

Male Infertility: Its Diagnosis and Management

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Male infertility is a significant health issue affecting couples worldwide. Male infertility, a complex and increasingly prevalent issue, poses significant challenges to reproductive health both nationally and internationally. Traditionally infertility has been considered female concern, but recent studies highlighted that male factor contributes equally to fertility problems in couples. Male infertility is a significant medical condition affecting approximately 7% of men worldwide, with approximately 50% of infertility cases attributed to male factors. It is defined by the inability to conceive a child after one year of unprotected intercourse. There are different causes of male infertility, which can vary widely and may include hormonal imbalances, genetic factors, anatomical issues such as varicocele (enlarged veins within the scrotum), or lifestyle factors such as smoking or excessive alcohol consumption.

Diagnosis and management strategies play crucial roles in addressing this condition and improving fertility outcomes. Diagnosis typically involves semen analysis to assess sperm count, motility, and morphology. Treatments range from medication to surgery, depending on the underlying cause, although

in some cases, assisted reproductive techniques like in vitro fertilization (IVF) may be necessary¹.

It is reported that Trace minerals play a crucial role in male fertility by supporting various physiological processes necessary for sperm production and function. Zinc, for instance, is essential for the synthesis of testosterone and the development of healthy sperm. Deficiencies in zinc have been linked to decreased sperm quality and infertility in men². Selenium is another trace mineral that acts as an antioxidant, protecting sperm from oxidative damage and enhancing sperm motility. Adequate intake of these traces minerals through diet or supplementation may potentially improve fertility outcomes in men by supporting sperm health and function.³

According to WHO, Accurate diagnosis of male infertility involves a comprehensive evaluation of both medical history and physical examination, followed by specialized laboratory tests. Conventional method of Semen analysis remains the cornerstone for assessing male fertility, examining parameters such as sperm count, motility, and morphology⁴. Additional tests may include hormonal assays to assess levels of testosterone, follicle-stimulating hormone (FSH),

and luteinizing hormone (LH), which provide insights into testicular function and endocrine status⁵.

Advanced diagnostic techniques are also available in specialized fertility centers such as sperm DNA fragmentation testing and sperm function assays, which have gained importance in recent years for evaluating sperm quality beyond traditional parameters⁶. Similarly, Genetic testing may also be indicated in cases of suspected genetic abnormalities impacting fertility, such as Y chromosome micro deletions or karyotyping analysis⁷.

Male infertility can be better managed, if the underlying cause is properly identified through diagnostic evaluation. It is reported that lifestyle modifications, including weight management, smoking cessation, and reduction of alcohol intake, may improve sperm quality in some cases⁸. Beside this, Medical interventions such as hormone replacement therapy or medications to improve sperm production (e.g., clomiphene citrate) can be beneficial for certain hormonal imbalances⁹.

Moreover, assisted reproductive techniques (ART), including intrauterine insemination (IUI) and in vitro fertilization (IVF) with intracytoplasmic sperm injection (ICSI), are often employed when natural conception is not achievable¹⁰. These techniques offer viable options for couples facing male infertility, particularly in cases of severe sperm abnormalities or obstruction of the reproductive tract. Despite advancements, challenges however, still persist in managing male infertility, which includes access to specialized care centre and financial constraints related to ART.

It is concluded that effective management of male infertility requires a multidisciplinary approach, involving urologists, reproductive endocrinologists/ andrologists, pathologists, and genetic counselors. Collaborative efforts between clinicians, researchers

and policymakers are also beneficial to address the complexities of male infertility and hence enhance overall fertility care. Early and accurate diagnosis enables targeted interventions that can significantly improve fertility outcomes for couples. Continued research and technological advancements are crucial for enhancing diagnostic precision and therapeutic efficacy in addressing male infertility.

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