

Male infertility: why sperm counts are falling

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Historically, women have carried the stigma of infertility alone on their shoulders. However, men and women are just as likely to contribute to a couple's infertility and male infertility needs to be investigated right from the very outset.

Sperm count from seminal fluid analysis is a crucial indicator of male reproductive health. When couples seek conception or face fertility challenges, sperm count is often the first parameter evaluated in males.

Although it is possible to conceive naturally, a reduced sperm count means there is statistically less chance to become pregnant. Numerous studies suggest a decline in sperm counts among men in Western and other countries over the past decades, with proposed contributing factors including environmental pollutants, lifestyle changes, and rising obesity rates.

But how robust is the evidence? What are its implications?

What has changed?

Although spermatogenesis naturally decreases with age, evidence clearly shows that even young adult males have been greatly affected by declining sperm counts.

Environmental and lifestyle factors emerge as primary culprits in the reported declines, including:

- Exposure to endocrine-disrupting chemicals (EDCs) such as phthalates, pesticides, and bisphenol.
- Longstanding stress and mental health issues – studies indicate chronic stress can disrupt testosterone and other hormone levels, negatively impacting spermatogenesis. Unhealthy coping mechanisms like smoking, excessive alcohol consumption, or poor dietary habits and stress can amplify negative health outcomes, causing further decline. High BMI and sedentary lifestyle also impact fertility.



- Chronic disease such as diabetes mellitus, hypertension, hyperlipidaemia and complications related to cancer treatments are linked to lower sperm counts. Some medications can also impair sperm function.
- Sexually Transmitted Infections – according to World Health Organisation (WHO), the number of STIs around the world is increasing, with chlamydia, gonorrhoea, syphilis and trichomoniasis being responsible for more than one million infections daily in adults aged 15-49 years. Men with leukocytospermia from STIs can have significantly decreased semen volume, concentration, total motility, progressive motility and abnormal morphology.

Implications of declining counts

Male infertility, closely tied to sperm count, incurs rising social

and economic costs. From an environmental standpoint low sperm counts correlate with conditions like cryptorchidism, hypospadias, and testicular cancer, suggesting that prenatal exposures and environmental factors can have prolonged effects on male health.

Geographic and lifestyle disparities further highlight how urbanisation, environmental degradation, and socioeconomic conditions shape reproductive trends.

As natural conception becomes more challenging, the demand for assisted reproductive technologies (ART), including in vitro fertilisation (IVF), has risen. This shift not only places emotional strain on couples but also raises financial burdens.

Controversies

Despite mounting evidence, some researchers challenge the extent of sperm decline due to potential biases in volunteer selection

Key messages

- A significant global decline in sperm counts over the past four decades has global implications for male reproductive health
 - Assisted reproductive technologies have helped address infertility, a more definitive solution involves prevention with public health strategies, policy changes, and individual behavioural modifications
 - Future studies should focus on identifying causative mechanisms and evaluating intervention efficacy to safeguard reproductive health for future generations.
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criteria, differences in laboratory standards, and heterogeneity in study designs.

Another key debate revolves around the role of environmental pollutants, including EDCs, found in plastics, pesticides, and industrial byproducts.

The difficulty in establishing causality between these exposures

and declining sperm quality means ongoing research is needed to clarify the extent, causes, and long-term consequences of this phenomenon.

Strategies for addressing the issue

A multifaceted approach is urgently required to mitigate the reported sperm count decline. Five main strategies can help address declining sperm counts:

Education: including incorporation of reproductive health topics into school curricula, emphasising the impact of environmental and behavioural risks, highlighting prevention and early treatment of chronic diseases and encouraging healthy habits like regular exercise, balanced nutrition, avoiding smoking and excessive alcohol.

Public health campaigns: including awareness campaigns on lifestyle and environmental risks, promoting healthier habits and raising awareness of the reproductive risks associated with occupations involving EDCs.

Medical interventions: including advocating for routine screenings

for metabolic and reproductive health, addressing male factor infertility earlier, and diagnosing potential issues before couples spend years trying to conceive.

Policy and environmental regulations: Advocating for statutory restriction of exposure to harmful chemicals in occupational and consumer settings and for safer workplace practices for men in high-risk professions.

Fertility preservation: Promoting sperm cryopreservation for individuals at risk. 

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