Evaluation of infertility associated with diet & lifestyle in current scenario: A multicentre observational case study

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Abstract

Background

Infertility is a major global public health concern affecting approximately one in six individuals during their reproductive lifetime. Increasing evidence suggests that modifiable dietary and lifestyle factors, including obesity, poor dietary quality, physical inactivity, psychological stress, inadequate sleep, smoking, and high consumption of ultra-processed foods (UPFs), adversely influence reproductive health. However, data describing the prevalence of these risk factors among infertile patients in routine Indian clinical practice remain limited.

Objective

To evaluate the dietary and lifestyle characteristics of infertile patients attending infertility clinics and describe the prevalence of modifiable nutritional and lifestyle factors associated with reproductive health.

Methods

A multicentre observational study was conducted between January and June 2026 among 60 infertile participants (30 males and 30 females) attending infertility clinics in the Malegaon region of Maharashtra, India. Demographic, anthropometric, dietary, lifestyle, and clinical data were collected using a structured Case Record Form and analysed using descriptive statistics.

Results

The mean age of participants was 28.48 ± 4.62 years and the mean body mass index was 27.01 ± 3.04 kg/m². Overweight and obesity were observed in 51.7% and 20.0% of participants, respectively, while 60.0% had primary infertility. Moderate-to-high psychological stress was reported by 95.0% of participants, 56.7% slept ≤6 hours/day, and 81.7% exhibited poor lifestyle quality. Poor dietary quality, inadequate micronutrient intake, and high UPF consumption were identified in 68.3%, 76.7%, and 66.7% of participants, respectively. Oligoasthenozoospermia was the most common male infertility diagnosis, whereas polycystic ovarian disease (PCOD) predominated among female participants.

Conclusion

Infertile patients exhibited a high prevalence of modifiable dietary and lifestyle risk factors, including excess body weight, poor dietary quality, inadequate micronutrient intake, high UPF consumption, psychological stress, insufficient sleep, smoking, and unhealthy lifestyle practices. These findings support integrating routine nutritional assessment and structured lifestyle counselling into infertility care. Larger prospective multicentre studies are warranted to clarify the relationship between modifiable lifestyle factors and reproductive outcomes.

Keywords

Infertility; Diet; Lifestyle; Nutrition; Ultra-processed foods; Reproductive health; Male infertility; Female infertility; Observational study.

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1. Introduction

Infertility is a major global public health concern affecting millions of individuals and couples of reproductive ages worldwide. The World Health Organization (WHO) defines infertility as the failure to achieve a clinical pregnancy after 12 months or more of regular, unprotected sexual intercourse. Recent estimates indicate that approximately one in six individuals experience infertility during their lifetime, highlighting its substantial medical, psychological, social, and economic impact. Beyond reduced reproductive potential, infertility is associated with emotional distress, impaired quality of life, social stigma, and considerable healthcare costs, particularly in low- and middle-income countries where access to fertility services remains limited (1–3).

Infertility is a multifactorial condition influenced by genetic, anatomical, endocrine, infectious, environmental, and behavioural factors. In recent

years, increasing attention has focused on the contribution of modifiable dietary and lifestyle factors to reproductive health. Obesity, unhealthy dietary patterns, physical inactivity, psychological stress, inadequate sleep, smoking, and high consumption of ultra-processed foods (UPFs) have all been associated with impaired fertility in both men and women. These factors may adversely affect reproductive function through mechanisms including endocrine dysregulation, oxidative stress, chronic inflammation, insulin resistance, and altered gametogenesis. Conversely, healthy dietary patterns rich in fruits, vegetables, whole grains, legumes, nuts, fish, and essential micronutrients have been associated with improved reproductive outcomes and better overall fertility potential (5–21).

The relationship between diet, lifestyle, and infertility is particularly relevant in India, where rapid urbanisation, nutritional transition, sedentary behaviour, and increasing consumption of ultra-processed foods have contributed to rising rates of obesity and metabolic disorders among adults of reproductive age. Although numerous international studies have investigated the influence of dietary and lifestyle factors on fertility, comprehensive data describing the combined burden of these modifiable risk factors among infertile patients in routine Indian clinical practice remain limited. Such evidence is important for developing context-specific preventive strategies and strengthening multidisciplinary infertility management (12,14,22–24).

Therefore, this multicentre observational study was undertaken to evaluate the dietary and lifestyle characteristics of infertile patients attending infertility clinics in the Malegaon region of Maharashtra, India. Specifically, the study aimed to describe participants' demographic characteristics, anthropometric profiles, dietary habits, lifestyle practices, and selected clinical findings using a structured Case Record Form (CRF). By identifying the prevalence of modifiable nutritional and lifestyle risk factors, this study seeks to support the integration of routine nutritional assessment and lifestyle counselling into infertility management while providing a foundation for future analytical and prospective research.

2. Materials and Methods

2.1 Study Design

This multicentre observational study was conducted to evaluate dietary and lifestyle factors among infertile patients attending infertility clinics in the Malegaon region of Maharashtra, India. The study employed a descriptive observational design to characterise the demographic, anthropometric, dietary, lifestyle, and clinical characteristics of infertile men and women. Data were collected prospectively over a six-month period (January–June 2026) using a structured Case Record Form (CRF).

2.2 Study Setting

The study was carried out at three healthcare facilities providing infertility-related diagnostic and clinical services in the Malegaon region of Maharashtra, India:

- **Baitul Hikmat Clinic**, supervised by Dr. Shoaib Chaudhry.
- **Insiya Maternity Hospital**, supervised by Dr. Shameel Faisal.
- **Al Rahman Laboratory**, supervised by Mr. Abdul Rahman.

These centres were selected because they routinely provide infertility-related diagnostic and clinical services and receive a diverse population of infertile patients from the Malegaon region.

2.3 Study Population

The study included **60 infertile participants**, including **30 male and 30 female patients**, who attended the participating infertility centres during the study period. Eligible participants were recruited consecutively after confirmation of eligibility and provision of written informed consent.

2.4 Eligibility Criteria

Inclusion Criteria

Participants were eligible if they fulfilled all of the following criteria:

- Male or female patients diagnosed with primary or secondary infertility.
- Age between **18 and 45 years** at the time of enrolment.
- Willingness to participate and provide written informed consent.

Exclusion Criteria

Participants were excluded if they met any of the following criteria:

- Incomplete clinical or questionnaire data.
- Infertility with a documented confirmed genetic cause.
- Current or previous chemotherapy or radiotherapy.
- Refusal or inability to provide written informed consent.

2.5 Sample Size and Sampling Technique

A total of **60 infertile participants** were enrolled during the study period.

Participants were recruited using **consecutive sampling**, whereby every eligible patient attending the participating infertility clinics during the study period was invited to participate until the predetermined sample size was achieved.

2.6 Data Collection

Data were collected using a structured Case Record Form (CRF) developed specifically for this study. Information was obtained through face-to-face participant interviews, review of available medical records and relevant laboratory reports, where available.

To ensure consistency across study sites, all investigators followed a standardized data collection procedure before study initiation.

The CRF collected information on:

- Demographic characteristics
- Anthropometric measurements
- Medical and reproductive history
- Dietary habits
- Lifestyle practices
- Physical activity
- Sleep patterns
- Psychological stress
- Smoking and addiction-related behaviours
- Micronutrient intake
- Clinical findings related to infertility

2.7 Study Variables

The following variables were evaluated.

Demographic variables

- Age
- Sex
- Type of infertility

Anthropometric variables

- Body mass index (BMI)

Lifestyle variables

- Physical activity
- Sleep duration
- Psychological stress
- Smoking status
- Addiction-related behaviours

Dietary variables

- Overall dietary quality
- Ultra-processed food (UPF) intake
- Micronutrient intake
- Fruit and vegetable consumption

Clinical variables

- Male infertility diagnosis
- Female infertility diagnosis
- Relevant reproductive characteristics

2.8 Outcome Measures

The **primary outcome** was to describe the prevalence of dietary and lifestyle characteristics among infertile patients attending infertility clinics.

The **secondary outcomes** included:

- Distribution of body mass index.
- Dietary quality profile.
- Lifestyle characteristics.
- Clinical findings among male participants.
- Clinical findings among female participants.

2.9 Statistical Analysis

Data were entered into Microsoft Excel before being analysed using **GraphPad Prism version 8.0** (GraphPad Software, San Diego, CA, USA).

Continuous variables are presented as **mean ± standard deviation (SD)**, whereas categorical variables are expressed as **frequencies and percentages**.

Because the study was descriptive in nature, analyses were limited to descriptive statistical methods used to summarize participant characteristics and the distribution of dietary, lifestyle, and clinical variables.

2.10 Ethical Considerations

The study protocol was reviewed and approved by the **Institutional Ethics Committee of the Institutes of Abdul Muttalib Campus, Malegaon, Maharashtra, India** (Approval No. **AMCIEC/2025–26/04**; Approval Date: **02 February 2026**).

Written informed consent was obtained from all participants before enrolment.

Participant confidentiality was maintained by anonymizing all collected data and restricting access to study records to members of the research team.

3. Results

3.1 Participant Characteristics

A total of **60 infertile participants** (30 males and 30 females) were enrolled in the present multicentre observational study. The baseline demographic and anthropometric characteristics of the participants are presented in **Table 1**.

Table 1. Demographic and anthropometric characteristics of study participants (N = 60)

Variable	Value
Total participants	60
Male	30 (50.0%)
Female	30 (50.0%)
Age (years), mean ± SD	28.48 ± 4.62
BMI (kg/m²), mean ± SD	27.01 ± 3.04
Primary infertility	36 (60.0%)
Secondary infertility	24 (40.0%)
Overweight	31 (51.7%)
Obese	12 (20.0%)

- Data are presented as **mean ± standard deviation (SD)** or **n (%)**. **SEM** was calculated using GraphPad Prism version 8.0.
- BMI = Body mass index.

The **mean age** of the study population was **28.48 ± 4.62 years** (SEM = 0.60), indicating that the

participants were predominantly within the reproductive age group commonly presenting for infertility evaluation. The **mean body mass index (BMI)** was **27.01 ± 3.04 kg/m²**. Based on BMI classification, **31 (51.7%)** participants were overweight and **12 (20.0%)** were obese, demonstrating that excess body weight was a frequently observed anthropometric characteristic among the infertile participants included in the study. With respect to infertility status, **primary infertility** was identified in **36 (60.0%)** participants, whereas **24 (40.0%)** had secondary infertility, indicating that primary infertility represented the predominant clinical presentation within the study population. Overall, the baseline findings describe a predominantly young infertile population in which primary infertility and excess body weight were common characteristics.

3.2 Lifestyle Characteristics

Lifestyle assessment demonstrated a high prevalence of modifiable behavioural risk factors among infertile participants. The detailed lifestyle characteristics are presented in **Table 2**, while the overall lifestyle quality of the study population is illustrated in **Figure 1**.

Variable	n (%)
Moderate-to-high stress	57 (95.0)
Sleep ≤6 hours/day	34 (56.7)
Poor lifestyle quality	49 (81.7)
Male smokers*	20 (66.7)

- Values are presented as **n (%)**.

*Smoking prevalence calculated among male participants only (n = 30).

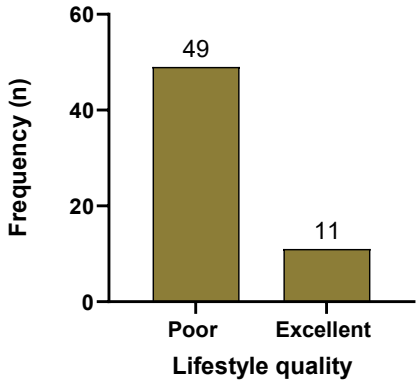

Figure 1: Lifestyle quality among infertile patients. (n=60)

Psychological stress: Moderate-to-high stress was reported by **57 (95.0%)** participants, indicating that psychological stress was one of the most prevalent lifestyle characteristics among infertile individuals. **Sleep duration:** Short sleep duration (≤6 hours/day) was reported by **34 (56.7%)** participants, suggesting that inadequate sleep was commonly observed in the study population. **Lifestyle quality:** Poor lifestyle quality was identified in **49 (81.7%)** participants, demonstrating that unhealthy lifestyle practices predominated among infertile participants. **Smoking:** Among male participants, **20 (66.7%)** were smokers, indicating that tobacco use was a frequently reported lifestyle behaviour within the male infertility subgroup, whereas alcohol consumption was uncommon.

3.3 Dietary Characteristics

Dietary assessment revealed a high prevalence of suboptimal nutritional practices among infertile participants. The dietary characteristics are summarised in **Table 3**, while **Figure 2** illustrates the distribution of diet quality and **Figure 3** presents the prevalence of UPF intake **Table 3. Dietary characteristics of infertile participants**

Variable	n (%)
Poor dietary quality	41 (68.3)
Inadequate micronutrient intake	46 (76.7)
High UPF intake	40 (66.7)

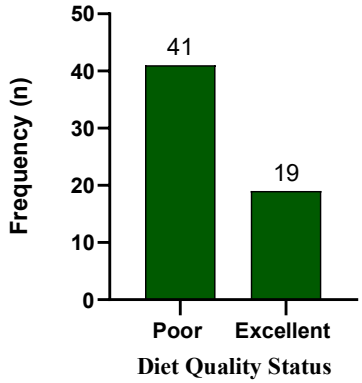

Figure 2: Diet quality status among infertile patients. (n=60)

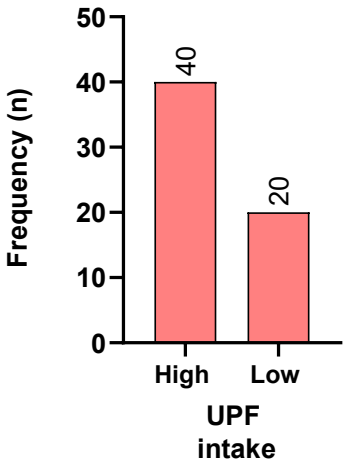

Figure 3: UPF's intake status among infertile patients. (n=60)

Ultra-processed food (UPF) intake: High UPF intake was reported by **40 (66.7%)** participants, identifying frequent consumption of ultra-processed foods as a predominant dietary characteristic among infertile participants. **Micronutrient intake:** Inadequate micronutrient intake was observed in **46 (76.7%)** participants, indicating that insufficient intake of essential nutrients was a common dietary characteristic among infertile individuals. **Diet quality:** Poor dietary quality was identified in **41 (68.3%)** participants, highlighting inadequate overall dietary practices among the study population.

3.4 Male Clinical Findings

The distribution of male infertility diagnoses is presented in **Table 4**, while **Figure 4** illustrates the frequency of each clinical diagnosis.

Table 4. Distribution of male infertility diagnoses (n = 30)

Diagnosis	n (%)
Oligoasthenozoospermia	12 (40.0)
Mild oligoasthenozoospermia	7 (23.3)
Asthenozoospermia	7 (23.3)
Severe oligoasthenozoospermia	3 (10.0)
Azoospermia	1 (3.3)

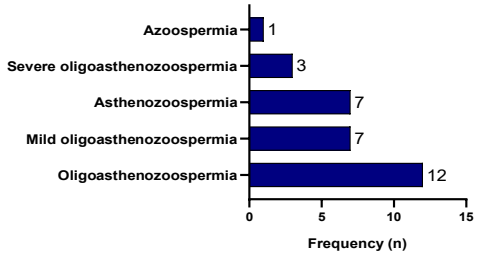

Figure 4. Distribution of male infertility diagnoses (N = 30).

Oligoasthenozoospermia: Was identified in **12 (40.0%)** participants, representing the predominant semen abnormality among infertile males. **Mild oligoasthenozoospermia:** Was observed in **7 (23.3%)** participants, indicating a considerable proportion of males with combined semen abnormalities. **Asthenozoospermia:** Was also identified in **7 (23.3%)** participants, demonstrating that impaired sperm motility was a frequently observed clinical finding. **Severe oligoasthenozoospermia:** Was recorded in **3 (10.0%)** participants. **Azoospermia:** Was identified in **1 (3.3%)** participant, representing the least frequently observed diagnosis in the study population.

3.5 Female Clinical Findings

The distribution of female infertility diagnoses is presented in **Table 5**, while **Figure 5** illustrates the frequency of the identified clinical conditions.

Table 5. Distribution of female clinical findings (n = 30)

Diagnosis	n (%)
PCOD	8 (26.7)
Delayed menstruation	6 (20.0)
Menstrual irregularities	5 (16.7)
Hypothyroidism	4 (13.3)
Oligomenorrhoea	4 (13.3)
Ovulatory dysfunction	2 (6.7)
Delayed ovulation	1 (3.3)

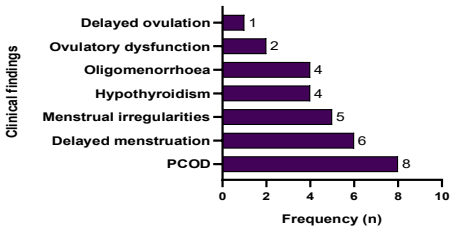

Figure 5. Distribution of female clinical findings (N = 30).

- Percentages were calculated using the total number of female participants (n = 30).
- Only the primary clinical diagnosis for each participant is presented.

Polycystic ovarian disease (PCOD) was the most frequently identified diagnosis, occurring in **8 (26.7%)** participants. **Delayed menstruation** was identified in **6 (20.0%)** participants, followed by **menstrual irregularities** in **5 (16.7%)** participants. **Hypothyroidism** and **oligomenorrhoea** were each identified in **4 (13.3%)** participants, whereas **ovulatory dysfunction** was observed in **2 (6.7%)** participants. **Delayed ovulation** was the least

frequently identified diagnosis, occurring in **1 (3.3%)** participant.

4. Discussion

Principal Findings

This multicentre observational study evaluated the dietary and lifestyle characteristics of infertile men and women attending infertility clinics in the Malegaon region of Maharashtra, India. The findings demonstrated a high prevalence of modifiable risk factors, including excess body weight, poor dietary quality, inadequate micronutrient intake, frequent consumption of ultra-processed foods (UPFs), psychological stress, insufficient sleep, smoking, and unhealthy lifestyle practices. Oligoasthenozoospermia was the predominant semen abnormality among male participants, whereas polycystic ovarian disease (PCOD) was the most common clinical diagnosis among female participants. Collectively, these findings support the growing evidence that infertility is influenced not only by biological factors but also by modifiable nutritional and lifestyle behaviours that frequently coexist and may adversely affect reproductive health in both sexes (3,5,7,8).

Obesity and BMI

A major finding of this study was the high prevalence of excess body weight, with more than two-thirds of participants classified as overweight or obese. Obesity is widely recognised as an important modifiable risk factor for infertility and has been associated with reduced natural fertility, poorer outcomes following assisted reproductive technologies, and adverse pregnancy outcomes (11,25,26). Excess adiposity contributes to endocrine dysregulation, insulin resistance, chronic inflammation, oxidative stress, and disruption of the hypothalamic–pituitary–gonadal axis, all of which may impair reproductive function. In women, these mechanisms can adversely affect ovulation, oocyte quality, and endometrial receptivity, whereas in men they may reduce testosterone production, impair spermatogenesis, and compromise semen quality (3,26–28).

The prevalence of overweight and obesity observed in our study is consistent with previous reports describing a substantial metabolic burden among infertile populations (23,26). The relatively high proportion of overweight participants may reflect regional dietary practices, reduced physical activity, and the ongoing nutritional transition occurring in many parts of India. Although the descriptive design of this study does not permit causal inference, these findings emphasise the importance of routine assessment of body weight and incorporation of evidence-based weight management strategies into infertility care, particularly in resource-limited healthcare settings (26,29).

Dietary Quality

Poor dietary quality was observed in more than two-thirds of participants, indicating that unhealthy dietary patterns are common among infertile individuals attending routine clinical services. Increasing evidence suggests that overall dietary patterns have a greater influence on reproductive health than individual nutrients alone. Healthy dietary patterns, particularly those rich in fruits, vegetables, whole grains, legumes, nuts, fish, and unsaturated fats, have been associated with improved semen quality, enhanced ovulatory function, and better reproductive outcomes. In contrast, diets characterised by high intakes of refined carbohydrates, saturated fats, sugar-sweetened beverages, and processed foods have been linked to impaired fertility (5,6,12,13).

The biological mechanisms underlying these associations include improved antioxidant defence, endocrine regulation, mitochondrial function, and reduced oxidative stress among individuals consuming healthy diets, whereas nutritionally poor diets promote systemic inflammation and metabolic dysfunction that may adversely affect gametogenesis and reproductive function (9,10,17,18,24,30). Although the present study was not designed to evaluate associations between dietary quality and reproductive outcomes, the findings demonstrate a considerable burden of unhealthy dietary behaviours among infertile patients in this regional Indian population. These observations support the integration of structured nutritional assessment and evidence-based dietary counselling into routine infertility management to improve both reproductive and overall metabolic health (5,6,12).

Micronutrient Intake

A high prevalence of inadequate micronutrient intake was observed in the present study, with approximately three-quarters of participants reporting insufficient intake of essential nutrients. Although serum micronutrient concentrations were not measured, the dietary assessment suggests that nutritional inadequacy may represent an important modifiable factor in this infertile population. Adequate intake of vitamins and trace elements is essential for endocrine regulation, gametogenesis, antioxidant defence, and cellular metabolism, all of which are fundamental to normal reproductive function (17,24).

Micronutrients such as zinc, selenium, folate, and vitamin D play established roles in spermatogenesis, hormone synthesis, DNA integrity, follicular development, implantation, and protection against oxidative stress. Deficiencies in these nutrients may impair reproductive capacity by disrupting hormonal regulation and increasing

oxidative damage to gametes (9,10,17,18,24,30). Evidence from systematic reviews suggests that correcting nutritional deficiencies as part of a comprehensive lifestyle intervention may be more beneficial than isolated supplementation alone (5,6,12). Our findings therefore support routine nutritional assessment and dietary counselling during infertility evaluation, particularly among individuals with obesity or poor dietary quality (11,26).

Ultra-Processed Food Consumption

Frequent consumption of ultra-processed foods (UPFs) was reported by approximately two-thirds of participants, indicating that this dietary behaviour is common among infertile individuals attending the participating centres. UPFs are typically characterised by high energy density, refined sugars, saturated fats, sodium, and food additives, while containing relatively low amounts of dietary fibre and essential micronutrients (14,22).

Previous studies have associated high UPF consumption with obesity, insulin resistance, metabolic syndrome, chronic inflammation, and impaired reproductive health (14,15,22,31). Proposed biological mechanisms include increased oxidative stress, endocrine disruption, mitochondrial dysfunction, and altered glucose metabolism, all of which may negatively influence oocyte quality, sperm function, ovulation, and implantation (9,12,22,31,32). Although this descriptive study cannot establish causal relationships, the coexistence of high UPF intake with excess body weight, poor dietary quality, and inadequate micronutrient intake suggests a clustering of modifiable nutritional risk factors within the study population. These findings reinforce the importance of promoting nutrient-dense dietary patterns and reducing UPF consumption as part of comprehensive infertility counselling (5,6,12,13).

Psychological Stress

Psychological stress was highly prevalent among study participants, with 95.0% reporting moderate-to-high stress levels. Infertility is recognised as both a medical and psychosocial condition, and emotional distress may arise from uncertainty regarding treatment outcomes, financial burden, repeated treatment attempts, and societal expectations. Conversely, chronic psychological stress may itself adversely influence reproductive function through neuroendocrine mechanisms, highlighting the complex bidirectional relationship between infertility and mental health (33,34).

Activation of the hypothalamic–pituitary–adrenal axis and sustained elevation of stress-related hormones may interfere with the hypothalamic–pituitary–gonadal axis, resulting in hormonal disturbances that impair reproductive function. In women, these changes may contribute to ovulatory dysfunction and menstrual irregularities, whereas in men they have been associated with reduced testosterone production, impaired spermatogenesis, and poorer semen quality (33,35,36). Although evidence regarding the direct effect of stress reduction on pregnancy outcomes remains inconsistent, psychological support remains an important component of comprehensive infertility care. The high prevalence of stress observed in our cohort supports the routine assessment of psychological well-being alongside nutritional and lifestyle evaluation during infertility management.

Sleep Duration

More than half of the participants reported sleeping six hours or less per day, indicating that insufficient sleep was common in this infertile population. Adequate sleep is essential for endocrine and metabolic homeostasis, and growing evidence suggests that sleep disturbance may adversely affect reproductive health. Sleep restriction has been associated with altered circadian regulation of reproductive hormones, increased systemic inflammation, impaired glucose metabolism, and disruption of melatonin secretion, all of which may negatively influence fertility (37,38).

In men, inadequate sleep has been linked to reduced testosterone concentrations, poorer semen quality, and decreased sperm motility, whereas in women it has been associated with menstrual irregularities, ovulatory dysfunction, and reduced fecundability (37,38). Although the descriptive design of this study does not permit conclusions regarding causality, the high prevalence of insufficient sleep supports the inclusion of sleep assessment and sleep hygiene counselling as part of routine lifestyle evaluation in infertility care.

Smoking

Smoking was another important lifestyle factor identified in the present study, with two-thirds of male participants reporting current or previous tobacco use. Tobacco smoke contains numerous toxic compounds capable of inducing oxidative stress, DNA fragmentation, mitochondrial dysfunction, and inflammation within the reproductive tract, leading to impaired sperm concentration, motility, morphology, and fertilising capacity (39–41).

Smoking has also been associated with diminished ovarian reserve, accelerated reproductive ageing, and poorer outcomes following assisted reproductive treatment in women (7,11). Although smoking prevalence was assessed only among male participants in the present study, the findings reinforce current international recommendations advocating smoking cessation as an essential component of fertility management. Integrating structured tobacco cessation counselling into

infertility services may therefore improve reproductive health while providing broader long-term health benefits (11,39–41).

Sex-Specific Clinical Findings

Among male participants, oligoasthenozoospermia was the most frequently observed semen abnormality, followed by mild oligoasthenozoospermia and asthenozoospermia. These findings are consistent with previous reports identifying combined abnormalities of sperm concentration and motility as common causes of male infertility (1,3). Semen quality is influenced by multiple interacting factors, including endocrine status, nutritional adequacy, obesity, oxidative stress, smoking, and environmental exposures. The coexistence of abnormal semen parameters with poor dietary quality, inadequate micronutrient intake, excess body weight, and smoking in our cohort highlights the importance of comprehensive lifestyle optimisation as an adjunct to conventional infertility management (3,4,7,11).

Among female participants, polycystic ovarian disease (PCOD) was the most frequently reported clinical diagnosis, followed by delayed menstruation, menstrual irregularities, hypothyroidism, and oligomenorrhoea. This distribution is consistent with the established role of PCOD as one of the leading causes of anovulatory infertility worldwide (42). PCOD is characterised by endocrine and metabolic disturbances, including hyperandrogenism, insulin resistance, chronic inflammation, and impaired follicular development, all of which can adversely affect ovulation and fertility (26,28,42).

The coexistence of excess body weight, unhealthy dietary patterns, and endocrine disorders observed in this study further emphasises the multifactorial nature of infertility and the need for multidisciplinary management. Current evidence supports combining nutritional counselling, weight management, lifestyle modification, and appropriate medical therapy to optimise reproductive outcomes in women with PCOD (26,42). Although causal relationships cannot be established from this observational study, the findings demonstrate that modifiable lifestyle factors frequently accompany the clinical conditions encountered in routine infertility practice and should be addressed alongside standard fertility treatment.

Strengths

This study has several strengths. First, the multicentre design, involving infertility clinics and diagnostic facilities in the Malegaon region, improves the representativeness of the study population compared with a single-centre investigation. Second, the inclusion of both male and female participants enabled a comprehensive evaluation of dietary and lifestyle characteristics across both sexes. Third, the use of a structured Case Record Form (CRF) allowed systematic collection of demographic, anthropometric, dietary, lifestyle, and clinical information using a standardised protocol. Finally, the study provides contemporary evidence from a regional Indian population, where data describing the combined burden of modifiable dietary and lifestyle risk factors among infertile patients remain limited.

Limitations

Several limitations should be considered when interpreting these findings. First, the descriptive observational design precludes conclusions regarding causal relationships between dietary and lifestyle factors and infertility. Second, the relatively small sample size and recruitment from a single geographical region may limit the generalisability of the findings to other populations. Third, dietary habits and lifestyle behaviours were primarily assessed through participant self-report, making them susceptible to recall and reporting bias. In addition, biochemical assessment of micronutrient status, endocrine function, inflammatory markers, and oxidative stress biomarkers was not performed; therefore, nutritional adequacy was evaluated using reported dietary intake rather than laboratory confirmation. Finally, the analysis was limited to descriptive statistics and did not examine multivariable associations or adjust for potential confounding factors, including socioeconomic status, duration of infertility, comorbidities, or environmental exposures. Despite these limitations, the study provides clinically relevant baseline data on modifiable risk factors among infertile patients in routine clinical practice.

Clinical Implications

The high prevalence of excess body weight, poor dietary quality, inadequate micronutrient intake, frequent consumption of ultra-processed foods, psychological stress, insufficient sleep, and smoking observed in this study highlights the importance of incorporating comprehensive lifestyle assessment into routine infertility evaluation. Nutritional counselling, weight management, psychological support, sleep hygiene education, and smoking cessation programmes should be considered alongside conventional fertility treatment to optimise overall reproductive health. Although lifestyle modification alone may not resolve infertility in every patient, it represents a practical, low-risk, and patient-centred strategy that may complement pharmacological treatment and assisted reproductive technologies while improving long-term metabolic health.

Future Scope

Future studies should include larger multicentre prospective cohorts involving more diverse populations to improve the external validity of these findings. Analytical studies using multivariable statistical models are needed to clarify the independent contribution of individual dietary and lifestyle factors to infertility. Incorporating objective measurements of nutritional biomarkers, endocrine profiles, inflammatory mediators, oxidative stress markers, and detailed dietary assessments would further strengthen understanding of the biological mechanisms linking lifestyle factors with reproductive outcomes. In addition, well-designed randomised controlled trials evaluating structured lifestyle intervention programmes before fertility treatment are required to determine their effectiveness in improving fertility outcomes.

Conclusion

In summary, this multicentre observational study demonstrated a high prevalence of modifiable dietary and lifestyle risk factors among infertile patients attending infertility clinics in the Malegaon region of Maharashtra, India. Excess body weight, poor dietary quality, inadequate micronutrient intake, frequent consumption of ultra-processed foods, psychological stress, insufficient sleep, and smoking commonly coexisted with clinically significant male and female reproductive disorders. These findings reinforce the growing evidence that infertility should be considered within a broader framework of nutritional, metabolic, behavioural, and psychosocial health.

Although the observational design does not permit causal inference, the findings support the integration of routine nutritional assessment, lifestyle optimisation, and behavioural counselling into comprehensive infertility care. Addressing modifiable risk factors before or alongside conventional fertility treatment may improve overall health and has the potential to enhance reproductive outcomes. Larger prospective and interventional studies are warranted to clarify causal relationships and evaluate the effectiveness of targeted lifestyle interventions in infertility management.

Key Messages

- Lifestyle-related risk factors were highly prevalent among infertile men and women attending infertility clinics.
- Poor dietary quality, inadequate micronutrient intake, and frequent ultra-processed food consumption were common findings.
- Psychological stress, insufficient sleep, excess body weight, and smoking were frequently identified among participants.
- Comprehensive lifestyle assessment should complement routine infertility evaluation and management.
- Larger prospective studies are required to determine the causal contribution of modifiable lifestyle factors to infertility.

Conflict of Interest Declared None

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