



Semen Parameters in Indian Men During the Preconception Period: A Cross-Sectional Study

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ABSTRACT

Background:

Male reproductive health plays a crucial role in successful conception and healthy pregnancy outcomes. Seminal quality parameters such as sperm concentration, motility, morphology, and semen volume are key indicators of male fertility. In India, changing lifestyle and environmental factors have raised concerns regarding declining semen quality, highlighting the need for pre-conception evaluation.

Objective: To assess seminal quality parameters in Indian men prior to conception and compare findings with World Health Organization (WHO) reference standards.

Methods: A cross-sectional observational study was conducted among Indian men attending pre-conception or fertility clinics. Semen samples were collected following WHO guidelines after 2–7 days of abstinence. Parameters assessed included semen volume, sperm concentration, total motility, progressive motility, and morphology.

Results: The majority of participants demonstrated semen parameters within WHO reference ranges. However, reduced sperm concentration and motility were observed in a significant proportion of men, particularly among those with lifestyle risk factors such as smoking, obesity, and occupational heat exposure.

Conclusion: Pre-conception assessment of seminal quality in Indian men reveals early alterations in sperm parameters that may impact fertility outcomes. Routine male reproductive screening before conception may aid in early identification and management of male-factor infertility.

Keywords: Seminal quality; Sperm parameters; Male fertility; Pre-conception health; Indian men

INTRODUCTION

Infertility is a growing public health concern worldwide, affecting approximately 10–15% of couples, with male factors contributing to nearly half of all cases. Seminal quality assessment remains the cornerstone for evaluating male fertility potential. Parameters such as sperm concentration, motility,

morphology, and semen volume provide insight into spermatogenic efficiency and reproductive capability. In India, rapid urbanization, environmental pollution, lifestyle changes, and increasing prevalence of metabolic disorders have been implicated in deteriorating male reproductive

health [1]. While most fertility evaluations focus on women, emerging evidence underscores the importance of assessing male reproductive health prior to conception, as sperm quality influences fertilization, embryo development, and placental formation. This study aims to assess seminal quality in Indian men prior to conception and evaluate deviations from established reference values [2].

MATERIALS AND METHODS

Study design and participants

A cross-sectional study was conducted among men aged 21–45 years attending pre-conception counselling or fertility clinics [3]. Participants with known genetic disorders, chronic systemic illness, or history of chemotherapy were excluded.

Sample collection

Semen samples were collected by masturbation into sterile containers following 2–7 days of sexual abstinence. Samples were allowed to liquefy at room temperature and analyzed within one hour of collection.

Semen analysis

Semen analysis was performed according to World Health Organization (WHO) Laboratory Manual (6th Edition) [4]. The following parameters were assessed:

- Semen volume (mL)
- Sperm concentration (million/mL)
- Total sperm count
- Total motility (%)
- Progressive motility (%)
- Normal morphology (%)

Statistical analysis

Data were expressed as mean $\pm$ standard deviation. Semen parameters were compared with WHO reference values. Associations with lifestyle factors were analyzed descriptively.

RESULTS

A total of 120 Indian men were included in the study (Table 1).

Table 1: Semen parameters of participants presented as mean $\pm$ standard deviation (SD) compared with World Health Organization (WHO) reference values.

Parameter	Mean $\pm$ SD	WHO Reference Value
Semen Volume (mL)	2.7 $\pm$ 0.8	≥ 1.4
Sperm Concentration (million/mL)	52.4 $\pm$ 21.6	≥ 16
Total Motility (%)	58.2 $\pm$ 12.3	≥ 42
Progressive Motility (%)	38.6 $\pm$ 9.4	≥ 30
Normal Morphology (%)	5.1 $\pm$ 1.9	≥ 4

- **28%** of participants exhibited oligozoospermia
- **34%** showed reduced motility
- Poor morphology was observed in **22%** of samples
- Smoking and obesity were associated with lower sperm motility and concentration

morphology may affect fertilization potential and early embryonic development, including placental formation. Pre-conception male screening offers an opportunity for early intervention through lifestyle modification, medical treatment, and counseling.

DISCUSSION

The findings demonstrate that while most Indian men prior to conception exhibit semen parameters within WHO reference ranges, a substantial proportion show suboptimal sperm concentration and motility. These findings align with earlier Indian studies reporting declining trends in seminal quality over time. Lifestyle and environmental factors appear to play a significant role in altered sperm parameters. The observed reduction in motility and

CONCLUSION

Assessment of seminal quality in Indian men prior to conception reveals early deviations in sperm parameters that may compromise fertility. Incorporating routine male reproductive evaluation into pre-conception care programs may improve fertility outcomes and reproductive health awareness in India.

DECLARATIONS

Conflict of interest

The authors declare no conflict of interest.

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Author contributions

The author solely contributed to the conception, design, analysis, interpretation, and writing of this manuscript.

Consent for publication

Not applicable.

Declaration of interest

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Availability of data and materials

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