



Original Article

Male and Female Factors Associated with Infertility Among Couples Attending a Tertiary Care Hospital: A Cross-Sectional Study

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OPEN ACCESS

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Received: 01-07-2026

Accepted: 10-07-2026

Available online: 28-07-2026

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Medical and Pharmaceutical Research

ABSTRACT

Background: Infertility is a significant reproductive health problem affecting couples worldwide and is associated with considerable psychological, social, and economic consequences. Both male and female factors contribute to infertility, either independently or in combination. Identification of these factors is essential for appropriate evaluation and management of affected couples.

Objectives: To determine the distribution of male and female factors associated with infertility among couples attending a tertiary care hospital and to identify the common etiological factors contributing to infertility.

Materials and Methods: A hospital-based cross-sectional study was conducted among 100 infertile couples attending the infertility clinic of a tertiary care teaching hospital over a period of one year. Detailed history, clinical examination, and relevant investigations were performed for both partners. Female evaluation included hormonal assessment, ultrasonography, and tubal patency testing, while male evaluation included semen analysis, hormonal evaluation, scrotal ultrasonography, genetic testing, Karyotyping and ejaculatory disorders. Data were analyzed using SPSS version 25.0 and expressed as frequencies, percentages, means, and standard deviations.

Results: The mean age of female and male partners was 28.9 ± 4.5 years and 32.4 ± 5.1 years, respectively. Primary infertility was observed in 68% of couples, while secondary infertility accounted for 32%. Female factors alone were identified in 42% of cases, male factors alone in 28%, combined male and female factors in 20%, and unexplained infertility in 10%. Among female factors, ovulatory disorders (38.1%) were the most common, followed by tubal factors (26.2%), PCOS (23.8%), and endometriosis (11.9%). Among male factors, idiopathic infertility (39.3%) was the most common cause, followed by varicocele (17.9%) and genetic abnormalities (10.7%).

Conclusion: Female factors contributed to a greater proportion of infertility cases; however, male factors also accounted for a substantial burden. Ovulatory disorders and idiopathic infertility were the most common female and male factors, respectively. Comprehensive evaluation of both partners is essential for accurate diagnosis and effective management of infertility.

Keywords: Infertility; Male factors; Female factors; Ovulatory disorders; Oligozoospermia;.

INTRODUCTION

Infertility is a common reproductive health problem affecting millions of couples worldwide and has significant medical, psychological, social, and economic consequences. The World Health Organization (WHO) defines infertility as the inability to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse. Globally, infertility affects approximately 10–15% of couples of reproductive age, making it an important public health concern.^{1,2} In recent years, the burden of infertility has increased due to delayed marriage, lifestyle changes, obesity, environmental factors, reproductive tract infections, and stress.³

Infertility can be classified as primary or secondary. Primary infertility refers to couples who have never conceived, whereas secondary infertility refers to the inability to achieve pregnancy following a previous conception. Both forms contribute substantially to reproductive morbidity and often result in emotional distress, social stigma, and reduced quality of life.⁴

The causes of infertility are multifactorial and may involve male factors, female factors, combined abnormalities in both partners, or unexplained causes. Earlier, infertility was largely attributed to female-related conditions; however, current evidence suggests that male factors contribute to approximately 20–30% of cases independently and are involved in nearly half of all infertile couples when combined with female factors.⁵ Therefore, evaluation of both partners is essential for accurate diagnosis and effective management.

Female infertility commonly results from ovulatory dysfunction, tubal pathology, endometriosis, uterine abnormalities, and hormonal disorders. Ovulatory disorders, particularly polycystic ovarian syndrome (PCOS), represent one of the most frequent causes of female infertility. Tubal damage secondary to pelvic inflammatory disease, genital infections, and postoperative adhesions also plays a significant role.^{6,7}

Male infertility is primarily associated with abnormalities in sperm concentration, motility, morphology, or function. Common semen abnormalities include oligozoospermia, asthenozoospermia, teratozoospermia, and azoospermia. Various factors such as infections, varicocele, endocrine disorders, genetic abnormalities, smoking, alcohol consumption, obesity, and environmental exposures have been implicated in male infertility.^{8,9}

Despite advances in diagnostic techniques, a proportion of couples continue to be categorized as having unexplained infertility, where no definite cause can be identified. The relative contribution of male and female factors varies among different populations due to differences in socioeconomic conditions, healthcare access, environmental influences, and lifestyle practices. Therefore, local data regarding infertility patterns are important for planning appropriate diagnostic and therapeutic strategies.¹⁰

Considering the increasing burden of infertility and the need for comprehensive evaluation of both partners, the present study was undertaken to assess the male and female factors associated with infertility among couples attending a tertiary care hospital.

MATERIALS AND METHODS:

Study Design and Setting

A hospital-based cross-sectional study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital over a period of one year. The study was undertaken after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from both partners before enrollment in the study.

Study Population

The study included 100 infertile couples attending the infertility clinic during the study period. All eligible couples were recruited consecutively until the required sample size was achieved.

Inclusion Criteria

- Couples unable to conceive after at least one year of regular unprotected sexual intercourse.
- Women aged between 20 and 40 years.
- Couples willing to undergo complete infertility evaluation.
- Couples providing written informed consent.

Exclusion Criteria

- Couples with incomplete clinical records or investigations.
- Couples unwilling to participate in the study.

Data Collection Procedure

A predesigned and structured data collection form was used to obtain demographic and clinical information from all participants. Information regarding age, occupation, socioeconomic status, duration of infertility, menstrual history, obstetric history, previous medical and surgical illnesses, history of sexually transmitted infections, lifestyle habits, and family history was recorded.

Infertility was classified as:

- **Primary infertility:** Failure to achieve pregnancy despite one year of regular unprotected intercourse without any previous conception.
- **Secondary infertility:** Failure to conceive following a previous pregnancy irrespective of its outcome.

Clinical Evaluation

Female Partner

All female participants underwent a detailed general physical examination and gynecological examination.

The following investigations were performed:

- Complete blood count
- Blood sugar estimation
- Thyroid function tests
- Serum prolactin levels
- Anti Mullarian Hormone
- Follicle-stimulating hormone (FSH)
- Luteinizing hormone (LH)
- Pelvic ultrasonography
- Follicular monitoring when indicated
- Hysterosalpingography (HSG) for assessment of tubal patency
- Diagnostic laparoscopy and hysteroscopy in selected cases

Female infertility factors were categorized into:

- Ovulatory disorders
- Polycystic ovarian syndrome (PCOS)
- Tubal factors
- Endometriosis
- Uterine factors
- Hormonal disorders
- Unexplained causes

Male Partner

All male participants underwent detailed history taking and clinical examination including assessment of secondary sexual characteristics and genital examination.

The following investigations were performed during infertility evaluation:

1.Semen Analysis (First-line Investigation)

• Semen analysis was performed as the primary investigation according to the World Health Organization (WHO) Laboratory Manual for the Examination and Processing of Human Semen, 6th edition (2021) after 2–7 days of sexual abstinence. Semen volume, sperm concentration, total sperm count, progressive and total motility, morphology, vitality, pH, and leukocyte count were assessed. Abnormal semen parameters were confirmed by repeat analysis after an appropriate interval

2 .Hormonal Evaluation

Hormonal investigations were performed in men with azoospermia, severe oligozoospermia, or suspected endocrine disorders. The hormonal profile included serum follicle-stimulating hormone (FSH), luteinizing hormone (LH), total testosterone, serum prolactin, and thyroid-stimulating hormone (TSH) where clinically indicated.

3. Imaging Studies

• Scrotal ultrasonography was performed to evaluate varicocele, testicular volume, and other testicular abnormalities. Transrectal ultrasonography (TRUS) was performed in selected patients with suspected ejaculatory duct obstruction or seminal vesicle abnormalities

4. Genetic Evaluation

Genetic investigations were performed in selected men with severe oligozoospermia, non-obstructive azoospermia, congenital bilateral absence of the vas deferens, or suspected chromosomal abnormalities. Investigations included:

- Conventional karyotyping
- Y-chromosome microdeletion analysis
- CFTR gene mutation analysis in patients with congenital absence of the vas deferens

Evaluation of Ejaculatory Disorders

Men with suspected ejaculatory dysfunction underwent further evaluation for retrograde ejaculation and other ejaculatory disorders. Assessment included post-ejaculatory urine examination and detailed clinical evaluation. Additional investigations were performed whenever clinically indicated.

Specialized Sperm Function Tests

Specialized investigations including sperm DNA fragmentation assay, antisperm antibody testing, and other sperm function tests were performed in selected patients with unexplained infertility or recurrent assisted reproductive technique failure.

Testicular Assessment

Testicular biopsy or fine-needle aspiration cytology (FNAC) was performed in selected azoospermic patients to differentiate obstructive from non-obstructive azoospermia whenever clinically indicated.

Male infertility factors were categorized as:

- Oligozoospermia
- Asthenozoospermia
- Teratozoospermia
- Oligoasthenoteratozoospermia
- Azoospermia
- Varicocele-associated infertility
- Genetic abnormalities
- Genital tract obstruction
- Endocrine disorders
- Testicular failure/cryptorchidism
- Infection-related infertility
- Ejaculatory dysfunction
- Unexplained male factor infertility

Statistical analysis: Data were analyzed using SPSS version 25.0 and expressed as frequencies, percentages, means, and standard deviations.

RESULTS:

A total of 100 infertile couples were included in the study and evaluated for factors associated with infertility. Both partners underwent detailed clinical assessment and relevant investigations.

The mean age of the female partners was 28.9 ± 4.5 years, while the mean age of the male partners was 32.4 ± 5.1 years. The average duration of infertility among the couples was 4.1 ± 2.3 years, indicating that most couples sought medical evaluation after several years of unsuccessful attempts to conceive. (Table 1)

Table 1: Demographic Characteristics of the Study Population

Variable	Mean $\pm$ SD
Female age (years)	28.9 ± 4.5
Male age (years)	32.4 ± 5.1
Duration of infertility (years)	4.1 ± 2.3

Primary infertility was observed in 68% of couples, whereas 32% had secondary infertility. This indicates that primary infertility constituted the major burden among couples attending the infertility clinic. (Table 2)

Table 2: Type of Infertility

Type of Infertility	Number (n=100)	Percentage (%)
Primary infertility	68	68.0
Secondary infertility	32	32.0

Female factors alone accounted for the largest proportion (42%) of infertility cases. Male factors alone contributed to 28%, while combined male and female factors were identified in 20% of couples. Unexplained infertility was observed in 10% of cases. (Table 3)

Table 3: Distribution of Infertility Factors

Factor Identified	Number	Percentage (%)
Female factor only	42	42.0
Male factor only	28	28.0
Combined male and female factors	19	19.0
Unexplained infertility	11	11.0

Ovulatory disorders were the most common female factor, accounting for 33.3% of cases, followed by tubal factors (23.8%) and PCOS (19%). Endometriosis contributed to 9.5% of female infertility cases. (Table 4)

Table 4: Female Factors Associated with Infertility (n = 42)

Female Factor	Number	Percentage (%)
Ovulatory disorders	14	33.3
Tubal factors	10	23.8
PCOS	8	19.0
Endometriosis	4	9.5
Uterine factors	3	7.1
Idiopathic female infertility	3	7.1
Total	42	100.0

Elevated LH/FSH ratio suggestive of ovulatory dysfunction was the most common hormonal abnormality (18%), followed by hyperprolactinemia (10%) and thyroid disorders (8%). (Table 5)

Table 5: Hormonal Abnormalities Among Female Partners

Hormonal Abnormality	Number (n=100)	Percentage (%)
Elevated LH/FSH ratio	18	18.0
Hyperprolactinemia	10	10.0
Thyroid dysfunction	8	8.0
Normal hormonal profile	64	64.0

Idiopathic infertility was the most common male factor, accounting for 39.3% of cases, followed by varicocele (17.9%). Genetic abnormalities contributed 10.7%, while genital tract obstruction, testicular failure/cryptorchidism, and infection-related infertility each accounted for 7.1% of cases. Endocrine disorders, ejaculatory dysfunction, and systemic disease/drug/environmental factors were less common contributors. (Table 6)

Table 6: Male Factors Associated with Infertility (n = 28)

Male Factor	Number	Percentage (%)
Idiopathic infertility	11	39.3
Varicocele	5	17.9
Genetic abnormalities	3	10.7
Genital tract obstruction	2	7.1
Testicular failure/Cryptorchidism	2	7.1
Infection-related infertility	2	7.1
Endocrine disorders	1	3.6
Ejaculatory dysfunction	1	3.6
Systemic diseases/drug/environmental factors	1	3.6

Normal semen parameters were observed in 52% of male partners. Abnormal sperm count (20%) and reduced sperm motility (16%) were the most frequently encountered semen abnormalities. (Table 7)

Table 7: Semen Analysis Findings Among Male Partners

Semen Parameter	Number (n=100)	Percentage (%)
Normal semen analysis	52	52.0
Abnormal sperm count	20	20.0
Reduced motility	16	16.0
Abnormal morphology	7	7.0
Azoospermia	5	5.0

Nearly half of the couples (46%) had infertility duration between 3 and 5 years, while 26% had infertility for more than five years before seeking specialized treatment. (Table 8)

Table 8: Duration of Infertility

Duration (Years)	Number	Percentage (%)
<3 years	28	28.0
3–5 years	46	46.0
>5 years	26	26.0

The highest proportion of infertile women belonged to the 26–30 years age group (44%), followed by the 31–35 years age group (24%). (Table 9)

Table 9: Distribution of Infertility According to Age of Female Partner

Age Group (Years)	Number	Percentage (%)
20–25	22	22.0
26–30	44	44.0
31–35	24	24.0
>35	10	10.0

DISCUSSION:

Infertility remains a major reproductive health problem affecting couples worldwide and contributes significantly to psychological, social, and economic distress. The present cross-sectional study evaluated the distribution of male and female factors associated with infertility among 100 couples attending a tertiary care hospital. The study provides insight into the relative contribution of various etiological factors and highlights the importance of comprehensive evaluation of both partners.

In the present study, the mean age of female partners was 28.9 ± 4.5 years, while the mean age of male partners was 32.4 ± 5.1 years. Most women belonged to the 26–30 years age group. Similar age distributions have been reported by Sharma et al. and Patel et al., who observed that infertility is most commonly investigated during the late twenties and early thirties when couples actively seek conception.^{11, 12} The predominance of younger age groups in the present study may be attributed to increased awareness regarding infertility services and earlier healthcare seeking behavior.

The average duration of infertility was 4.1 ± 2.3 years, with the majority of couples reporting infertility for three to five years before seeking specialized treatment. Similar findings have been reported by Unisa and colleagues, who observed delayed presentation among infertile couples due to social stigma, financial constraints, and lack of awareness regarding available treatment options.¹³

Primary infertility constituted 68% of cases, whereas secondary infertility accounted for 32%. These findings are consistent with reports from several Indian studies demonstrating a higher prevalence of primary infertility among couples attending tertiary care infertility clinics.¹⁴ The predominance of primary infertility may reflect changing reproductive patterns, delayed childbearing, and increasing prevalence of lifestyle-related reproductive disorders.

Female factors alone were identified in 42% of couples, making them the most common contributors to infertility in the present study. Male factors alone accounted for 28%, while combined factors were observed in 20% of couples. Similar distributions have been reported by Thonneau et al., who found female factors in approximately 40–50% of infertility cases and male factors in 25–35% of cases.¹⁵ These findings emphasize that infertility should no longer be considered solely a female problem and that evaluation of both partners is essential for accurate diagnosis.

Among female causes, ovulatory disorders emerged as the leading factor, accounting for 38.1% of female infertility cases. This finding is in agreement with the observations of Balen et al., who reported ovulatory dysfunction as one of the most common causes of female infertility worldwide.¹⁶ Ovulatory disorders impair follicular development and oocyte release, thereby reducing the likelihood of successful conception. Early diagnosis and appropriate ovulation induction therapies can substantially improve reproductive outcomes in such women.

Tubal pathology was identified in 26.2% of women and represented the second most common female factor. Similar findings have been reported by Cates et al., who demonstrated that pelvic inflammatory disease, genital tract infections, and postoperative adhesions contribute significantly to tubal infertility.¹⁷ In developing countries, reproductive tract infections remain an important preventable cause of infertility.

Polycystic ovarian syndrome accounted for 23.8% of female infertility cases in the present study. The increasing prevalence of PCOS may be related to obesity, sedentary lifestyle, insulin resistance, and metabolic disturbances. Previous studies have consistently demonstrated a strong association between PCOS and anovulatory infertility.¹⁸

Endometriosis was identified in 11.9% of female partners. This finding is comparable with previous studies that have reported endometriosis in approximately 10–15% of infertile women.¹⁹ Endometriosis may impair fertility through alterations in pelvic anatomy, inflammatory changes, impaired implantation, and reduced ovarian reserve.

With respect to male factors, idiopathic infertility was the most common cause, accounting for 39.3% of male infertility cases, followed by varicocele (17.9%). Similar findings have been reported in previous studies, where a substantial proportion of infertile males had no identifiable cause despite comprehensive evaluation.^{8, 9} Varicocele remains one of the most common identifiable and potentially correctable causes of male infertility and is associated with impaired sperm production and function.⁹

Genetic abnormalities, genital tract obstruction, testicular failure, infection-related infertility, endocrine disorders, and ejaculatory dysfunction contributed smaller proportions of male infertility cases. These findings highlight the multifactorial nature of male infertility and emphasize the importance of comprehensive clinical, hormonal, imaging, and genetic evaluation.^{9,21}

The present study also demonstrated that abnormal semen parameters were present in nearly half of the male partners evaluated. These findings reinforce the importance of routine semen analysis as the initial and most informative investigation in the evaluation of male infertility. According to WHO recommendations, semen analysis remains the cornerstone of male fertility assessment and provides valuable information regarding sperm production and function.²²

Combined male and female factors were identified in 20% of couples. Similar observations have been reported by Gnath et al., who emphasized that infertility often results from multiple interacting factors affecting both partners simultaneously.²³ The presence of combined factors highlights the need for coordinated multidisciplinary evaluation and management.

Unexplained infertility accounted for 10% of cases in the present study. Previous studies have reported unexplained infertility rates ranging from 10% to 20% among infertile couples.²⁴

CONCLUSION:

The present study demonstrated that both male and female factors contribute significantly to infertility, with female factors accounting for a slightly higher proportion of cases. Ovulatory disorders were the most common female factor, while idiopathic infertility emerged as the leading male factor. Combined infertility factors were identified in a considerable proportion of couples, highlighting the multifactorial nature of infertility.

These findings emphasize the importance of comprehensive evaluation of both partners for accurate diagnosis and appropriate management. Early identification of underlying causes and timely intervention may improve reproductive outcomes and reduce the burden of infertility among affected couples.

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