

# Frequency of Causes of Female Infertility Diagnosed Through Laparoscopy in Females Presenting in a Tertiary Care Hospital

Mahwish Saif<sup>1</sup>, Sadia Mustafa<sup>2</sup>, Binyamin Butt<sup>3</sup>

<sup>1,2</sup> Senior Registrar, Department of Obstetrics & Gynaecology, Shalamar Hospital, Lahore.

<sup>3</sup> Postgraduate Resident, Department of Obstetrics & Gynaecology, Shalamar Hospital, Lahore.

## Author's Contribution

<sup>1</sup> Conception of study

<sup>1</sup> Experimentation/Study conduction

<sup>1</sup> Analysis/Interpretation/Discussion

<sup>3</sup> Manuscript Writing

<sup>2</sup> Critical Review

<sup>2</sup> Facilitation and Material analysis

## Corresponding Author

Dr. Mahwish Saif,

Senior Registrar,

Department of Obstetrics & Gynaecology,

Shalamar Hospital,

Lahore

Email: Drmahwish786@gmail.com

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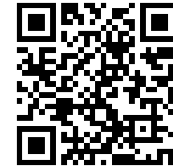
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## Abstract

**Objective:** To report the frequency of causes of female infertility by laparoscopy in females presenting in a tertiary care hospital

### Materials & Methods:

This Cross-sectional study was conducted at the Department of Obstetrics & Gynecology, Shalimar Hospital, Lahore from July 01, 2020, till July 31, 2021. A total of 370 females fulfilling the selection criteria were selected from the operation theatre. Informed consent was obtained from each case. Demographic information (name, age, BMI, duration of marriage, type of infertility, and parity) will also be noted. Then females underwent laparoscopy under general anesthesia researchers. On laparoscopy, the pelvis was inspected, including the uterus, fallopian tubes, round ligaments, ureterovesical pouch, uterosacral ligaments, and Pouch of Douglas. The tubes were inspected for any abnormality in their length and shape and patency was checked by a retrograde dye test. Both ovaries were examined regarding their size, shape, thickness of peripheral follicles, evidence of ovulation, and their relationship with the fimbrial end of the tubes. Peritubal, periovarian and omental adhesions, tubo-ovarian masses, endometriotic deposits, fibroid, presence of fluid in the Pouch of Douglas, or any other pathology, if the present was noted. Data was entered and analyzed in SPSS version 21.0.

**Results:** The mean age of our cases was  $33.93 \pm 5.81$  years with minimum and maximum ages of 18 and 45 years. According to the etiology of infertility, 5(1.4%) cases had unexplained infertility, 140(37.8%) cases had tubal infertility, 60(16.2%) cases had polycystic ovaries, 41(11.1%) cases had Peritubal and peri-ovarian adhesion, 71(19.2%) cases had endometriosis, 38(10.3%) females had fibroids and 20(5.4%) cases had an ovarian cyst.

**Conclusion:** We conclude that on diagnostic laparoscopy the frequency of causes of female infertility was found to, be tubal infertility (37.8%), followed by endometriosis (19.2%), polycystic ovaries (16.2%), Peri-tubal and periovarian adhesion (11.1%), fibroids (10.3%), ovarian cyst (5.4%), unexplained infertility (1.4%).

**Keywords:** Infertility, Laparoscopy, Endometriosis, Fibroid, Hysterosalpingography, Polycystic ovarian disease.

## Introduction

In recent studies, Infertility affects up to 15% of couples. The analysis and treatment of this intricate disorder are one of the most rapidly emerging problems. Many studies have shown that most pelvic pathology in infertile females is typically not well established by daily pelvic examinations in a hospital or clinic. Laparoscopy has become a choice of investigation due to the ability to visualize and operate the uterus, ovaries, and fallopian tubes for infertility assessment.<sup>1</sup> Almost 15 % of couples are affected by this disorder, which is elaborated as the inability to conceive after 1 year of frequent and regular unprotected intercourse. Commonly known reasons take into account male factors (40-45%), ovarian disorders (35-37%), and fallopian tubes (18-20%).<sup>2,3</sup> Age group of 25-25 years is mostly included in primary disorder however 30-35 years age group in secondary problems.<sup>4,6</sup> So by the laparoscopic examination it was concluded that 20% were caused by primary infertility and 25% by secondary infertility and about 80% of patients had different pelvic abnormalities.<sup>7</sup> The most common cause found by laparoscopy was tubal obstruction (30%), following PCOS<sup>17</sup>, endometriosis (13%) in case of primary infertility while pelvic abnormalities (22.2%) and PID (16.7%) were commonly seen in secondary infertility, ovarian cysts 4% of cases and fibroid in 6% cases of infertility.<sup>8</sup> Another study conducted in Pakistan on 200 infertile females established normal findings in 22% of married females. Abnormal findings were present in 78.3% of patients. The commonly seen cause of laparoscopy was tubal blockage (54.6%), polycystic ovaries (6.4%), endometriosis (8.4%), adhesions (32.5%), and ovarian cyst in 1.5% cases.<sup>9</sup>

There is a shortage of information associated with secondary infertility in Pakistan. However, there is evidence of unsafe practices by women during childbirth and the postpartum period which results in pelvic inflammatory diseases (PID), tubal blockage, and infertility. For example, > 65% of the women are delivered in homes by unskilled birth assistants which results in infections for the mother.

Moreover insecure practices for IUCD placement, intra-vaginal use of medicines, and hazardous termination of pregnancy lead to infection and adhesions in pelvic organs which results in PID and secondary infertility. It has been established that sexually transmitted infections, if not treated properly also upshot to secondary infertility. So sexually

transmitted infection should be treated to avoid this problem in previously fertile couples.<sup>16</sup>

The rationale of this study is to assess the frequent causes of female infertility through laparoscopy in females presenting in a tertiary care hospital. So we want to conduct the study to confirm the most commonly seen causes of infertility (primary and secondary) among females presenting to tertiary care hospitals.

## Materials and Methods

**Study design:** Cross-sectional study

**Setting:** Department of Obstetrics & Gynecology, Shalimar Hospital, Lahore

**Duration of study:** July 01, 2020, till July 31, 2021

**Sample size:** 370 females underwent diagnostic laparoscopy during this time period.

**Sampling technique:** Non-probability, consecutive sampling.

**Selection criteria:**

- **Inclusion criteria:** Married females with age 18-45 years presenting with infertility.
- **Exclusion criteria:** Females with a history of any pre-existing cardiovascular or respiratory diseases, generalized peritonitis, intestinal ileus or obstruction, and abdominal hernia. Females with a medical record of husband infertility

**Data collection procedure:** A total of 370 females fulfilling the selection criteria were selected from the operation theatre of the Department of Obstetrics and Gynaecology, Shalimar Hospital Lahore. Informed consent was obtained from each case. Demographic information (name, age, BMI, duration of marriage, type of infertility, and parity) will also be noted. Then females underwent laparoscopy under general anesthesia by the researcher herself. On laparoscopy, the pelvis was inspected, including the uterus, fallopian tubes, round ligaments, ureterovesical pouch, uterosacral ligaments, and Pouch of Douglas. The tubes were inspected for any abnormality in their length and shape. Both ovaries were examined regarding their size, shape, thickness of peripheral follicles, evidence of ovulation, and their relationship with the fimbrial end of the tubes. Peritubal, periovarian and omental adhesions, tubo-ovarian masses, endometriotic deposits, fibroid, presence of fluid in the Pouch of Douglas, or any other pathology, if the present was noted. The patency of fallopian tubes was ascertained by injecting methylene blue or

Gentian violet into the uterine cavity and its spill through the fimbrial ends was checked and the cause of infertility was noted (as per operational definition). All this information was recorded in Performa (attached).

**Data Analysis:** Data were entered and analyzed in SPSS version 21.0. Quantitative data like age, BMI, and duration of marriage were presented as mean and standard deviation. Qualitative data like type of infertility cause of infertility (tubal occlusion, polycystic ovaries, endometriosis, peritubal and periovarian adhesions, pelvic inflammatory disease, fibroid, and ovarian cyst) and parity was presented as frequency and percentages. Data was stratified for age, type of infertility, parity, and BMI. Stratified groups were compared by using the chi-square test. P-value  $\leq$  0.05 was considered significant.

## Results

The mean epoch of cases was  $33.93 \pm 6.81$  years with minimum and maximum ages of 18 and 45 years. There were 109(29.5%) 18-30 years old 261(70.5%) were 31-45 years of age. The mean BMI was  $27.59 \pm 4.98$  with minimum and maximum BMI of 18.10 and 36.30. There were 128(34.6%) cases that were obese and 242(65.4%) cases were non-obese. The mean interval of marriage was  $4.98 \pm 1.45$  years with a bare minimum and ceiling duration of 2 and 7 years. According to the type of infertility, 204(55.1%) cases had primary and 166(44.9%) cases had secondary infertility (Table 1). There were 189(51.1%) cases that had  $< 3$  parity and 181(48.9%) cases had a parity of 3-4. According to the etiology of infertility, 5(1.4%) cases had no pathology for infertility, 140(37.8%) cases had tubal infertility, 60(16.2%) cases had polycystic ovaries with irregular cycles, 41(11.1%) cases had Peritubal and peri-ovarian adhesion, 71(19.2%) cases had endometriosis, 38(10.3%) females had intramural fibroids and 20(5.4%) cases had an ovarian cyst (Table 2). On stratifying data for age the frequency of different causes was the same in both age groups (18-30 years and 31-45 years) i.e. p-value  $> 0.05$ . On stratifying data for obesity the frequency of PCO, fibroids (intramural), an ovarian cyst was significantly higher in obese cases, p-value  $< 0.05$  while frequency of Peritubal periovarian, endometriosis, PID was significantly higher in non-obese cases, p-value  $< 0.05$ . The frequency of Unexplained Infertility, Tubal occlusion, PCO, Peritubal and periovarian adhesions, Endometriotic, PID, Fibroid, and Ovarian cyst was

statically same in both types of infertility and parity, p-value  $> 0.05$ .

**Table 1:**

Type of infertility	Frequency	Percentage
Primary	204	55.1
Secondary	166	44.9
Total	370	100.0

**Table 2:**

Etiology	Frequency	Percentage
No pathology	5	1.4
Tubal occlusion	140	37.8
Polycystic ovaries with an irregular menstrual cycle.	60	16.2
Peritubal and periovarian adhesions	41	11.1
Endometriosis	71	19.2
Pelvic inflammatory diseases.	38	10.3
Intra mural fibroid	21	5.7
Ovarian cysts	20	5.4

## Discussion

Inability to conceive leads to substantial individual distress and interruption of family life. According to United Nations "Reproductive health is a state of complete physical mental and social well-being and not merely the absence of disease or infirmity in all matters relating to the reproductive system and its functions and processes". Infertility is a global issue, with  $>70$  million married couples suffering from it.<sup>13</sup>

Recent studies explain that 10% prevalence of infertility with 56% of couples seeking medical care in developed and 52% in undeveloped countries.<sup>17</sup> Female factors are more frequent in different areas landmarked up to 52%.<sup>12</sup> However most commonly known factors that account for this disorder include ovarian disorder at the top, followed by fallopian tube blockage, endometriosis, uterine and cervical stenosis, etc. Laparoscopy is a modestly insidious method and a better choice rather than the laparotomy that was formerly required. However diagnostic laparoscopy is the best procedure to establish abdominal and pelvic pathology by direct visualization. It gives exact information about the ovarian and tubal status and also about uterine morphology. It also provides information regarding pelvic adhesions, endometriosis, pelvic congestion, and pelvic tuberculosis.<sup>15,16</sup> It is the best method for checking the

tubal patency. After normal hysterosalpingography, it reveals abnormal findings in about 23% of cases of infertile couples.<sup>9</sup> In the current study According to the type of infertility, 204(55.1%) cases had primary and 166(44.9%) cases had secondary infertility. This study established that ovarian problems were seen in 14% of primary and 7% cases of secondary infertility. PCO (polycystic ovaries) were responsible for 9% and 3% of cases of primary and secondary infertility respectively. Endometriosis and its different deposits were seen in 12% cases of primary and 6% cases of secondary infertility. In the current study, we found that tubal infertility (37.8%), followed by endometriosis (19.2%), PCO (16.2%), Peritubal and peri-ovarian adhesion (11.1%), fibroids (10.3%), ovarian cyst (5.4%), unexplained infertility (1.4%). The most common and frequently seen cause is a tubal obstruction in 22% and 34% of cases of primary and secondary infertility respectively.<sup>11,8</sup> These findings are almost similar to our statistics. Different studies reported different causes, as a study reported out of 100 cases studied, in 55 cases the probable cause of infertility was found and in the remaining 45 cases no cause of infertility was found. Out of 55 cases, 13 cases had cystic ovary & PCOD, 11 cases had a bilateral tubal block, 10 cases had multiple pelvic adhesion, 8 cases had endometriosis, 5 cases had combined endometriosis & pelvic adhesion, 4 cases had a unilateral tubal block, 2 cases had cystic ovary with pelvic adhesion, 1 case had beaded tube and 1 case had fimbrial phimosi. Hence, the study concluded that laparoscopy has a vital role in the diagnosis and treatment of unexplained infertility.<sup>3,5,9,15</sup> The most recurrent discovery was a tubal blockage in 29% and 34% cases of primary and secondary infertility respectively. 26% of cases of primary infertility were of as polycystic ovaries (PCO) and 14% in cases of secondary infertility. However, endometriosis was seen in only one case with primary infertility and 14% of cases with secondary infertility. Intra mural fibroids were founded in 9% and 6% cases of primary and secondary infertility respectively. Thus this study has accomplished that the most frequent sources of infertility were tubal occlusion and polycystic ovary which is inconsistent with the result of our study. Similarly, another study was conducted to reckon laparoscopy as a diagnostic procedure in infertile females. The relative frequencies of different causes of infertility detected in the course of laparoscopy were ascertained. Diagnostic laparoscopy was conducted in fifty-four infertile patients in the Gynaecology Department of KKHU, Riyadh, and King Abdul Aziz

Military Hospital, Dhahran. The study result has shown that among these fifty-four patients, thirty-eight (70.4%) had primary infertility and sixteen (29.6%) suffered from secondary infertility. Of the fifty-four cases, laparoscopic findings were normal in seventeen (31.5%) and showed some pathology in 37 (68.5%) cases. Amongst the primary infertility patients, ten (26.3%) revealed no abnormal laparoscopic findings. Blocked tubes were found in eight (21.1%) cases. Six of these had bilateral blockades whereas two had unilateral ones. Hydrosalpinx was observed in two (5.3%) patients and pelvic adhesions were encountered in seven (18.4%). Adhesions were extensive in five of these seven and mild in the remaining two. Endometriosis was seen in four (10.5%) cases. A fibroid uterus was revealed in two (5.3%) cases. Ovarian pathology was found in four (10.5%) patients. One of these patients had absent ovulation, another had polycystic ovaries and the remaining two had ovarian cysts. A rudimentary uterus was found in only 2% of the cases. The patients having secondary infertility showed normal findings in 38% of cases. The tubal block was present in 25% which was bilateral in all these cases. 19% of cases had pelvic adhesions which were extensive in two cases and mild in one. Fibroid uterus was encountered in 13% of cases and they were multiple. 6 % were found to have an ovarian cyst.<sup>17</sup> The most common seen factor by laparoscopy was a tubal blockage in both the groups followed by PCOS, endometriosis, tubal and ovarian adhesion, pelvic inflammatory disease (PID), tuberculosis, ovarian cyst, and uterine fibroid. Ovarian findings were considerably high in primary infertility while tubal blockage following peritubal and periovarian adhesion was mostly seen in secondary infertility. Thus it can be concluded that laparoscopy is the most efficient instrument for appraisal of female infertility and it should be considered in infertility workup for early treatment decisions.<sup>8,12,17</sup> Another study was performed to evaluate the role of diagnostic laparoscopy in the investigation of female infertility and the study included 60 infertile women attending tertiary care hospitals attached to Sri Siddhartha Medical College Hospital, Tumkur. Diagnostic laparoscopy was conducted in 75% of primary and 25% of secondary infertile women. This study discovered that the preponderance of the patients with primary infertility was in the age group 20-25 years and that of secondary were between 28-30 years. Most of the patients in the study had a duration of 1-5 years of infertility. According to this study, tubal factors (50%) were the most common cause of infertility.

therefore diagnostic laparoscopy is a vital contrivance in the appraisal of infertility.<sup>5,15</sup> Most common etiological factor was tubal occlusion in primary and secondary infertility. Other factors responsible for infertility are endometriosis, pelvic adhesions, and fibroids. Laparoscopy is a modestly insidious yet dependable procedure for the apparition of the internal architecture of the female pelvis.<sup>18</sup>

## Conclusion

We conclude that on diagnostic laparoscopy the frequency of causes of female infertility was found to be tubal blockage (37.8%), followed by endometriosis (19.2%), PCO (16.2%), Peritubal and peri-ovarian adhesion (11.1%), fibroids (10.3%), ovarian cyst (5.4%), unexplained infertility (1.4%). We conclude that laparoscopy is a choice of investigation to scrutinize this disorder. It gives straight apparition of the pelvic organs, tubal and ovarian status, and an exact location of tubal blockage. It is used for direct foresight of adhesions and tubal conditions ensuing more information in contrast to ultrasonography and hysterosalpingography.

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