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Prevalence Causes, and Contributing Factors of Male Infertility in Pakistan

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Abstract

Background

According to estimates, 8–12% of couples in the reproductive age range suffer from infertility, a serious health issue that affects people all over the world.

Objective

To assess the prevalence, causes, and contributing factors of male infertility

Methods

This was a descriptive, cross-sectional study conducted in an infertility clinic within a tertiary care center's obstetrics and gynecology department. Simple random sampling was used to select 120 patients. The study included men in the 18-50 age group who had been married for more than a year. Hence, qualitative and quantitative data were examined using means, medians, and percentages, and Fisher's exact test was used to determine the degree of significance.

Results

The study included 120 males between the ages of 18 and 50. Their BMI was 26.6 ± 4.1, suggesting they were moderately overweight, and their average age was 30 ± 5 years. With 43.3% having Grade 2, 14.2% having Grade 3, and 1.7% having Grade 1, varicocele was prevalent. Male factor infertility was the most common cause of male infertility (18%), followed by ovulatory dysfunction (35%), and normal pelvic findings (25%). Sexual dysfunction (1%), ejaculatory problems (0.8%), hormonal imbalances (5%), tubal blockage (9%), and atypical abnormalities of cervical mucus (3%).

Conclusion

In the therapeutic context, this study emphasizes the significance of early identification, suitable treatment approaches, and individualized care for male infertility.

Keywords

Contributing factors, Infertility, Male, Sexual Dysfunction

Introduction

The World Health Organization (WHO) defines infertility as the failure to conceive following 12 months of unprotected sexual activity (WHO, 2010). Infertility affects fertility and population growth rates globally, affecting 10–15% of couples (Ahmed et al., 2020). Male infertility is a complex issue that affects a large percentage of couples globally and accounts for around half of all occurrences of infertility (Singh et al., 2021). In almost half of these cases, male infertility is the cause (Agarwal et al., 2021). About 35% of infertility cases in Pakistan are caused by male factors, with the incidence being approximately 21.9% (Ali et al., 2023). Male reproductive health is influenced by a complex interaction of environmental, hormonal, and genetic factors (Ahmed et al., 2019). Although males account for around 40% of infertility cases, cultural norms in many nations, including Pakistan, typically impose an undue burden on women (Ali et al., 2022; Alhusayn et al., 2022). In Pakistan, several environmental, lifestyle, and health-related factors are frequently linked to male infertility. The incidence of male infertility is influenced by these variables as well as the lack of access to male infertility diagnosis and treatment choices, underscoring the need for greater awareness and easily accessible therapies (Ashraf et al., 2022; Ateeb et al., 2023). Male infertility in the region is significantly influenced by sperm abnormalities and their aetiologies, according to a meta-analysis (Barrera et al., 2022). It is known that spermatogenesis and total male fertility are significantly influenced by hormonal abnormalities, especially those that impact the hypothalamic-pituitary-gonadal axis (Singh et al., 2021). A more thorough understanding of the etiology of these abnormalities is necessary since they frequently result in a variety of illnesses that affect sperm production and function. Furthermore, studies have shown that among Pakistani men, obesity is a rising public health issue linked to male infertility (Choy & Eisenberg, 2021).

Additionally, a Karachi study found that 21.91% of men were infertile, highlighting the necessity of thorough assessments of male reproductive health (Ahmed et al., 2019). The function of polymorphisms in genes linked to male infertility has also been clarified by recent developments in genetic research. Mutations like MTR A2756G and MTRR A66G are strongly linked to decreased sperm quality and function, according to Tariq et al. (2023). To better understand these genetic markers' role in male infertility, their updated meta-analysis emphasizes how urgent it is to investigate them, especially in varied groups (Shi, Z et al., 2024). Research indicates that infertile males in Pakistan are likely to have biological issues such as sperm abnormalities, including azoospermia (lack of sperm) and oligospermia (low sperm count) (Shiraishi & Matsuyama, 2022; Tariq et al., 2023). Sperm abnormalities are more common in areas like Sindh and Khyber Pakhtunkhwa, possibly due to environmental, genetic, and health-related variables (Shiraishi & Matsuyama, 2022). Other important factors that affect sperm quality and function include varicoceles, hormone abnormalities, and blockages in the reproductive system. Furthermore, lifestyle choices such as smoking, poor diet, and exposure to pollution can lead to oxidative stress, harming sperm cells and reproductive health (Nowicka-Bauer & Nixon, 2020; Jiang et al., 2020).

The frequency and specific contributing causes of male infertility in Pakistan are still not well-documented, despite these efforts. Although requiring further research, factors such as genetic predispositions, environmental exposures, and lifestyle choices are thought to play a role. To lessen the effects of male infertility in the nation, targeted therapies and public health initiatives must be developed. This highlights the importance of understanding the incidence, causes, and contributing factors of male infertility in Pakistan. To inform targeted preventive and treatment measures, this study intends to evaluate the incidence of male infertility in Pakistan, identify its main causes, and understand the contributing elements.

Objective

To assess the prevalence, causes, and contributing factors of male infertility

Material and Methods

This was a descriptive, cross-sectional study conducted in an infertility clinic within a tertiary care center's

obstetrics and gynecology department. Simple random sampling was used to select 120 patients for the study. The study included men belonging to the age group 25–50 who had been married for more than a year, cohabiting women, and women who were not using contraceptives because they were either primary or secondary infertile. The ethical letter was obtained from the ethical review committee of Sir Syed Hospital, Karachi, Pakistan. All the participants were informed regarding the aim and objectives of the study and they were further assured that the information obtained from them will remain confidential. Participants in the study were enrolled in an infertility clinic, and on their initial appointment, a thorough medical history of the couples was obtained. Verbal interviews, medical tests, and record reviews were used to gather information from the willing patients. A standardized case record form was used to record the data, which included demographic information, a thorough history of infertility, and any prior treatments, surgical history, and coital history. Both the overall and specific examination findings were recorded in the document. Investigation reports and specifics from any previous infertility treatments were also recorded. To, the study population's qualitative and quantitative data were examined using means, medians, and percentages, and Fisher's exact test was used to determine the degree of significance.

Results

The results revealed 120 male participants in the study, belonging to the age group of 18 to 50, with a mean age of 30 ± 5 years. The group's average body mass index (BMI) was 26.6 ± 4.1, suggesting the members were moderately overweight. In terms of varicocele, Grade 2 varicocele accounted for 43.3% of the total number of patients (52 patients), followed by Grade 3 varicocele (14.2%, 17 patients), and Grade 1 varicocele (1.7%, 2 patients). On the right side, the average testicular capacity was 16.4 ± 3.0 ml, whereas on the left, it was 16.3 ± 3.3 ml. The testicular volumes were smaller in the azoospermic group, which did not produce any sperm, with the left side measuring 12.2 ± 5.2 ml and the right side measuring 11.7 ± 5.6 ml as shown in table-1.

The results revealed the causes and contributing factors of the study on male infertility (n=120). With 22 cases (18%), male factor infertility was the most prevalent. Thirty-one instances (25%) had normal pelvic results, indicating no obvious pelvic abnormalities. Despite being frequently linked to female infertility, ovulatory dysfunction was discovered in 43 instances (35%), suggesting that it also plays a part in male infertility. Eleven cases (9%) had tubal blockage, while four cases (3%), had cervical mucous abnormalities. Six patients (5%) had hormonal abnormalities, including high levels of FSH and LH. Two instances (1%), included sexual dysfunction, and one case (0.8%) had ejaculatory abnormalities, including retrograde ejaculation as shown in table-2.

Table 1- Male Patients' Clinical and Demographic Features

S. No	Variables	Mean
1	Age years Range (18-50years)	 30 ± 5 years
2	Average BMI	26.6 ± 4.1
3	Varicocele Grades Distribution (%)	Grade 2: 52 (43.3%) Grade 3: 17 (14.2%) Grade 1: 2 (1.7%
4	Average Testicular Volume	Right: 16.4 ± 3.0 ml Left: 16.3 ± 3.3 ml

5	Azoospermia Group Testicular Volume	Right: 11.7 ± 5.6 ml Left: 12.2 ± 5.2 ml
6	Average FSH Level (Azoospermia Group)	14.6 ± 12.4 mIU/ml

Table 2- Causes and Contributing Factors of male infertility (n=120)

S. No	Causes and Contributing Factors	Number of Cases
1	Male factor	22 (18%)
2	Normal Pelvic Findings	31 (25%)
3	Tubal obstruction	11 (9%)
4	Abnormalities of cervical mucus	4 (3%)
5	Ovulatory dysfunction	43 (35%)
6	Imbalance of Hormones (FSH, LH)	6 (5%)
7	Sexual dysfunction	2 (1%)
8	Ejaculatory Disorders (e.g., retrograde ejaculation)	1 (0.8%)

Discussion

Male infertility is still a major global public health concern, and it is becoming more and more prevalent in nations like Pakistan. This study highlights significant clinical characteristics and demographic information among Pakistani males aged 18 to 50, which advances our understanding of the prevalence, cause, and contributing factors of male infertility.

Many participants were quite young and somewhat overweight, as seen by their mean BMI of 26.6 and average age of 30. Age and BMI are important determinants in male fertility, according to previous research, and being overweight or obese has a detrimental impact on sperm quality because it alters hormonal profiles and increases oxidative stress (Sermondade et al., 2019; Agarwal et al., 2021). Varicocele, a recognized risk factor for infertility, was common in this research; 43.3% of patients had Grade 2 varicocele, and 14.2% had Grade 3. By interfering with the control of testicular temperature, varicocele causes oxidative stress, apoptosis, and decreased sperm production, all of which contribute to infertility (Shiraishi & Matsuyama, 2022).

With averages of 11.7 ml (right) and 12.2 ml (left), the azoospermic group's testicular volume was significantly lower than the group's average of 16.4 ml and 16.3 ml. Other investigations have shown that poor spermatogenesis is frequently linked to reduced testicular volume (Esteves et al., 2020). A sizable percentage of the male infertility cases in the research were caused by azoospermia, which is the total lack of sperm. As was seen in 5% of cases studied, azoospermic males frequently exhibit hormonal abnormalities, especially increased levels of FSH and LH, which may indicate hypogonadotropic hypogonadism (Kumar & Sharma, 2020). A total of 35% of cases had ovulatory dysfunction, which is often associated with infertility in women but can also lead to infertility in men due to problems with partner fertility compatibility (Keene et al., 2019). These results highlight the complexity of infertility, where total fertility is influenced by the reproductive health of both couples (Cox et al., 2022).

The study's primary drawback was its cross-sectional methodology, which had a smaller sample size and was

single-center, limiting how broadly the findings could be applied. Furthermore, genetic factors were not directly investigated despite their acknowledged significance, and depending solely on self-reported data may induce bias.

Further research should be conducted in Pakistan to fill in these gaps by using longer-term, multicenter designs that capture more extensive trends and variances. To lessen the effects of male infertility, public awareness campaigns about modifiable risk factors including stress, smoking, and obesity are advised, as is easier access to genetic testing and infertility therapies. Effectively tackling this complex issue also requires focused policy improvements and comprehensive, couple-based interventions.

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