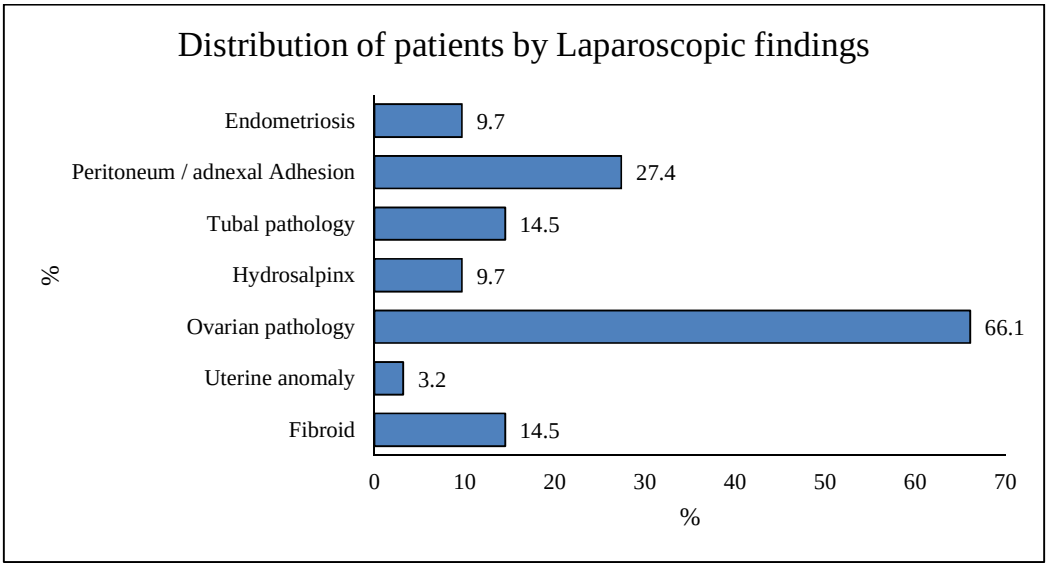

Table 8 & Figure 11 represents laparoscopic findings among patients. Ovarian pathology is the most common finding, seen in 66.1% of cases, followed by peritoneal/adnexal adhesions (27.4%). Fibroids and tubal pathology are observed in 14.5% of patients each, while endometriosis and hydrosalpinx are noted in 9.7% of cases. Uterine anomalies are the least common finding at 3.2%.

Table 9: Association of Uterine Findings by Type of Infertility (Primary vs. Secondary)

Uterus	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Normal	34	82.9	17	81.0	51	82.3	0.92
Congenital anomaly	1	2.4	1	4.8	2	3.2	
Intramural fibroid	3	7.3	2	9.5	5	8.1	
Sub serosal fibroid	3	7.3	1	4.8	4	6.4	
Total	41	100.0	21	100.0	62	100.0	

Figure 12: Bar chart of Uterine Findings by Type of Infertility (Primary vs. Secondary)

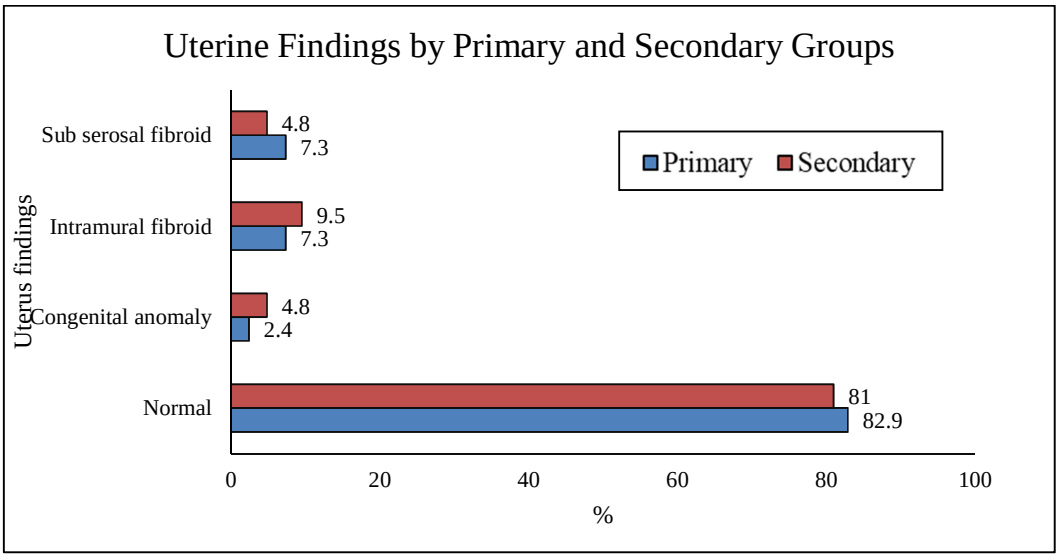

Table 9 & Figure 12 presents uterine abnormalities observed via laparoscopy in patients. 82.3% of patients have a normal uterus, while congenital anomaly – unicornuate uterus were noted in 3.2% of the patients. Subserosal fibroids are present in 6.4%, and intramural fibroids in 8.1%.

Table 10: Association of Ovarian Findings by Type of Infertility (Primary vs. Secondary)

Ovary	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Normal	13	31.7	8	38.1	21	33.9	0.87
Simple cyst	5	12.2	2	9.5	7	11.3	
Hemorrhagic cyst	1	2.4	0	0.0	1	1.6	
PCOM	15	36.6	9	42.9	24	38.7	
Large ovarian cyst	1	2.4	0	0.0	1	1.6	
Endometriotic cyst	3	7.3	2	9.5	5	8.1	
Tuboovarian mass	2	4.9	0	0.0	2	3.2	
Paraovarian cyst	1	2.4	0	0.0	1	1.6	
Total	41	100.0	21	100.0	62	100.0	

Figure 13: Bar chart of Laparoscopic Ovarian Findings by Type of Infertility (Primary vs. Secondary)

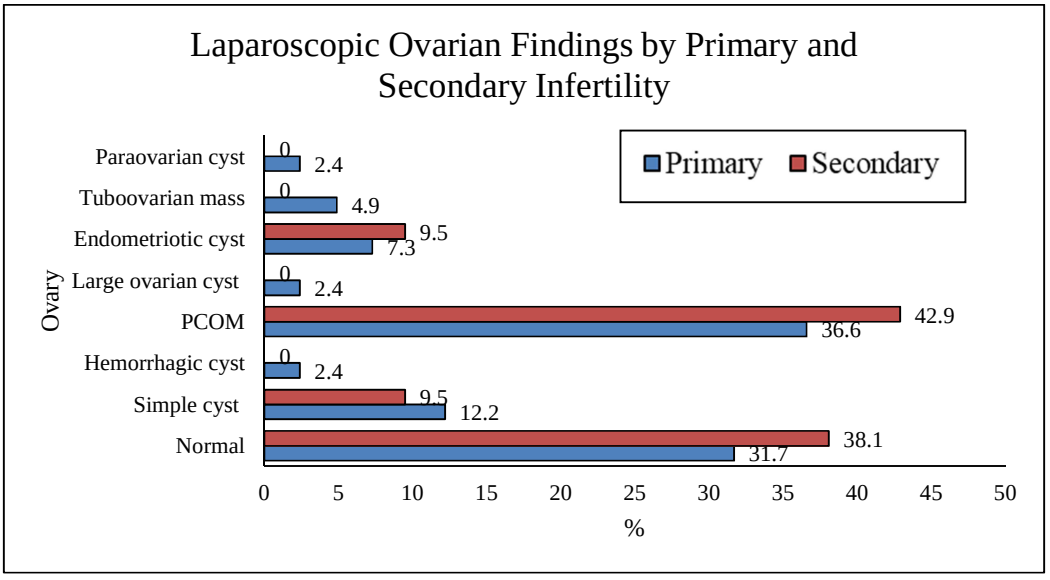

Table 10 & Figure 13 represents ovarian pathologies detected through laparoscopy. 38.7% of patients have polycystic ovarian morphology (PCOM), while 33.9% have normal ovaries. Simple cysts (11.3%) and endometriotic cysts (8.1%) are also observed. Less frequent conditions include tubo-ovarian mass (3.2%), paraovarian cyst (1.6%), and large ovarian cyst (1.6%).It categorizes ovarian abnormalities in primary and secondary infertility groups. Polycystic ovarian morphology (PCOM) is present in 36.6% of primary cases and 42.9% of secondary cases. Simple cysts (12.2% in primary, 9.5% in secondary) and endometriotic cysts (7.3% in primary, 9.5% in secondary) are noted.

Table 11: Association of Fallopian Tube Findings by Type of Infertility (Primary vs. Secondary)

Fallopian tube	Primary		Secondary		Total		p
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Normal	28	68.3	19	90.5	47	75.8	0.4
Hydrosalpinx	4	9.8	2	9.5	6	9.7	
Beaded appearance	3	7.3	0	0	3	4.8	
Others	6	14.6	0	0	6	9.7	
Total	41	100.0	21	100	62	100	

Figure 14: Bar chart of Laparoscopic Fallopian Tube Findings by Type of Infertility (Primary vs. Secondary)

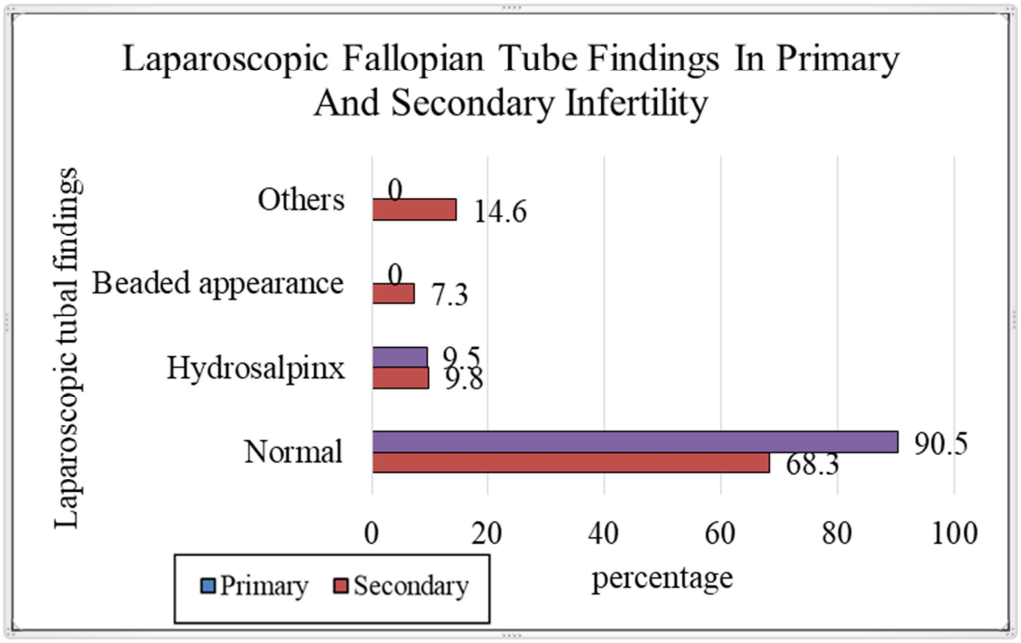

Table 11 & Figure 14 categorizes fallopian tube findings observed during laparoscopy ,a normal appearance of the fallopian tubes was observed in the majority of cases (75.8%), with higher prevalence in the secondary infertility group (90.5%) compared to the primary group (68.3%). Other findings include - fimbrial cysts seen in 4.8% of patients , while tubo-ovarian mass (3.2%) and tortuous tubes (1.6%) are less frequent. It compares fallopian tube conditions in primary and secondary infertility cases. Normal tubes were observed in 68.3% of primary infertility cases and 90.5% of secondary infertility cases. Hydrosalpinx was present in 9.8% of primary and 9.5% of secondary cases.

Table 12: Association of Chromopertubation Findings by Type of Infertility (Primary vs. Secondary)

Chromopertubation	Primary		Secondary		Total		p value
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
B/L Spillage noted	27	65.9	16	76.2	43	69.4	0.294
U/L Spillage noted	5	12.2	4	19.0	9	14.5	
NO Spillage noted	6	14.6	1	4.8	7	11.3	
Not done (cervical stenosis)	3	7.3	0	0.0	3	4.8	
Total	41	100.0	21	100.0	62	100.0	

Figure 15: Bar chart of Chromopertubation Findings by Type of Infertility (Primary vs. Secondary)

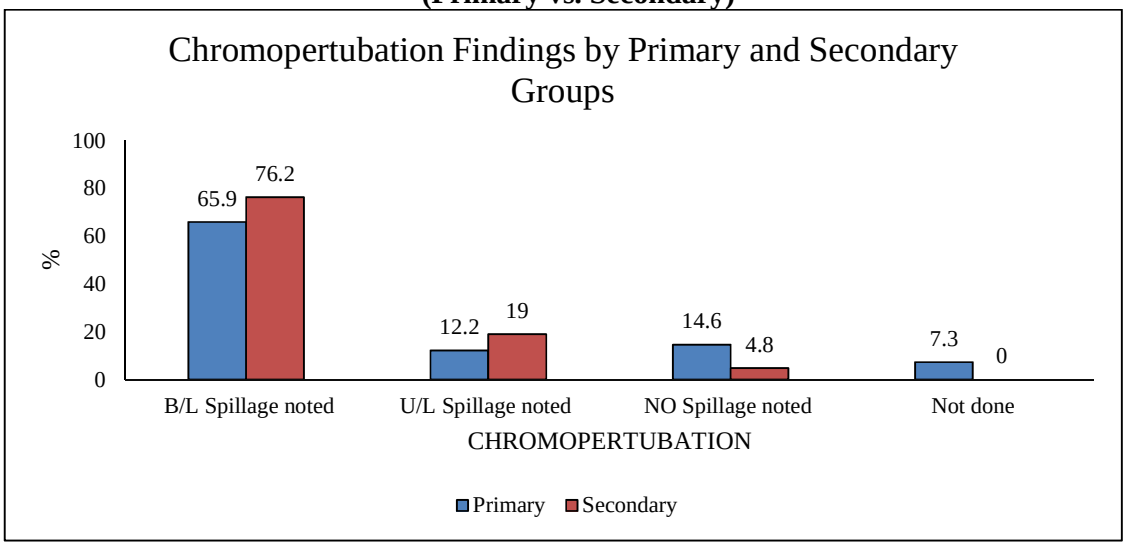

Table 12 & Figure 15 represents the results of chromopertubation testing. 69.4% of patients show bilateral spillage, indicating open tubes. Unilateral spillage was noted in 14.5%, while 11.3% show no spillage. In 4.8% of cases, the test cound not be performed.It shows tubal patency results using chromopertubation in primary and secondary infertility cases. Bilateral spillage was noted in 65.9% of primary and 76.2% of secondary cases. No spillage is observed in 14.6% of primary cases and 4.8% of secondary cases.

Table 13: Association of Pelvic Adhesions Detected During Laparoscopy in Primary and Secondary Infertility

Peritoneal Adhesions	Primary		Secondary		Total		P
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Present	10	24.4	7	33.3	17	27.4	0.65
Absent	31	75.6	14	66.7	45	72.6	
Total	41	100.0	21	100.0	62	100.0	

Figure 16: Bar chart of Peritoneal Adhesions Observed by Type of Infertility (Primary vs. Secondary)

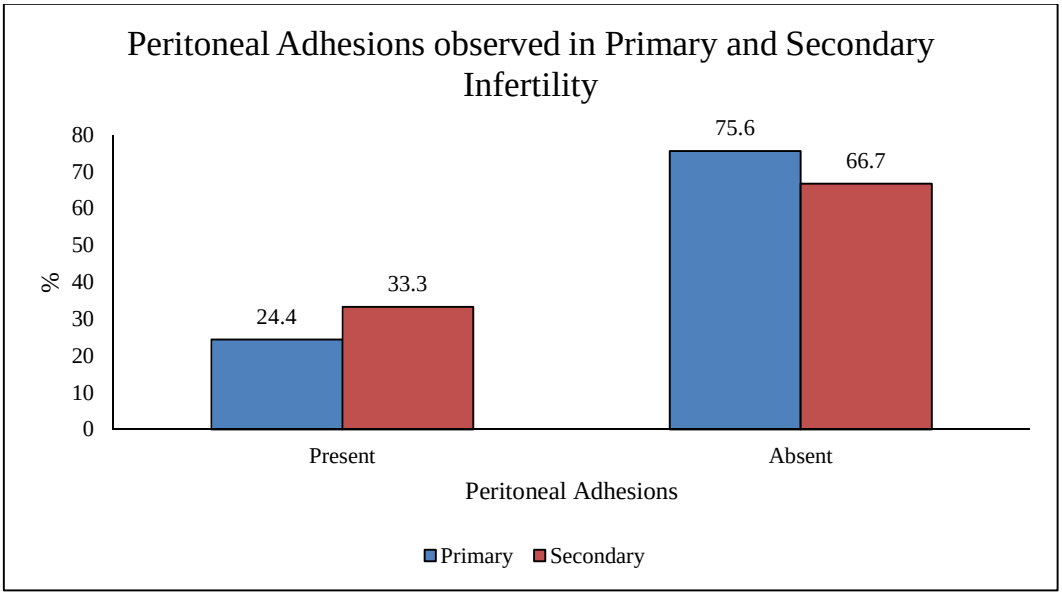

Table 13 & Figure 16 categorizes patients based on the presence of peritoneal adhesions. Peritoneal adhesions were noted in 27.4% of the patients, while 72.6% do not show adhesions. 24.4% of primary infertility cases and 33.3% of secondary infertility cases had peritoneal adhesions.

Table 14: Association of Incidence of Endometriosis Observed During Laparoscopy by Type of Infertility (Primary vs. Secondary)

Endometriosis	Primary		Secondary		Total		P
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Present	6	14.6	0	0.0	6	9.7	0.08
(acc. To ARSM)	4	9.7	0	0.0	4	6.5	
Grade 1	2	4.9	0	0.0	2	3.2	
Grade 4							
Absent	35	85.4	21	100.0	56	90.3	
Total	41	100.0	21	100.0	62	100.0	

Figure 17: Bar chart of Endometriosis by Type of Infertility (Primary vs. Secondary)

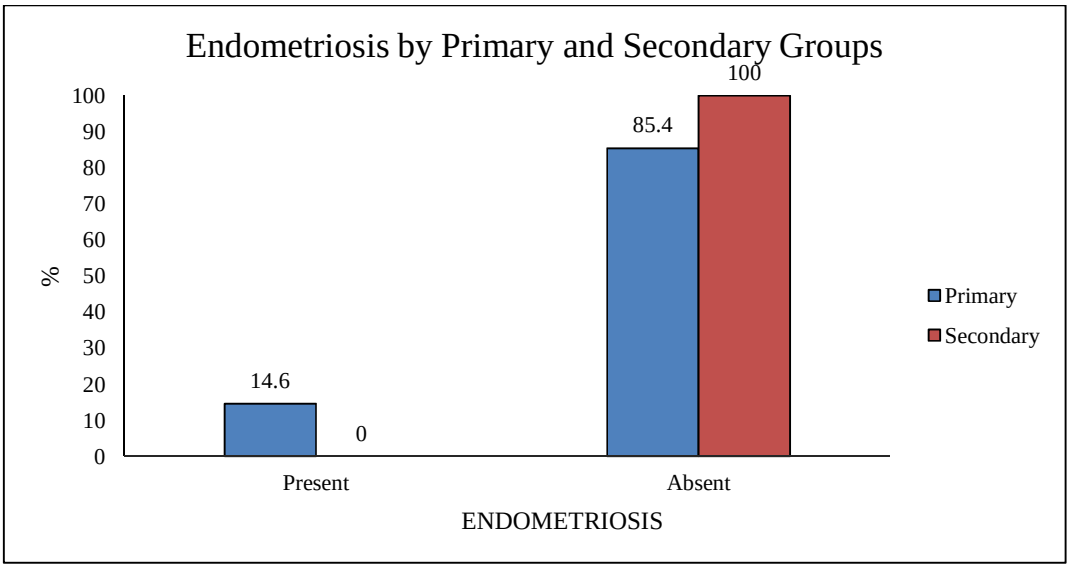

Table 14 & Figure 17 represents endometriosis classification based on ARSM grading amoung patients. 9.7% of patients have Grade 1 endometriosis, while 4.9% have Grade 4 endometriosis. The remaining 90.3% of patients have no evidence of endometriosis. 14.6% of primary infertility cases have endometriosis, whereas no secondary infertility cases show endometriosis.

Table 15: Hysteroscopic Findings Among Patients (n = 62)

Hysteroscopic findings	Total (n)	Total (%)
Cervix	4	6.4
Uterine Cavity	10	16.1
Endometrium	8	12.9

Figure 18: Pie chart of Hysteroscopic Findings by Site (Cervix, Uterine, Endometrium)

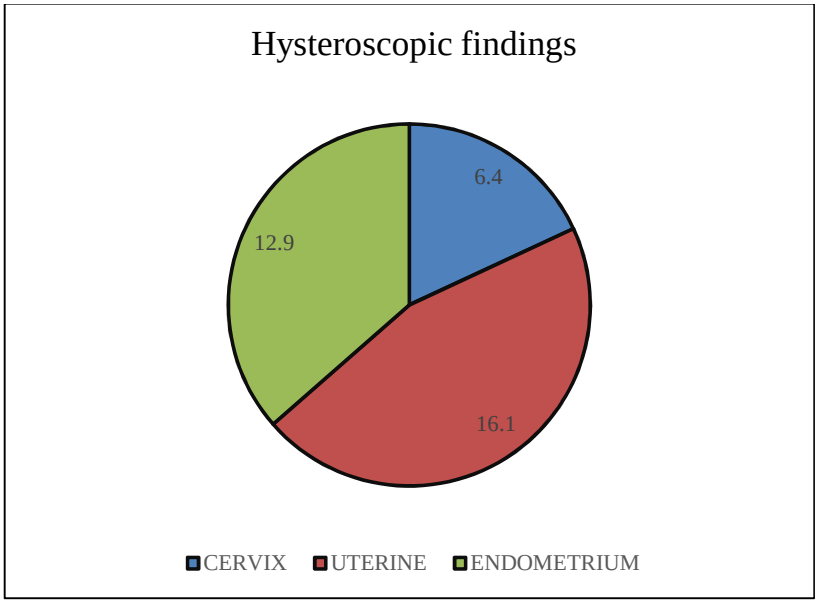

Table 15 & Figure 18 represents hysteroscopic findings. 16.1% of patients have uterine abnormalities, 12.9% have endometrial abnormalities, and 6.4% show cervical abnormalities.

Table 16: Association of Cervical Findings via Hysteroscopy among patients by Type of Infertility (Primary vs. Secondary)

Cervix	Primary		Secondary		Total		P
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Normal	38	92.7	20	95.2	58	93.5	0.53
Polyps	2	4.9	0	0.0	2	3.2	
Stenosis	1	2.4	1	4.8	2	3.2	
Total	41	100.0	21	100.0	62	100.0	

Figure 19: Bar chart of Cervical Findings by Type of Infertility (Primary vs. Secondary)

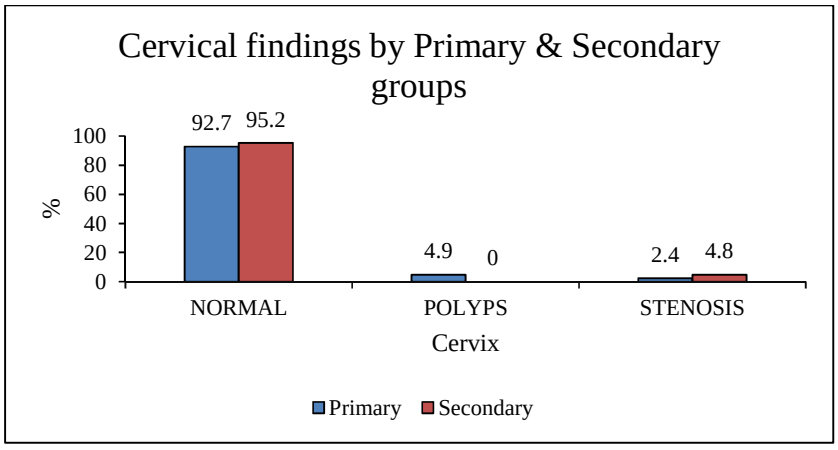

Table 16 & Figure 19 represents cervical findings during hysteroscopy in primary and secondary infertility groups. No cervical abnormality was observed in the majority of cases in both groups (93.5% overall), cervical polyps (3.2%) were observed only in primary infertility cases, while cervical stenosis was present in both groups at a low frequency (3.2%), suggesting that cervical abnormalities are relatively uncommon contributors to infertility in this study.

Table 17: Association of Uterine Cavity Findings via Hysteroscopy among patients by Type of Infertility (Primary vs. Secondary)

Uterine Cavity Findings	Primary		Secondary		Total		P
	n (n=41)	%	n (n=21)	%	n (n=62)	%	
Normal	31	75.6	13	61.9	44	70.9	0.82
Endometrial Polyp	4	9.7	4	19.0	8	12.9	
Uterine Synechiae	2	4.9	1	4.7	3	4.8	
Unicornuate Uterus	1	2.4	1	4.7	2	4.8	
Complete Septate Uterus	1	2.4	0	0.0	1	1.6	
Partial Septate Uterus	1	2.4	1	4.8	2	3.2	
Hysteroscopy could not be done	1	2.4	1	4.8	2	3.2	
Total	41	100.0	21	100.0	62	100.0	

Figure 20: Bar chart of Uterine Cavity Hysteroscopic Findings by Type of Infertility (Primary vs. Secondary)

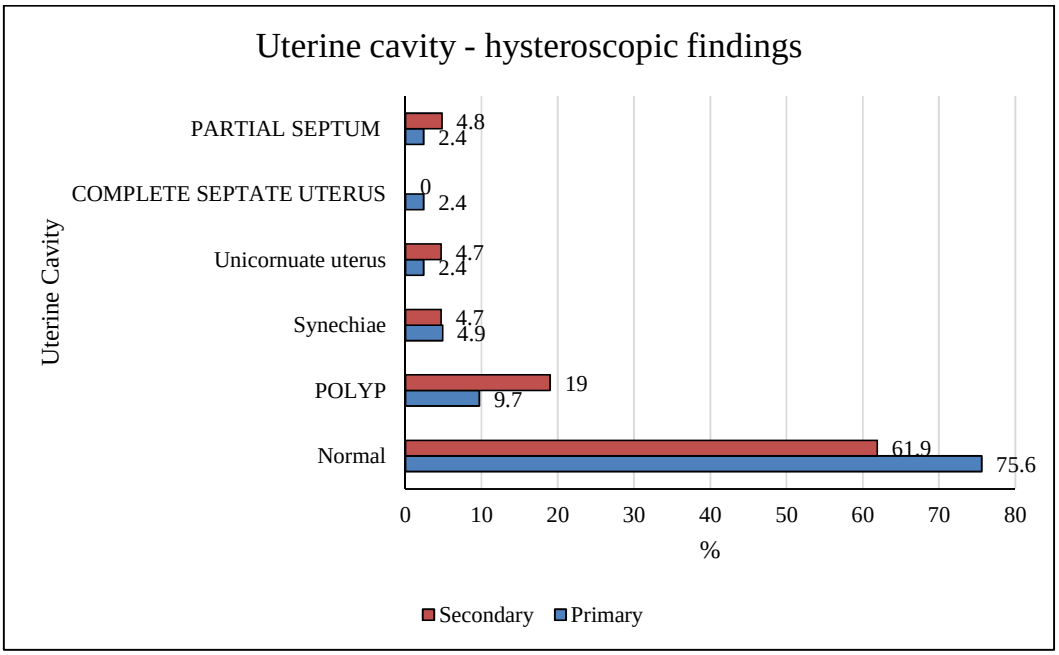

Table 17 & Figure 20 Categorizes abnormalities within the uterine cavity observed in hysteroscopy of total, 70.9% of patients have a normal uterine cavity, while 12.9% have endometrial polyps. Synechiae (4.8%), partial septum (3.2%), unicornuate uterus (3.2%), and complete septum (1.6%) is less frequently observed. Hysteroscopy was not performed in 3.2% of cases. The distribution of uterine cavity findings between the Primary and Secondary groups shows no significant difference ($p = 0.82$), indicating comparable anatomical profiles.

DISCUSSION

Type of Infertility (Table 1)

In our study, among the 62 infertile patients evaluated, 41 (66.1%) had primary infertility and 21 (33.9%) had secondary infertility, indicating a predominance of primary infertility among women seeking clinical evaluation.

A study by Gupta et al. (2020) at a tertiary care center in northern India reported a comparable distribution, with 68.7% of women presenting with primary infertility and 31.3% with secondary infertility[56].

A study by Adegbola et al. (2021) in Nigeria found that among 320 infertile women, 63.1% had primary infertility, while 36.9% had secondary infertility[57].

A study by Singh et al. (2021) in eastern India observed primary infertility in 65.5% and secondary infertility in 34.5% of 250 women attending infertility clinics[58].

A study by Mascarenhas et al. (2019), utilizing Demographic and Health Survey (DHS) data from 190 countries, noted that primary infertility is more prevalent in high-income and urbanized regions (2.5–5%), while secondary infertility dominates in low-income settings such as sub-Saharan Africa and parts of South Asia, accounting for up to 70% of infertility cases[59].

A study by Boivin et al. (2022), based on a systematic review, suggested that the higher clinical presentation of primary infertility may be influenced by behavioral patterns, as women with primary infertility tend to seek care earlier—within 2–3 years—compared to those with secondary infertility, who often present after 5–7 years[60].

Demographic Characteristics (Table 2–3)

In our study, the majority of infertile women were aged ≤30 years (58.1%), with 61.0% of patients in the primary infertility group and 52.4% in the secondary infertility group falling in this category. Mean years of infertility (overall) = 5.8 years. This indicates that infertility evaluation is commonly sought by younger women in their reproductive years.

A study by Jain et al. (2023) highlighted that early consultation for infertility is increasing among younger couples, with a mean age of 29.4 years among women with primary infertility[61].

In our study, only 3.2% (n=2) of all patients were aged above 40 years, indicating that most women seek infertility treatment within a biologically favorable age window.

A study by Verma et al. (2022) also reported that women over 40 constituted less than 5% of the infertility cases in their cohort[62].

The age distribution between primary and secondary infertility groups in our study was not statistically significant (p = 0.7), suggesting a similar age range of presentation across both groups.

In our study, nearly half the patients (46.8%) had been infertile for less than 5 years, while 43.5% had a duration of 6 to 10 years, and only 9.7% had infertility lasting more than 10 years.

A study by Mishra et al. (2022) reported that 52% of women presented within 5 years of infertility, aligning closely with our findings[63].

In our study, a statistically significant association was observed between duration of infertility and type of infertility (p = 0.024).

Among those with primary infertility, 58.5% had a shorter duration (<5 years), while in the secondary infertility group, 66.7% had a longer duration (6–10 years).

This suggests that secondary infertility patients may delay evaluation, possibly due to a previous conception and the perception of preserved fertility.

A study by Kumar et al. (2021) found that women with secondary infertility typically delayed seeking treatment compared to those with primary infertility, often presenting after more than 5 years of trying to conceive[64].

Consanguinity (Table 4)

In our study, the overall prevalence of consanguinity among infertile women was 8%, comprising 4.8% second-degree and 3.2% third-degree relationships. Consanguinity was slightly more common in the primary infertility group, although this difference was not statistically significant ($p = 0.405$).

A study by Al-Turki (2019) conducted in Saudi Arabia reported that 10–15% of infertile patients were in consanguineous marriages[65].

The study observed a stronger association between consanguinity and primary infertility, attributing this link to potential inherited autosomal recessive disorders that may impair reproductive function.

A study by Naeem et al. (2021) in Pakistan also identified consanguinity as a contributing factor in female infertility[66].

Menstrual Pattern (Table 5)

In our study, menstrual irregularities were more frequently observed in women with primary infertility (43.9%) compared to those with secondary infertility (18.2%), although the difference did not reach statistical significance ($p = 0.093$).

A study by Sharma et al. (2020) reported that irregular menstruation, commonly associated with ovulatory dysfunction and polycystic ovary syndrome (PCOS), was significantly more prevalent among women experiencing primary infertility[67].

A study by Teklu et al. (2019) found that up to 40% of patients with primary infertility reported menstrual cycle irregularity[68].

BMI and Comorbidities (Table 6–7)

In our cohort, BMI analysis revealed that nearly half of the patients (48.4%) were overweight (BMI 25–29.9), and 21.0% were obese (BMI >30). Obesity was slightly more common in the secondary infertility group (23.8%) compared to the primary group (19.5%), though the difference was not statistically significant (p = 0.82).

A study by Kafy et al. (2022) reported similar findings in Bangladesh, where 46% of infertile women were overweight and 18% obese[69].

A study by Chavarro et al. (2019), involving multiple countries, concluded that overweight and obesity negatively affect ovulation, implantation, and live birth rates[70].

Comorbidity analysis in our study showed that hypothyroidism was present in 19.4% of the total cohort, with nearly equal distribution between primary (19.5%) and secondary (19.1%) infertility groups (p = 0.66).

A study by Rao et al. (2021) found a 15–20% prevalence of hypothyroidism among infertile women[71].

A study by Dasari et al. (2023) also found no significant difference in thyroid dysfunction prevalence between the two types of infertility, consistent with our observations[72].

Laparoscopic Findings in Infertile Patients (Table 8)

In our study, the most common laparoscopic finding among infertile women was ovarian pathology, seen in 66.1% (n=41) of the patients.

A study by Priyadarshini et al. (2022) reported ovarian abnormalities in 60% of infertile women undergoing laparoscopy in South India[73].

In our study, peritoneal or adnexal adhesions were found in 27.4% (n=17) of patients, making it the second most common pathology.

We observed fibroids and tubal pathologies in 14.5% of patients each.

In our cohort, endometriosis and hydrosalpinx were each present in 9.7% (n=6) of cases.

Uterine anomalies were the least common laparoscopic finding in our study, seen in 3.2% (n=2) of patients, which was unicornuate uterus.

Uterine Findings in Relation to Type of Infertility (Table 9)

In our study, a normal uterus was observed in 82.3% (n=51) of patients overall, including 82.9% of women with primary infertility and 81.0% with secondary infertility.

A study by Bafna et al. (2022) also found that a majority of women had a normal uterus, with no significant difference between primary and secondary infertility groups[74].

Intramural fibroids were observed in 8.1% (n=5) of our patients—slightly higher in secondary infertility (9.5%) than in primary (7.3%).

Bafna et al. (2022) reported a similar prevalence of intramural fibroids, ranging from 8% to 10% among infertile women[74].

Subserosal fibroids were seen in 6.4% (n=4) of our patients, with a slightly higher rate in primary infertility (7.3%) compared to secondary (4.8%).

Bafna et al. also found subserosal fibroids in 5–6% of women with infertility[74].

Congenital uterine anomalies were noted in 3.2% (n=2) of patients in our study—one in each infertility group, especially unicornuate.

Tavakkoli et al. (2019) reported a comparable incidence of 3.1% for Müllerian anomalies in infertile women[75].

In our study, the difference in uterine pathology between primary and secondary infertility was not statistically significant (p = 0.92).

Chitra et al. (2020) similarly found no significant variation in uterine abnormalities when comparing primary and secondary infertility groups.

Ovarian Findings by Type of Infertility (Table 10)

In our study, ovarian abnormalities were observed in a significant proportion of infertile women, with only 33.9% showing normal ovaries. The most common finding was polycystic ovarian morphology (PCOM), seen in 38.7% of patients—36.6% in women with primary infertility and 42.9% in those with secondary infertility. Other observed abnormalities included simple ovarian cysts (11.3%), endometriotic cysts (8.1%), and tubo-ovarian masses (3.2%). Less frequent findings included hemorrhagic cysts, large ovarian cysts, and paraovarian cysts, each noted in approximately 1.6% of the cohort.

Nayak et al. (2020) reported the presence of PCOM in 40.2% of infertile women undergoing laparoscopy[76].

Sowmya et al. (2020) observed PCOM in 37.6% of patients presenting with primary infertility[77].

PCOM is widely associated with oligo-ovulation and endocrine dysfunction.

Parasar et al. (2022) documented endometriotic cysts (endometriomas) in 9–12% of infertile women evaluated via diagnostic laparoscopy[78].

Patel et al. (2019) found simple ovarian cysts in 10.5% of women assessed for infertility[79].

Mahmoud et al. (2021) reported tubo-ovarian masses in 2–4% of infertile women, often associated with pelvic infections or endometriosis[80].

Kavitha et al. (2021) concluded that although the type of ovarian abnormality may

vary, the overall frequency is comparable between infertility types[81].

In our data, the distribution of abnormalities showed no statistically significant difference between the two groups (p = 0.87).

Fallopian Tube and Chromopertubation Findings (Table 11–12)

In our study, fallopian tube evaluation using laparoscopy revealed that 75.8% of the 62 patients had normal fallopian tubes, with a higher proportion observed in the secondary infertility group (90.5%) compared to the primary infertility group (68.3%). Although the difference was not statistically significant (p = 0.4), this distribution supports existing observations that tubal pathology is more frequently associated with primary infertility.

Hydrosalpinx was detected in 9.7% of patients, with an almost equal distribution between primary (9.8%) and secondary (9.5%) infertility groups. A beaded appearance of the fallopian tubes, indicative of chronic infections such as genital tuberculosis, was observed exclusively in the primary infertility group (7.3%).

Yu et al. (2020) found tubal blockages in 28% of women with primary infertility and 16% in those with secondary infertility[82].

Oliveira et al. (2021) reported hydrosalpinx in 11.3% of infertile women undergoing laparoscopy[83].

Aggarwal et al. (2022) found a 12% prevalence of tubal beading among women diagnosed with genital tuberculosis[84].

Banerjee et al. (2019) identified tubal beading more frequently among women with no prior conception history[85].

Chromopertubation revealed bilateral spillage in 69.4% of cases, unilateral in 14.5%, and no spillage in 11.3%.

Sharma et al. (2020) found bilateral tubal patency in approximately 70–75% of infertile women.

Dhananjay et al. (2021) reported unilateral spillage in 10–15% of patients[86].

Goyal et al. (2019) observed complete tubal blockage in 9–13% of women undergoing chromopertubation[87].

In our study, the procedure could not be completed in 4.8% of cases.

Pelvic Adhesions and Endometriosis (Table 13–14)

In our study, pelvic adhesions were observed in 27.4% of infertile women undergoing diagnostic laparoscopy, with a higher proportion seen in the secondary infertility group (33.3%) compared to the primary group (24.4%). Although this difference was not statistically significant ($p = 0.65$), the presence of adhesions in nearly one-third of patients suggests a clinically relevant burden, particularly in cases of unexplained infertility. These findings suggest that peritoneal adhesions may contribute to mechanical infertility by distorting pelvic anatomy, impeding oocyte pick-up, or altering tubal function.

A study by El-Tabbakh et al. (2020) reported pelvic adhesions in 29.8% of women undergoing laparoscopy for infertility, with slightly higher prevalence among secondary infertility cases[88].

A study by Kaur et al. (2022) reported that in cases of primary infertility, pelvic adhesions were frequently linked to subclinical endometriosis or chronic inflammation[89].

A systematic review by Ahmad et al. (2023) concluded that peritoneal adhesions were present in 20–40% of infertile women undergoing laparoscopy, with a slightly higher incidence among secondary infertility cases[90].

In our study, endometriosis was identified in 14.6% of patients with primary infertility, while no cases were noted among those with secondary infertility. Based on the revised American Society for Reproductive Medicine (ASRM) classification, 9.7% were classified as Grade 1 and 4.9% as Grade 4. Although the association was not statistically significant (p = 0.08), the trend suggests a higher burden of endometriosis among women with primary infertility.

A study by Parasar et al. (2022) found endometriosis in 15–20% of women with unexplained primary infertility, mostly in Stage I or II[78].

A study by Vercellini et al. (2019) reported a significantly higher prevalence of endometriosis in women with primary infertility compared to those with secondary infertility[91].

A study by Gupta et al. (2020) observed endometriosis in only 2% of secondary infertility cases, compared to over 18% in primary infertility.

A study by Roman et al. (2021) highlighted that severe (Grade 4) endometriosis is often associated with extensive pelvic adhesions, ovarian endometriomas, and anatomical distortion[92].

Hysteroscopic Evaluation of Uterine and Endometrial Pathologies by Type of Infertility (Table 15)

In our study, hysteroscopic findings related to the uterine cavity were evaluated among 62 infertile women, and the abnormalities were categorized based on the type of infertility. A normal uterine cavity was observed in 70.9% of patients, with a slightly higher proportion in the primary infertility group (75.6%) compared to the secondary group (61.9%). However, this difference was not statistically significant (p = 0.82).

A study by Jindal et al. (2021) reported endometrial polyps in 10–15% of infertile women undergoing hysteroscopy[93].

These findings were particularly noted in women with prior uterine procedures or age-related endometrial changes, aligning with the 12.9% prevalence observed in our cohort—9.7% in primary and 19.0% in secondary infertility.

A study by Sharma et al. (2020) identified uterine synechiae in approximately 5% of infertile women.

Our study showed a similar distribution, with synechiae present in 4.8% of patients—4.9% in the primary group and 4.7% in the secondary group.

A study by Pansky et al. (2022), supported by findings from Chan et al. (2020), reported a 3–5% prevalence of congenital uterine anomalies, including unicornuate and septate uterus, among infertile women[94] [95].

In our study, such anomalies were detected in 9.6% of patients, with unicornuate uterus and septate uterus (partial and complete) each comprising 4.8%.

Hysteroscopy could not be done in 3.2% of our patients—one from each infertility group—due to cervical stenosis. This limitation is consistent with data from other large hysteroscopic series, where failure rates range between 2–4%.

Cervical Findings via Hysteroscopy by Type of Infertility (Table 16)

In our study, cervical findings assessed via hysteroscopy revealed that the majority of patients (93.5%) had no visible cervical abnormalities.

Cervical polyps were noted in 3.2% of patients, exclusively among those with primary infertility (4.9%), while cervical stenosis was observed in 3.2% of cases, one each in the primary and secondary infertility groups. The absence of a statistically significant difference between the groups ($p = 0.53$) suggests that cervical abnormalities are relatively uncommon contributors to infertility in our population.

A study by Nigam et al. (2020) reported cervical lesions in 5–7% of women undergoing hysteroscopy during infertility workup[96].

A study by Oliveira et al. (2019) identified cervical polyps in 2.5–4% of infertile women[97].

A study by El-Hammady et al. (2021) reported cervical stenosis in approximately 3% of women undergoing hysteroscopic evaluation[98].

Uterine Cavity Findings via Hysteroscopy by Type of Infertility (Table 17)

In our study, uterine cavity abnormalities were identified via hysteroscopy in 29.1% of the total patients, while 70.9% showed a normal uterine cavity. Among the detected abnormalities, endometrial polyps were the most frequent, present in 12.9% of patients, followed by uterine synechiae (4.8%), unicornuate uterus (4.8%), partial septate uterus (3.2%), and complete septate uterus (1.6%).

A study by Jindal et al. (2021) reported a 10–15% prevalence of endometrial polyps in infertile women undergoing diagnostic hysteroscopy[93].

A study by Sharma et al. (2020) observed uterine synechiae in approximately 5% of infertile women.

A study by Pansky et al. (2022) and another by Chan et al. (2020) reported congenital uterine anomalies in 8–10% of infertile women[94 95].

A study by Di Spiezio Sardo et al. (2019), through a meta-analysis, found that uterine abnormalities were present in approximately 30–35% of infertile women[99].

Interestingly, hysteroscopy could not be performed in 3.2% of patients in our study, most likely due to anatomical challenges such as severe cervical stenosis or distortion of the uterine cavity.

CONCLUSION

The comprehensive evaluation of infertile women in our study using both hysteroscopic and laparoscopic approaches has revealed critical insights into the distribution and prevalence of reproductive tract abnormalities.

Notably, ovarian pathologies were among the most common findings, with polycystic ovarian morphology (PCOM) observed in nearly 39% of patients. This underscores the importance of hormonal evaluation and ovulatory monitoring, especially in women presenting with menstrual irregularities and ovulatory dysfunction, as PCOM remains a major contributor to anovulatory infertility. Importantly, the distribution of PCOM did not differ significantly between primary and secondary infertility groups, reaffirming its broad clinical relevance across different infertility presentations.

Endometriotic cysts and tubo-ovarian masses, though less frequent, were clinically significant and more closely associated with primary infertility. These findings emphasize the importance of identifying chronic pelvic pathology, particularly in patients with a history suggestive of subclinical inflammation, pelvic pain, or dysmenorrhea. The detection of endometriosis, exclusively among women with primary infertility in our study, supports existing evidence that endometriosis is a predominant factor in this group and often underdiagnosed without surgical visualization. The presence of Grade IV endometriosis in a subset of patients further illustrates the advanced disease burden and its potential impact on spontaneous conception, tubal function, and ovarian reserve.

The study also revealed a substantial burden of uterine cavity abnormalities, including endometrial polyps, intrauterine synechiae, and congenital anomalies such as unicornuate and septate uterus. Hysteroscopy proved to be a valuable diagnostic

modality, detecting abnormalities in nearly 30% of patients—many of which were missed on non-invasive imaging. The identification of structural uterine anomalies in both primary and secondary infertility groups, without significant statistical difference, reinforces the idea that intrauterine pathologies are equally relevant across infertility types. These abnormalities, though often correctable, have the potential to impair implantation, increase miscarriage rates, and complicate assisted reproductive procedures if left undiagnosed.

Cervical abnormalities were relatively uncommon in our cohort, with only 6.4% of patients presenting with either polyps or stenosis. While these lesions were not significantly different between primary and secondary infertility groups, their potential to interfere with embryo transfer, sperm migration, or IUI should not be overlooked, particularly in the context of failed ART cycles. The use of hysteroscopy enabled direct visualization and the opportunity for immediate intervention, thus minimizing future procedural complications.The assessment of fallopian tubes via laparoscopy and chromopertubation revealed that tubal abnormalities, including hydrosalpinx, tubal beading, and unilateral or bilateral blockage, were more commonly associated with primary infertility. Bilateral tubal block was present in 11.3% of patients, with a markedly higher incidence in the primary infertility group. These findings are consistent with global literature and highlight the importance of tubal evaluation, especially in women who have never conceived. Moreover, the presence of beaded tubes and other structural distortions may indicate chronic infections such as genital tuberculosis, which continues to be a relevant cause of infertility in endemic regions.

Pelvic adhesions were observed in 27.4% of patients, again more commonly among women with secondary infertility, possibly due to prior obstetric events, surgeries, or

infections. However, a significant number of primary infertility patients also presented with adhesions, which were often linked to endometriosis or subclinical inflammatory processes. The multifactorial nature of pelvic adhesions and their silent presentation underscore the need for laparoscopy in unexplained infertility cases, where imaging modalities may fall short in detecting peritoneal pathology.

The role of comorbid conditions, such as hypothyroidism and obesity, was also examined. Our study found hypothyroidism in nearly 20% of patients, with an equal distribution across infertility types. This supports the critical role of thyroid function in the hypothalamic-pituitary-ovarian axis and suggests routine endocrine screening for all infertile women. Additionally, nearly 70% of women were either overweight or obese, further complicating reproductive outcomes. The impact of excess body weight on ovulation, endometrial receptivity, and hormonal balance reinforces the need for lifestyle and metabolic optimization as part of fertility treatment planning.

Consanguinity was present in 8% of patients, more commonly in primary infertility, though not statistically significant. Genetic counseling should be considered in populations where consanguineous marriages are common, given the potential for autosomal recessive conditions affecting fertility.

Overall, our findings highlight the multidimensional nature of female infertility, where structural, endocrine, inflammatory, and genetic factors often coexist. The comparable distribution of many abnormalities across primary and secondary infertility groups suggests that a standardized, comprehensive diagnostic approach—including both hysteroscopy and laparoscopy—is warranted for all patients. Routine inclusion of these minimally invasive techniques can improve diagnostic accuracy, allow for simultaneous therapeutic intervention, and enhance the personalization of fertility treatment plans.

This study, however, has certain limitations. First, the sample size was relatively small, which may limit the generalizability of the findings. Second, as a single-center, hospital-based study, the patient population may not represent the broader demographic and geographic variations that influence infertility patterns. Additionally, male factor infertility was not evaluated in parallel, which may have contributed to an incomplete understanding of couple-based infertility. Lastly, while laparoscopy and hysteroscopy provide valuable diagnostic insights, the subjective interpretation of findings and operator variability may introduce potential bias. Future multicentric studies with larger sample sizes and inclusion of male partner evaluation are recommended to validate and expand upon these findings.

SUMMARY

This study offers a detailed evaluation of anatomical and pathological findings among infertile women using diagnostic hysteroscopy and laparoscopy. Among the 62 women evaluated for infertility, 66.1% presented with primary infertility, while 33.9% had secondary infertility. The majority of patients (58.1%) were aged ≤30 years, with a significant proportion (46.8%) experiencing infertility within five years of marriage . Non-consanguineous unions were predominant, accounting for 92% of cases. Menstrual irregularities were more frequently observed in the primary infertility group (43.9%) compared to the secondary group (18.2%). In terms of nutritional status, 48.4% of patients were overweight, and 21.0% were obese, based on BMI classification. Hypothyroidism was the most common comorbidity, present in 19.4% of the study population.

Ovarian abnormalities were the most common findings, with PCOM observed in 38.7% of cases, followed by simple and endometriotic cysts. These ovarian pathologies were similarly distributed across both primary and secondary infertility groups.

Hysteroscopy identified uterine cavity abnormalities in 29.1% of patients, with endometrial polyps, uterine synechiae, and congenital anomalies such as unicornuate and septate uterus being the most prevalent. Cervical abnormalities were rare, affecting only 6.4% of the cohort, with cervical polyps and stenosis identified exclusively in primary infertility or evenly distributed, respectively.

Fallopian tube evaluation revealed that tubal pathology was more common in primary infertility. Hydrosalpinx, beaded tubes, and other abnormalities were present, and chromopertubation showed that 11.3% of patients had bilateral tubal block, mostly

among those with primary infertility. Pelvic adhesions were observed in 27.4% of cases, particularly among women with secondary infertility or a history of surgery or infection.

Endometriosis was identified exclusively in the primary infertility group (14.6%), with both mild (Grade 1) and severe (Grade 4) stages represented.

This comprehensive evaluation underscores the critical role of hysteroscopy and laparoscopy in infertility workups. The detection of correctable intrauterine and pelvic abnormalities, often missed on imaging, supports the integration of minimally invasive diagnostics into standard infertility protocols. The findings also highlight the multifactorial etiology of infertility, necessitating a holistic, personalized, and evidence-based approach to patient care.

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BIBLIOGRAPHY

1. World Health Organization. Infertility . Geneva: WHO; 2023 [cited 2025 Mar 11]. Available from: https://www.who.int/health-topics/infertility
2. 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. doi: 10.1093/humrep/dem046.
3. Infecundity, Infertility, and Childlessness in Developing Countries. DHS Comparative Reports No. 9. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004.
4. Mascarenhas MN, Flaxman SR, Boerma T, et al. National, regional, and global trends in infertility prevalence since 1990: A systematic analysis of 277 health surveys. PLoS Med. 2012;9(12):e1001356.
5. Larsen U. Childlessness, subfertility, and infertility in Tanzania. Stud Fam Plann. 1996 Jan 1:18–28.
6. Philippov OS, Radionchenko AA, Bolotova VP, Voronovskaya NI, Potemkina TV. Estimation of the prevalence and causes of infertility in western Siberia. Bull World Health Organ. 1998;76(2):183.
7. Sharon NC, Linda HB. Infertility Counselling: A Comprehensive Handbook for Clinicians. second ed. USA: Cambridge University Press; 2006:635.
8. Schmidt L, Sobotka T, Bentzen JG, Nyboe Andersen A, Reproduction ESHRE. Society Task Force. Demographic and medical consequences of the postponement of parenthood. Hum Reprod Update. 2012 Jan 1;18(1):29–43
9. Practice Committee of the American Society for Reproductive Medicine. Diagnostic evaluation wiesenfeldlathaof the infertile female: a committee opinion. Fertil Steril. 2015;103(6):e44–e50.

10. Quaas A, Dokras A. Diagnosis and treatment of unexplained infertility. Rev Obstet Gynecol. 2008 Spring;1(2):69-76. PMID: 18769664; PMCID: PMC2505167.
11. Nayak PK, Mahapatra PC, Mallick J, et al. Role of diagnostic hysterolaparoscopy in the evaluation of infertility: A retrospective study of 300 patients. J Hum Reprod Sci. 2013;6(1):32–34.
12. Kaur S, Bedi M, Kaur S. Hysterolaparoscopy: a step towards success in infertility treatment. Int J Reprod Contracept Obstet Gynecol. 2016;5(9):2929–2932.
13. Propst AM, Hill JA. Anatomic factors associated with recurrent pregnancy loss. Semin Reprod Med. 2000;18(4):341-50.
14. Taylor E, Gomel V. The uterus and fertility. Fertil Steril. 2008;89(1):1-16.
15. Tulandi T, Al-Fozan HM. Minimally invasive reproductive surgery. Curr Opin Obstet Gynecol. 2008;20(4):374-79.
16. American Society of Reproductive Medicine. Laparoscopy in the evaluation of infertility. Fertil Steril. 2008;90(5 Suppl):S150-S153.
17. Chanu S, Rudra Pal G, Panda S, Santa Singh A. Diagnostic hysterolaparoscopy for evaluation of infertility: Our experience in a tertiary Care Hospital. J Hum Reprod Sci. 2018;11(1):19.
18. World Health Organization, United Nations Children's Fund, United Nations Population Fund, The World Bank (2012) Trends in maternal mortality: 1990 to 2010. Geneva: World Health Organization.

19. Chandra A, Copen CE, Stephen EH. Infertility and impaired fecundity in the United States, 1982-2010: data from the National Survey of Family Growth. Natl Health Stat Report. 2013 Aug 14;(67):1-18, 1 p following 19.

20. World Health Organization: Infertility prevalence estimates,1990–2021[Internet]. Geneva:WorldHealth Organization; cited 2023 Nov 13.

21. Patel M. The socioeconomic impact of infertility on women in developing countries. Facts Views Vis Obgyn. 2016;8(1):59-61.

22. Centers for Disease Control and Prevention. Infertility [Internet]. Atlanta (GA): CDC; 2023 [cited 2025 Apr 4]. Available from: https://www.cdc.gov/nchs/fastats/infertility.htm

23. Wang GT. Population control policies and implementations in India. J Sociol Soci Work. 2019;7(2): 135-44.

24. Purkayastha N, Sharma H. Prevalence and potential determinants of primary infertility in India: Evidence from Indian demographic health survey. Clin Epidemiol Global Health. 2021;9:162-70.

25. Amodini KN, Chaudhuri S. Infertility management in India: Issues and potential solutions. J Obstet Gynecol India. 2023;73(4):368–9

26. Agiwal, Varun & Madhuri, R. & Chaudhuri, Sirshendu. (2023). Infertility Burden Across Indian States: Insights from a Nationally Representative Survey Conducted During 2019-21. Journal of Reproduction & Infertility. 24. 10.18502/jri.v24i4.14156.)

27. World Health Organization. Infertility definitions and terminology [Internet]. Geneva: WHO; [cited 2025 Mar 9]. Available from: https://www.who.int/health-topics/infertility

28. Practice Committee of the American Society for Reproductive Medicine. Definitions of infertility and recurrent pregnancy loss: a committee opinion. Fertil Steril 2020;113:533–5.
29. Guttmacher AF. Factors affecting normal expectancy of conception. J Am Med Assoc 1956;161:855–60.
30. Wilcox AJ, Weinberg CR, Baird DD. Timing of sexual intercourse in relation to ovulation. Effects on the probability of conception, survival of the pregnancy, and sex of the baby. N Engl J Med 1995;333:1517–21.
31. Zinaman MJ, Clegg ED, Brown CC, O'Connor J, Selevan SG. Estimates of human fertility and pregnancy loss. Fertil Steril 1996;65:503–9.
32. Schlegel PN, Sigman M, Collura B, De Jonge CJ, Eisenberg ML, Lamb DJ, et al. Diagnosis and treatment of infertility in men: AUA/ASRM guideline part I. Fertil Steril 2021;115:54–61.
33. Schlegel PN, Sigman M, Collura B, De Jonge CJ, Eisenberg ML, Lamb DJ, et al. Diagnosis and treatment of infertility in men: AUA/ASRM guideline part II. Fertil Steril 2021;115:62–9.
34. Wise LA, Mikkelsen EM, Rothman KJ, Riis AH, Sørensen HT, Huybrechts KF, et al. A prospective cohort study of menstrual characteristics and time to pregnancy. Am J Epidemiol 2011;174:701–9.
35. Crawford NM, Pritchard DA, Herring AH, Steiner AZ. Prospective evaluation of the impact of intermenstrual bleeding on natural fertility. Fertil Steril 2016;105:1294–300.
36. Carson SA, Kallen AN. Diagnosis and Management of Infertility: A Review. JAMA. 2021 Jul 6;326(1):65-76. doi: 10.1001/jama.2021.4788. PMID: 34228062; PMCID: PMC9302705.

37. Practice Committee of the American Society for Reproductive Medicine. Optimizing natural fertility: a committee opinion. *Fertil Steril*. 2021;116(1):54–63. doi:10.1016/j.fertnstert.2021.03.038.

38. Moore JF, Carugno J. Hysteroscopy. [Updated 2023 Jul 18]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan.

39. Alkatout I, Mechler U, Mettler L, Pape J, Maass N, Biebl M, Gitas G, Laganà AS, Freytag D. The Development of Laparoscopy-A Historical Overview. Front Surg. 2021 Dec 15;8:799442. doi: 10.3389/fsurg.2021.799442. PMID: 34977146; PMCID: PMC8714650.

40. Xia E, Yu D. Diagnostic Hysteroscopy. In: Xia E, editor. Practical Manual of Hysteroscopy [Internet]. Singapore: Springer Nature Singapore; 2022 [cited 2025 Mar 3]. p. 73–181. Available from: https://link.springer.com/10.1007/978-981-19-1332-7_8

41. Nourag I, Mohamed M, Elmazzaly S. Role of Diagnostic Hysteroscopy in Cases with Unexplained Infertility. Al-Azhar Int Med J. 2022 Sep 1;3(9):88–95.

42. Munro MG, Storz K, Abbott JA, Falcone T, Jacobs VR, Muzii L, et al. AAGL Practice Report: Practice Guidelines for the Management of Hysteroscopic Distending Media. J Minim Invasive Gynecol. 2013;20(2):137-48.

43. Umranikar S, Clark TJ, Saridogan E, Miligkos D, Arambage K, Torbe E, Campo R, Di Spiezio Sardo A, Tanos V, Grimbizis G., British Society for Gynaecological Endoscopy /European Society for Gynaecological Endoscopy Guideline Development Group for Management of Fluid Distension Media in Operative Hysteroscopy. BSGE/ESGE guideline on management of fluid distension media in operative hysteroscopy. Gynecol Surg. 2016;13(4):289-303

44. Tanaka T, Hayashi H, Kuroda K. Tubal function assessment: Limitations of hysterolaparoscopy. *Reprod Med Biol*. 2021;20(3):299-307.

45. Verhaak CM, Smeenk JM, Evers AW. Emotional impact of infertility treatments and the importance of psychosocial support. *Hum Reprod*. 2020;35(2):456-64

46. Shinde KP, Krovi N, Dhutraj PG. Study of factors contributing to female infertility. *Int J Reprod Contracept Obstet Gynecol*. 2021;10(6):2591–5.

47. Nourag, ibrahim; Mohamed, Mohamed; and Elmazzaly, Saged (2022) "Role of Diagnostic Hysteroscopy in Cases with Unexplained Infertility," Al-Azhar International Medical Journal: Vol. 3: Iss. 9, Article 16. DOI: https://doi.org/10.21608/aimj.2022.128782.1882

48. Igbodike IC, Obajimi GO, Ijarotimi AO, Adegoke OA. Diagnostic accuracy of hysterosalpingography compared with diagnostic hysterolaparoscopy in the evaluation of utero-tubal infertility. [Institutional study – Obafemi Awolowo University Teaching Hospitals Complex, Nigeria]; 2022.

49. Shruti D, Sen P. Laparoscopic evaluation in infertile women: A prospective observational study in a tertiary care hospital. [Institutional study – Udaipur, Rajasthan]; 2019.

50. Sharma S, Meena R, Gupta M. Diagnostic and therapeutic value of hysterolaparoscopy in infertile women: A prospective study. [Institutional study – Jaipur National University Hospital]; 2024.

51. Gaur S, Sharma R, Agarwal R, Saxena S. Combined hysterolaparoscopy in evaluation of female infertility: A descriptive interventional study. [Institutional study – SMS Medical College, Jaipur]; 2020.

52. Ajjammanavar V, Hiremath ND, Jayashree S. Role of hysterolaparoscopy in infertility. *Int J Infertil Fetal Med*. 2020;11(1):5–10.

53. Mehta AV, Modi AP, Raval BM, Munshi SP, Patel SB, Dedharotiya SM. Role of diagnostic hysterolaparoscopy in the evaluation of infertility. *Int J Reprod Contracept Obstet Gynecol*. 2016;5:437–40.
54. Singh S, Arora R, Saini S, Gupta S, Agarwal N. Diagnostic Hysterolaparoscopy for Female Genital Tuberculosis: Laparoscopic and Hysteroscopic Features in a Large Case Series. *J Minim Invasive Gynecol*. 2022;29(5):650–8. doi:10.1016/j.jmig.2021.09.007
55. Pande H, Sahoo N, Das A. Diagnostic hysterolaparoscopy in infertility: A prospective observational study. [Institutional study – VIMSAR, Burla, Odisha]; 2020.
56. Gupta R, Kumari S, Sharma S. Clinical and etiological profile of infertile women at a tertiary care center in North India. *Int J Reprod Contracept Obstet Gynecol*. 2020;9(6):2318-23.
57. Adegbola O, Akintayo AA, Odukogbe AA, et al. Pattern of infertility among Nigerian women: A study from a tertiary hospital. *Afr J Reprod Health*. 2021;25(1):46–54.
58. Singh N, Sinha P, Shukla M. Clinical spectrum and etiological factors of infertility in Eastern India. *J Clin Diagn Res*. 2021;15(3):QC05–QC09.
59. Mascarenhas MN, Flaxman SR, Boerma T, et al. National, regional, and global trends in infertility prevalence since 1990: A systematic analysis of 277 health surveys. *PLoS Med*. 2019;16(12):e1001356.
60. Boivin J, Harrison C, Mathur R, et al. What women want from their doctors: gender and life-stage specific infertility care needs. *Hum Reprod*. 2022;37(5):905–14.
61. Jain R, Sharma A, Verma M. Changing trends in infertility: early consultation and younger age at presentation. *Int J Gynecol Obstet India*. 2023;26(1):12–16.

62. Verma V, Desai A, Menon S. Age-related infertility trends: a retrospective study in an urban tertiary center. *J Reprod Health Med*. 2022;8(2):55–59.
63. Mishra S, Ghosh D, Singh S. Time to seek infertility care: A cross-sectional study from a tertiary hospital. *Int J Reprod Contracept Obstet Gynecol*. 2022;11(8):2165–70.
64. Kumar R, Gupta P, Singh A. Duration of infertility and healthcare-seeking behavior among infertile couples. *Indian J Public Health Res Dev*. 2021;12(3):153–58.
65. Al-Turki HA. Consanguinity and its relevance to infertility in the Saudi population. *Saudi Med J*. 2019;40(12):1186–90.
66. Naeem M, Arif M, Khan S. Consanguinity and its association with female infertility in Pakistan. *Pak J Med Sci*. 2021;37(4):1045–50.
67. Sharma S, Mahajan N, Singh R. Menstrual irregularities and infertility: a clinical study of PCOS and ovulatory dysfunction. *Int J Reprod Contracept Obstet Gynecol*. 2020;9(2):503–07.
68. Teklu S, Kassaye E, Asres Y. Patterns and causes of female infertility at a fertility clinic in Addis Ababa. *BMC Women's Health*. 2019;19:123.
69. Kafy S, Islam R, Hossain A. Body mass index and infertility: A study in a tertiary care hospital in Bangladesh. *Int J Reprod Biomed*. 2022;20(1):45–51.
70. Chavarro JE, Rich-Edwards JW, Rosner BA, et al. Body mass index and ovulatory infertility: Results from the Nurses' Health Study II. *Obstet Gynecol*. 2019;134(4):734–41.
71. Rao S, Pillai M, Thomas R. Thyroid dysfunction in infertile women: prevalence and outcomes. *J Clin Diagn Res*. 2021;15(9):QC01–QC05.

72. Dasari P, Kavya K, Sahoo J. Thyroid profile in infertile women and its association with menstrual irregularities. *Int J Reprod Contracept Obstet Gynecol*. 2023;12(1):56–61.
73. Priyadarshini P, Gupta S, Mehta R. Laparoscopic findings in women with infertility in South India: a cross-sectional study. *J Obstet Gynaecol India*. 2022;72(2):150–55.
74. Bafna S, Rajendra G, Murthy M. Correlation of uterine pathologies with infertility: A hysteroscopic study. *Int J Reprod Contracept Obstet Gynecol*. 2022;11(5):1379–83.
75. Tavakkoli M, Amirian A, Marashi T. Prevalence of Mullerian anomalies in infertile women: a cross-sectional study. *Iran J Reprod Med*. 2019;17(6):411–16.
76. Nayak PK, Mahapatra PC, Sahu SK. Polycystic ovarian morphology in infertile women: findings from a laparoscopic evaluation. *J Hum Reprod Sci*. 2020;13(3):207–11.
77. Sowmya S, Prabhu TR, Lakshmi D. Polycystic ovaries and infertility: an observational study. *Int J Reprod Contracept Obstet Gynecol*. 2020;9(2):421–25.
78. Parasar P, Ozcan P, Terry KL. Endometriosis: epidemiology, diagnosis and clinical management. *BMJ*. 2022;377:e070850.
79. Patel MD, Ranjan R, Roy S. Ovarian cysts in infertility: diagnostic and therapeutic approaches. *J Obstet Gynaecol India*. 2019;69(1):42–46.
80. Mahmoud MS, Elshaer HS, Said MA. Incidence of tubo-ovarian masses in infertile women undergoing laparoscopy. *Middle East Fertil Soc J*. 2021;26(1):7.
81. Kavitha R, Kamala S, Ramanathan M. Ovarian factors in female infertility: comparative analysis in primary and secondary infertility. *Int J Reprod Med*. 2021;2021:6648593.

82. Yu H, Zhang J, Yang X. Tubal factor infertility: laparoscopy-based analysis of etiologies and outcomes. *Reprod Sci*. 2020;27(6):1292–98.
83. Oliveira E, Fernandes S, Santos L. Hydrosalpinx and tubal pathology in infertile women: a laparoscopic study. *Fertil Res Pract.* 2021;7:5.
84. Aggarwal N, Ghosh R, Kaur K. Genital tuberculosis and infertility: a histopathological and laparoscopic correlation. *J Hum Reprod Sci*. 2022;15(2):103–08.
85. Banerjee A, Sinha R, Sharma N. Tubal beading as a diagnostic marker in genital tuberculosis. *Int J Tuberc Lung Dis*. 2019;23(4):450–54.
86. Dhananjay BS, Kulkarni M, Joshi R. Chromopertubation in female infertility evaluation: analysis of findings. *J Gynecol Endosc Surg*. 2021;13(1):12–16.
87. Goyal M, Joshi A, Mehta M. Tubal patency and chromopertubation outcomes in infertile women: a multicenter Indian study. *J Obstet Gynecol India*. 2019;69(5):451–56.
88. El-Tabbakh M, Awadalla A, El-Sherbiny W. Laparoscopic findings in infertile women with suspected pelvic adhesions. *Middle East Fertil Soc J*. 2020;25:6.
89. Kaur R, Khanna R, Bedi A. Subclinical pelvic adhesions and endometriosis in infertility: findings from laparoscopy. *Int J Reprod Contracept Obstet Gynecol*. 2022;11(6):1580–84.
90. Ahmad A, Khan M, Shahid R. Pelvic adhesions in infertility: a systematic review of prevalence and etiologies. *Fertil Steril*. 2023;120(2):345–53.
91. Vercellini P, Vigano P, Somigliana E, et al. Endometriosis: pathogenesis and clinical impact in infertility. *Obstet Gynecol Clin North Am*. 2019;46(3):481–91.
92. Roman H, Auber M, Bourdel N. Severe endometriosis and its association with infertility and ART outcomes. *Hum Reprod Update*. 2021;27(4):560–72.

93. Jindal UN, Malhotra N, Rani A. Hysteroscopy in female infertility: diagnostic accuracy and therapeutic value. *J Gynecol Endosc Surg*. 2021;12(1):22–27.
94. Pansky M, Feingold M, Maymon R. Hysteroscopic evaluation of the infertile uterus: a critical tool. *Reprod Biol Endocrinol*. 2022;20:14.
95. Chan Y, Pang T, Kwok M. Congenital uterine anomalies in infertility: role of hysteroscopy. *Gynecol Surg*. 2020;17(1):12.
96. Nigam A, Ahmad A, Bansal G. Cervical pathology in hysteroscopy: implications in infertility. *J Obstet Gynaecol India*. 2020;70(6):453–57.
97. Oliveira F, Martins C, Lopes R. Cervical polyps in infertility: prevalence and clinical relevance. *Int J Reprod Biomed*. 2019;17(2):97–101.
98. El-Hammady E, Ragab H, Shehata N. Cervical stenosis and infertility: hysteroscopic approach. *J Minim Invasive Gynecol*. 2021;28(3):412–17.
99. Di Spiezio Sardo A, Calagna G, Zizolfi B, et al. Hysteroscopic diagnosis and treatment of intrauterine pathologies: meta-analysis and clinical insights. *Fertil Steril*. 2019;111(3):578–89.

ANNEXURE – I - INFORMED CONSENT FORM

"Role of Hysterolaparoscopy for the Diagnosis of Female Infertility – a one year hospital based observational study"

Name of Student/Principal Investigator:

Name of Guide/Co Investigators:

Introduction: Infertility is a common disorder affecting many women. Hysterolaparoscopy is a tool to diagnose her with minimal invasion and treat her in the same operative setting. **Explanation of procedure:** Detailed history will be taken. Diagnostic hysterolaparoscopy intra-op findings, surgical interventions done and complications will be noted. The findings will then be correlated with the cause of infertility and the outcomes are studied.

Withdrawal from participation in the study: Participation in this study in voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to Witham' decision to the principal investigator.

Possible benefits from participating in the study: You will not get any benefits by participating in this study. The data gathered will help population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person to identify you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study. Cost of investigations done during the course of study will be paid by the Participant.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purpose and or presented to scientific groups. However, your identity will never be revealed.

Questions: In case of any questions with regard to this study, you are free to contact: If you have any question or complaints with regard to your right as study participant you may contact Dr Harsha Hegde, Chairperson, Ethical committee of JNMC, 0831 2473777 Extension 4052. Legal rights: By signing this consent form, we are not waving any of your legal rights.

CONSENT STATEMENT

I am making a voluntary decision to participate in the study: **"Role of Hysterolaparoscopy for the Diagnosis of Female Infertility – a one year hospital based observational study".** My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was given the opportunity to ask questions and that they have been answered to my satisfaction.

Name of the participant:

Signature or left thumb impression of the participant:

Name of the witness:

Signature or left thumb impression of the witness:

Name of the investigator:

Signature of the investigator:

ANNEXURE – II - PROFORMA

DATA COLLECTION INSTRUMENT

PART I: CONTACT INFORMATION

SAMPLE NO. : ☐☐☐☐☐☐☐

Age : ☐☐ (in years)

In patient no. (IP NO.) : ☐☐☐☐☐☐☐☐

Date of admission : ☐☐.☐☐.☐☐☐☐

Provisional Diagnosis at Admission: ☐☐☐☐☐☐☐☐☐☐☐☐

Primary infertility ☐ Secondary infertility ☐

Procedure underwent : DIAGNOSTIC HYSTEROLAPAROSCOPY

PART II: FEMALE MEDICAL HISTORY AND INFORMATION

Day of Cycle: - ☐☐☐☐☐☐☐

LMP - ☐☐.☐☐.☐☐☐☐

Married life: - ☐☐☐ (in yrs) ☐ CM ☐ 2ND CM ☐ 3RD CM

Cycle - ☐ Regular ☐ Irregular

Obstetric Score: G P L A D

_____

_____

Significant family history - YES NO

If yes (details): _____

Significant personal history - YES NO

If yes (details) : _____

Significant past history - YES NO

If yes (details) : _____

Significant prior infertility treatment - YES NO

If yes (details): _____

ON EXAMINATION

HEIGHT - _____

WEIGHT –_____

BMI - _____

HYSTERO-LAPAROSCOPIC FINDINGS:

LAPAROSCOPIC REPORT:

	FEATURES	**FINDINGS**
1.	**UTERUS - SIZE**	☐ NORMAL ☐ ABNORMAL ☐ FIBROID 1. NUMBER - 2. SIZE - 3. POSITION - 4. OTHERS - SPECIFY : _____ _____ _____ ☐ UTERINE ANOMALIES ☐ BICORNUATE ☐ UNICORNUATE ☐ ARCUATE ☐ OTHERS – SPECIFY : _____ _____ _____ ☐ ADHESIONS – 1. POSITION – SPECIFY : _____ _____ _____

		☐ ENDOMETRIOTIC SPOTS ☐ OTHERS SPECIFY : _____ _____ _____ _____
2.	**LEFT FALLOPIAN TUBE**	☐ NORMAL ☐ ABNORMAL ☐ OEDEMATOUS /HYDROSALPINX ☐ BEADED APPEARANCE ☐ TORTOUS ☐ PERITUBAL ADHESIONS ☐ OTHERS SPECIFY :_____ _____ _____ _____ _____ PROCEDURE DONE - _____
3.	**RIGHT FALLOPIAN TUBE**	☐ NORMAL ☐ ABNORMAL ☐ OEDEMATOUS / HYDROSALPINX ☐ TORTOUS ☐ BEADED APPEARANCE ☐ PERITUBAL ADHESIONS ☐ OTHERS SPECIFY : _____ _____ _____ _____ _____ _____ PROCEDURE DONE - _____
4.	**LEFT OVARY**	☐ NORMAL ☐ ABNORMAL ☐ PCOS ☐ CYST ☐ ENDOMETRIOTIC / HEMORRHAGIC ☐ OTHERS

		SPECIFY : _____ PROCEDURE DONE - _____
5.	**RIGHT OVARY**	☐ NORMAL ☐ ABNORMAL ☐ PCOS ☐ CYST ☐ ENDOMETRIOTIC / HEMORRHAGIC ☐ OTHERS SPECIFY : _____ PROCEDURE DONE - _____
6.	**PERITONEUM**	☐ NORMAL ☐ ABNORMAL
CHROMOPERTUBATION DONE		
1.	**LEFT SIDE FT SPILLAGE**	☐ YES ☐ NO
2.	**RIGHT SIDE FT SPILLAGE**	☐ YES ☐ NO
9.	**OTHERS**	

HYSTEROSCOPY REPORT:

INDICATION OF THE PROCEDURE: ☐ INFERTILITY

☐ SUSPECTED MULLERIAN ANOMALY

☐ OTHER:_____

EQUIPMENT USED: HYSTEROSCOPE: _____

DISTENSION MEDIA: ☐ SALINE ☐ GLYCINE

VAGINOSCOPY ☐ NORMAL ☐ ABNORMAL (FINDINGS) _____

CERVIX: ☐ NORMAL ☐ ABNORMAL (FINDINGS) _____

CERVICAL CANAL: ☐ OPEN ☐ STENOTIC

MORPHOLOGY AND SIZE OF THE UTERINE CAVITY:

☐ NORMAL

☐ ABNORMAL:

- ☐ SEPTUM
- ☐ TUBULAR
- ☐ ARCUATE
- ☐ OTHERS

ENDOMETRIUM: ☐ NORMAL ☐ ABNORMAL:

- ☐ ATROPHIC
- ☐ POLYPOID
- ☐ OTHER

VISUALIZATION OF BILATERAL TUBAL OSTIUM: ☐ YES ☐ NO

IF NO (DETAILS) : _____

INTRAUTERINE PATHOLOGY: ☐ NO ☐ YES

IF YES (DETAILS) : _____

CLINICAL IMPRESSION: _____

COMPLICATIONS: ☐ NO ☐ YES

IF YES (DETAILS) : _____

ANNEXURE – III – KEY TO MASTER CHART

ABBREVIATION	FULL FORM
+	Present
-	Absent
CA	Congenital Anomaly
CM	Consanguineous Marriage
E CYST	Endometriotic Cyst
F CYST	Fimbrial Cyst
H CYST	Hemorrhagic Cyst
HS	Hydrosalpinx
HYPOTH	Hypothyroidism
IMF	Intramural Fibroid
IR	Irregular
N	Normal
NCM	Non-Consanguineous Marriage
ND	Not Done
P	Primary Infertility
POL	Polyp
R	Regular
S	Secondary Infertility
S CYST	Simple Cyst
SSF	Subserosal Fibroid
STEN	Stenosis
SU	Septate Uterus
SYN	Synechiae
TOM	Tuboovarian Mass

ANNEXURE – IV

MASTER CHART

SLNo	DATE OF ADM	IP NO.	AGE (YRS)	ML (YRS)	CONSANGUINITY	DAY OF CYCLE	MENSTRUAL IRRITIES	HT (CM)	WT (KG)	BMI (KG/M2)	PRIMARY/SECONDARY INFERTILITY	COMORBIDITIES	UTERUS	OVARIES		Tubes		SPILLAGE		ADHESIONS	ENDOMETRIOSIS	HYSTEROSCOPY	
														LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT			CERVIX	UTERINE CAVITY
1	10-12-2023	10026086	26	3	NCM	13	R	1.56	64	26.3	P	-	N	N	N	N	N	+	+	N	N	N	N
2	02-01-2024	10031032	34	5	NCM	10	IR	1.58	60	24.0	P	-	SSF	S CYST	S CYST	N	N	+	+	N	N	N	N
3	02-01-2024	10030934	24	5	NCM	5	IR	1.64	84	31.2	P	-	N	N	N	N	N	+	+	N	+	N	N
4	11-01-2024	10033135	36	8	NCM	7	R	1.59	63	24.9	S	-	IMF	N	N	N	N	+	-	+	N	N	N
5	18-01-2024	10034526	25	10	NCM	8	R	1.5	58	25.8	P		N	N	N	N	N	+	+	N	N	N	N
6	26-01-2024	10036319	39	15	NCM	7	R	1.61	76	29.3	S	HYPOT	N	N	N	N	N	+	+	N	N	N	N
7	26-01-2024	10036331	33	5	NCM	4	R	1.59	74	29.3	P	-	N	N	N	HS	N	+	+	N	N	N	N
8	28-01-2024	10036594	32	8	NCM	11	IR	1.65	68	25.0	S	HYPOT	N	N	N	N	N	+	+	N	N	N	POL
9	31-01-2024	10037384	28	4	NCM	14	R	1.74	75	24.8	P	-	N	N	N	N	N	-	-	N	+	N	N
10	01-02-2024	10037750	27	8	3 DEGREE	6	R	1.6	75	29.3	S	-	N	N	N	N	N	+	+	N	N	N	N
11	02-02-2024	10037826	41	9	NCM	6	R	1.53	58	24.8	S	-	CA	N	N	-	N	-	+	N	N	N	UNILATERAL
12	08-02-2024	10039282	26	8 MONTHS	NCM	9	IR	1.57	56	22.7	P	-	N	S CYST	N	N	N	ND	ND	+	+	N	POL
13	20-02-2024	10041988	28	9	NCM	8	IR	1.6	110	43.0	S	-	N	N	N	N	N	+	+	N	N	N	N
14	22-02-2024	10042564	32	9	NCM	6	R	1.68	80	28.3	P	-	N	N	N	F CYST 1*1 CM	F CYST 3*3 CM	+	+	N	N	N	POL
15	28-02-2024	10043784	24	4	NCM	13	IR	1.65	70	25.7	P	HYPOT	N	N	N	N	N	ND	ND	N	N	N	SU
16	04-03-2024	10044843	37	10	2 DEGREE	6	iR	1.5	69	30.7	P	-	IMF	TOM	S CYST	TOM	TOM	ND	ND	+	N	N	SYN
17	04-03-2024	10044718	25	3.5	NCM	6	IR	1.62	78	29.7	P	-	N	N	N	N	N	+	+	N	N	N	SYN
18	05-03-2024	10045167	32	5	NCM	2	IR	1.58	70	28.0	P	-	N	N	LARGE CYST 10*8*9	TORTOUS	TORTOUS	-	-	+	N	N	N
19	12-03-2024	10046632	36	3	NCM	18	IR	1.61	64	24.7	P	HYPOT	N	N	N	FCYST 2*2	N	+	-	N	N	N	N
20	27-03-2024	10050019	25	8	NCM	5	R	1.6	64	25.0	S	-	N	N	N	N	N	+	-	+	N	N	N
21	04-04-2024	10051928	37	7	NCM	5	R	1.65	78	28.7	S	-	N	S CYST	S CYST	N	N	+	+	+	N	N	SYN
22	10-04-2024	10052810	26	5	NCM	6	R	1.6	62	24.2	S	-	N	N	N	HS	HS	+	+	+	N	N	N
23	12-04-2024	10053272	38	12	NCM	9	R	1.62	80	30.5	S	-	N	E CYST	E CYST	N	N	+	+	+	N	N	POL
24	14-04-2024	10053670	24	5	NCM	4	IR	1.54	60	25.3	P	-	N	N	N	N	N	+	+	N	N	N	N
25	16-04-2024	10054242	29	11	NCM	8	R	1.62	58	22.1	P	-	N	N	N	N	N	+	+	N	N	N	N
26	18-04-2024	10054711	26	2.5	NCM	22	IR	1.51	66	28.9	P	-	N	E CYST	N	BEADED	BEADED	-	-	+	+	STEN	ND
27	22-04-2024	10055591	32	7	NCM	4	IR	1.6	72	28.1	S	-	N	N	N	N	N	+	+	N	N	N	N
28	30-04-2024	10057452	32	9	NCM	10	IR	1.58	60	24.0	P	-	N	N	N	N	N	+	+	N	N	N	N
29	01-05-2024	10057583	27	3	NCM	17	IR	1.58	72	28.8	S	-	N	N	N	N	N	+	+	N	N	N	SU
30	07-05-2024	10058796	30	7	NCM	10	IR	1.62	70	26.7	P	HYPOT	N	N	N	N	N	+	+	N	N	N	N
31	19-05-2024	10061917	28	4	NCM	5	R	1.49	47	21.2	S	-	N	E CYST	N	N	N	+	+	N	N	N	N
32	03-06-2024	10065643	30	7	NCM	7	IR	1.54	62	26.1	P	-	N	N	N	N	N	+	+	N	N	N	N
33	10-06-2024	10067653	34	3	2 DEGREE	7	R	1.54	70	29.5	P	-	N	N	N	N	N	+	+	N	N	N	N
34	13-06-2024	10068522	32	10	3 DEGREE	13	IR	1.55	62	25.8	P	-	N	N	N	N	N	+	+	N	N	POL	N
35	24-06-2024	10070989	24	2.5	NCM	12	IR	1.6	66	25.8	P	-	N	CYST	N	N	N	-	+	N	N	N	N
36	24-06-2024	10071105	35	7	NCM	7	R	1.53	70	29.9	S	-	IMF	N	N	N	N	-	+	+	N	N	N

SLNo	DATE OF ADM	IP NO.	AGE (YRS)	ML (YRS)	CONSANGUINITY	DAY OF CYCLE	MENSTRUAL IRRITIES	HT (CM)	WT (KG)	BMI (KG/M2)	PRIMARY/SECONDARY INFERTILITY	COMORBIDITIES	UTERUS	OVARIES		Tubes		SPILLAGE		ADHESIONS	ENDOMETRIOSIS	HYSTEROSCOPY	
37	28-06-2024	10072145	30	8	NCM	8	IR	1.54	54	22.8	S	-	N	N	S CYST	N	N	-	-	N	N	STEN	ND
38	28-06-2024	10072013	36	7	NCM	7	R	1.58	67	26.8	P	-	N	N	N	N	N	+	+	N	N	N	N
39	09-07-2024	10074750	29	6	NCM	7	R	1.54	77	32.5	P	HYPOT	IMF 4*5 CM	N	N	N	1*1 F CYST	-	-	N	N	N	N
40	15-07-2024	10076327	29	4	NCM	6	R	1.56	58	23.8	P	-	SSF 2*2 CM	N	N	N	N	+	+	N	N	N	N
41	15-07-2024	10076435	25	5	NCM	2	R	1.62	72	27.4	P	-	N	S CYST	N	N	N	+	+	N	N	N	SU
42	25-07-2024	10078921	26	8	NCM	6	R	1.54	62	26.1	P	-	SSF	N	N	N	N	+	+	N	N	POL	N
43	15-08-2024	10083912	25	4	NCM	7	R	1.58	81	32.4	P	-	N	N	N	N	N	+	+	N	N	N	N
44	21-08-2024	10085204	41	13	NCM	46	IR	1.41	45	22.6	P	HYPOT	N	N	N	N	N	+	+	N	N	N	N
45	29-08-2024	10087316	34	15	NCM	7	R	1.64	68	25.3	P	-	N	S CYST	N	BEADED	BEADED	+	+	N	N	N	POL
46	09-09-2024	10089533	38	8	NCM	16	R	1.51	54	23.7	S	-	N	N	N	N	N	+	+	N	N	N	POL
47	22-09-2024	10092934	22	7Months	NCM	32	IR	1.51	67	29.4	P	-	CA	E CYST + TOM 6*5 CM	N	TOM	N	-	+	N	N	N	RT CAVITY (POLYP) LT CAVITY NOT SEEN
48	23-09-2024	10093141	34	5	NCM	10	R	1.58	69	27.6	S	-	N	N	N	N	N	+	+	+	N	N	POL
49	23-09-2024	10093060	24	2	NCM	8	IR	1.54	50	21.1	P	HYPOT	N	E CYST	E CYST	HS	HS	+	+	+	N	N	POL
50	02-10-2024	10030993	29	3	NCM	5	IR	1.64	82	30.5	P	-	N	PARA OVARIAN CYST	N	N	N	+	+	N	N	N	N
51	02-10-2024	10095370	24	7	2 DEGREE	20	IR	1.58	62	24.8	P	HYPOT	N	N	N	N	N	+	+	N	N	N	N
52	05-10-2024	10096209	31	1.5	NCM	8	R	1.57	55	22.3	P	-	N	E CYST	E CYST	N	N	+	+	+	+	N	N
53	09-10-2024	10096422	30	3	NCM	7	R	1.57	70	28.4	P	-	N	N	N	N	N	+	+	N	N	N	N
54	11-11-2024	1014827	21	3	NCM	10	R	1.54	72	30.4	S	-	N	N	N	N	N	+	+	N	N	N	N
55	11-11-2024	10104876	28	6	NCM	10	R	1.54	78	32.9	S	HYPOT	N	N	N	N	N	+	+	N	N	N	N
56	11-11-2024	10104902	33	12	NCM	10	R	1.6	68	26.6	P	HYPOT	N	N	N	HS	N	+	+	N	N	N	N
57	16-11-2024	10106383	29	6	NCM	4	R	1.65	82	30.1	S	-	N	N	N	N	N	+	+	N	N	N	N
58	02-12-2024	10110220	26	5	NCM	2	R	1.52	71	30.7	P	-	N	N	N	BEADED	BEADED	-	+	+	+	N	N
59	04-12-2024	10024574	32	10	NCM	11	R	1.57	56	22.7	P	-	N	N	N	N	N	+	+	+	N	N	N
60	06-12-2024	10111370	31	10	NCM	8	R	1.56	75	30.8	P	-	N	N	N	HS	HS	-	-	+	N	N	N
61	09-12-2024	10112068	29	3.5	NCM	7	R	1.53	80	34.2	P	-	IMF	ABSENT	H CYST	ABSENT	N	-	+	+	N	N	N
62	09-12-2024	10104482	30	10	NCM	10	R	1.49	62	27.9	S	HYPOT	SSF	N	N	N	HS	+	+	N	N	N	N