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Research Article

Causes and associated factors with male infertility among couples visiting infertility/andrologist clinics

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Abstract

Introduction: Infertility is a global public health issue, affecting couples worldwide. The WHO defines infertility as the inability to conceive after one year of regular, unprotected intercourse. Male infertility accounts for 50% of cases and is influenced by various physiological, environmental, and lifestyle factors. This descriptive study aimed to identify the causes and associated factors of male infertility among couples visiting infertility/andrology clinics in Indore from 2016-2017. **Methodology**: An exploratory descriptive design was used, with 90 male participants selected through purposive sampling. Data were collected via structured questionnaires covering socio-demographic, personal, medical, surgical, and psychological aspects. Physiological and biochemical parameters were assessed to determine specific causes of infertility. **Results**: The common causes identified were azoospermia, oligospermia, asthenospermia, mixed pathology, and low semen volume. Tobacco use showed a significant association with male infertility ($\chi 2 = 17.45$, $p < 0.05$), while no significant associations were found with other factors such as age, occupation, or medical history. Participants often had a history of smoking or environmental pollutant exposure. **Discussion:** The study emphasizes the multifactorial nature of male infertility, highlighting the influence of physiological factors and lifestyle choices, particularly tobacco use. Comprehensive interventions addressing both medical and lifestyle factors are recommended for better fertility outcomes.

Keywords: Male infertility, Azoospermia, Oligospermia, Asthenospermia. Mixed pathology, Less volume.

INTRODUCTION

Background of the study

Infertility is a significant global health concern affecting millions of couples worldwide. Defined by the World Health Organization as the inability of a couple to conceive after one year of regular, unprotected intercourse, it presents a complex and multifaceted challenge[1]. According to the National Institute for Health and Care Excellence, regular intercourse is defined as occurring every two to three days[2]. Statistics suggest that of 100 couples trying to conceive naturally, 84 will achieve conception within the first year, 92 within two years, and 93 within three years. However, if couples fail to conceive within three years, the chances of achieving pregnancy in the following year drop to 25% or less[3]. Infertility affects both men and women, and its global prevalence rates are difficult to determine due to the complexity of factors involved. A comprehensive WHO study in 2012 revealed that infertility rates among women across 190 countries remained consistent from 1990 to 2010, highlighting the enduring burden of infertility. In developing countries, approximately one in every four couples is affected, and the global demand for fertility services continues to rise. Parenthood is widely regarded as one of the most universally desired goals in adulthood, with most individuals planning to have children. However, not all couples who wish to conceive are able to do so naturally, and some will require medical assistance to address fertility issues. The World Health Organization (WHO) has recognized infertility as a global public health concern. In a keynote address at a WHO international meeting, Dr. Mahmoud Fathalla emphasized accessibility as a key challenge for those providing infertility treatment and assisted reproductive services[4]. To establish effective fertility services, it is essential to understand both the need for and demand for medical services within individual countries and to have international estimates for comparison[5].

Infertility affects approximately one in six couples. A diagnosis of infertility is given to a couple who cannot conceive after one year of unprotected intercourse. When the issue lies with the male partner, it is classified as male infertility, which accounts for around 30% of all infertility cases. Male infertility alone is responsible for about one-fifth of these cases. Despite ongoing research,

many cases of male infertility remain unexplained. Common causes include abnormal sperm, low sperm count, or issues with ejaculation. Sperm abnormalities can be due to a short sperm lifespan or poor sperm motility[6].

Approximately 7% of men in the general population are infertile, and genetic disorders are implicated in at least 15% of these cases, including both chromosomal abnormalities and single-gene mutations. Genetic causes are found across the major categories of male infertility: pre-testicular, testicular, and post-testicular. As a result, genetic testing has become a routine part of the diagnostic process in specific groups of patients. Karyotype analysis and microdeletion screening of the AZF (azoospermia factor) region are recommended for patients with sperm counts below 10 million/ml and 5 million/ml, respectively[7].

NEED OF THE STUDY

Infertility affects approximately 15% of couples worldwide, with male factors contributing to 20-30% of cases and playing a role in 50% overall. However, accurate global data on male infertility remains limited[8]. Several factors, including lifestyle, environmental exposure, and physiological issues, have contributed to a decline in male fertility rates. Studies from India, such as those by AIIMS and IVF expert Dr. Sonia Malik, highlight a significant reduction in sperm quality and count over recent decades, with lifestyle changes, occupational hazards, and environmental toxins being key contributors[9]. Male infertility often remains under recognized, partly due to social stigma, where women are disproportionately blamed for childless marriages. Despite its prevalence, male infertility remains a neglected area of reproductive health, warranting urgent research and intervention. Male infertility causes—such as asthenozoospermia, oligospermia, and hormonal imbalances—need further exploration to understand underlying mechanisms. This study will focus on identifying the causes of male infertility and the emotional challenges faced by affected individuals. It aims to provide valuable insights for healthcare professionals and inform effective treatments, improving both medical and psychological outcomes for infertile men.

STATEMENT OF THE PROBLEM

This descriptive study aims to identify the causes and associated factors of male infertility among couples visiting infertility and andrology clinics in Indore during the years 2016-2017.

OBJECTIVES OF THE STUDY

1. To describe the sample characteristics according to demographic variables.
2. To determine the association between causative factors of infertility and sociodemographic variables.
3. To identify the major associated factors of male infertility.
4. To establish the primary causes of infertility based on clinical and laboratory findings in males.

HYPOTHESES

- **H1:** There is a significant association between the causative factors of infertility and sociodemographic variables ($p \leq 0.05$).
- **H2:** There is a significant association between the causative factors of male infertility and associated factors of male infertility ($p \leq 0.05$).

RESEARCH METHODOLOGY

This study employed a quantitative research approach to collect and analyse numerical data, focusing on measuring variables and evaluating their interrelationships. An exploratory descriptive design was utilized to gain insights into the factors influencing male infertility, examining both known and unknown aspects of the condition. The research was conducted at a male infertility clinic in Indore, specializing in diagnosing and treating male reproductive health issues. A total of 90 male participants visiting the andrology clinic were included in the study, selected for their clinical relevance to the research objectives. A purposive sampling technique was employed, ensuring participants met specific criteria pertinent to the study. This approach aimed to create a representative sample of the target population, which consists of males experiencing infertility issues, thereby enhancing the study's validity and relevance to the field of male reproductive health.

Tool: Data Collection Instruments

The data collection tools were developed based on an extensive review of the literature, the researchers' personal experience, and the specific needs of the study. These tools were validated by subject matter experts to ensure their reliability and accuracy. A self-structured questionnaire, consisting of both closed and open-ended questions, was used to gather detailed information on male medical history and the diagnostic tests required.

The tools utilized in this study were organized into six sections:

- Section I: Socio-Demographic Data
- Section II: Personal History
- Section III: Medical and Surgical History
- Section IV: Psychological Aspects
- Section V: Physiological and Chemical Parameters
  - Part A: Common Physiological and Chemical Parameters
  - Part B: Specific Chemical Parameters

Procedure for Data Collection

The primary setting for the study was an andrology clinic in Indore, specializing in male infertility under the guidance of Dr. Kapil Kochher, a renowned andrologist. A total of 90 participants were selected based on the inclusion criteria of the study. Each participant was briefed about the study, and informed consent was obtained. Clinical data from the patients were collected, and observations were systematically recorded.

Data analysis

The data analysis was designed to encompass both descriptive and inferential statistics, guided by expert opinions. The following analytical plan was developed:

I. The demographic and personal histories of males were described using frequency and percentage distributions.

II. The causes of infertility and their respective proportions were reported in percentage format.

III. Chi-square tests were conducted to assess the association between causative factors and socio-demographic variables.

IV. Chi-square tests were also performed to evaluate the association between causative factors and other associated factors of male infertility.

OBSERVATION

Table 1: major findings of the study in different aspect

Aspect	Variable	Findings
Socio-Demographic Variables	**Type of Infertility**	Primary infertility: 72 (80%) Secondary infertility: 18 (20%)
	Occupational Exposure	No exposure: 47 (52.21%) Pesticide exposure: 20 (22.23%) Heat exposure: 20 (22.23%)
Personal History	**Caffeine Consumption**	Tea drinkers (2-4 cups/day): 59 (65.55%)
	Smoking	Non-smokers: 54 (60%) Smokers: 36 (40%) 5-10 cigarettes/day: 27 (30%)
	Tobacco/Drug Use	No addiction: 53 (58.89%) Tobacco users (daily): 37 (41.11%)
Medical-Surgical History	**Disease Diagnosis**	No diagnosis: 48 (53.33%) Varicocele: 19 (21.11%) Hydrocele: 8 (8.89%) Koch: 1 (1.11%) Cancer: 1 (1.11%) Hernia: 1 (1.11%) Hypertension: 9 (10%) Diabetes mellitus: 3 (3.33%)
Psychological Aspects	**Emotional Response to Fertility Issues**	Feelings of sadness and depression: 71 (78.89%)
Causative Factors of Infertility	**Infertility Causes**	Oligospermia: 22 (24.44%) Asthenozoospermia: 22 (24.44%) Azoospermia: 19 (21.12%) Mixed pathology: 19 (21.12%) Low semen volume: 8 (8.88%)

Socio-demographic variables

1. The distribution of subjects based on age indicates that more than half of the samples, 53 (58.88%), were in the age group of less than 30 years. Additionally, 23 samples (25.56%) fell within the 31-35 year age group, 9 samples (10%) were aged between 36-40 years, and 5 samples (5.56%) were over 40 years.
2. Regarding educational attainment, the majority of the samples were high school graduates (42, 46.67%), followed by 33 samples (36.67%) who were graduates, 10 samples (11.11%) who were postgraduates, 4 samples (4.44%) who had completed primary school, and 1 sample (1.11%) who was illiterate.
3. In terms of occupation, more than half of the samples (47, 52.23%) were self-employed, while 34 samples (37.78%) were employed in private service.
4. Regarding occupational exposure, more than half of the samples (47, 52.21%) of the 90 males reported having no occupational exposure. Of those with exposure, 20 samples (22.23%) reported pesticide exposure, and another 20 samples (22.23%) reported prolonged exposure to heat.

5. In relation to family type, 65 samples (72.23%) belonged to joint families, while 25 samples (27.77%) belonged to nuclear families.
6. Concerning Body Mass Index (BMI), the majority of the samples (38, 42.22%) fell under the pre-obese category (25-29.99). Additionally, 28 samples (31.11%) were classified as normal (18.50-24.99), 10 samples (11.12%) were classified as obese (>30), 9 samples (10%) were categorized as having mild thinness (17-18.49), and 5 samples (5.55%) were classified as overweight (>25).
7. A significant majority of the males (71, 78.90%) reported no family history of infertility in first-line relatives, while 5 samples (5.55%) had a history of infertility in first-line relations.
8. Regarding the area of residence, more than half of the 90 samples (58, 64.45%) resided in urban areas, whereas 32 samples (35.55%) lived in rural areas.
9. Among couples, the majority (53, 64.45%) had been married for 1-5 years, while 37 samples (41.12%) had been married for more than 5 years.
10. Of the 90 samples, more than three-fourths (84, 93.34%) identified as Hindu.
11. Regarding the age of puberty, the majority of samples (84, 93.34%) experienced normal puberty (9-14 years), while 4 samples (4.45%) experienced early puberty (before age 9), and 2 samples (2.21%) experienced delayed puberty (after age 14).
12. In terms of infertility type, most samples (72, 80%) experienced primary infertility, while 18 samples (20%) experienced secondary infertility.

Personal History

1. Out of 90 samples, the majority reported consuming caffeinated drinks (coffee, tea, soda), with 59 samples (65.55%) drinking 2-4 cups of tea per day.
2. Regarding smoking habits, the majority of samples (54, 60%) reported not smoking, while 36 samples (40%) indicated a smoking habit, of which 27 samples (30%) smoked 5-10 cigarettes per day.
3. Concerning alcohol consumption, 62 samples (68.88%) reported drinking alcohol. Among these, 33 samples (36.66%) drank occasionally, 13 samples (14.45%) drank weekly, and 8 samples (8.88%) drank daily or monthly.
4. In relation to the use of addictive substances, 53 samples (58.89%) did not report using any drugs, while 37 samples (41.11%) indicated daily tobacco use.
5. Regarding the use of hot or warm baths, 83 samples (92.22%) did not regularly use hot baths.
6. More than three-fourths (80, 88.89%) of participants rode bikes, with 38 samples (42.22%) riding for less than 1 hour, 20 samples (22.23%) riding for more than 4 hours, 14 samples (15.55%) riding for 1-2 hours, and 8 samples (8.89%) riding for 3-4 hours.
7. Data on the use of anabolic steroids for increasing muscle strength showed that 84 samples (93.34%) had no history of steroid use, while 6 samples (6.66%) reported using steroids.
8. Regarding recent weight changes, the majority (70, 77.78%) reported no experience of weight loss or gain, while 20 samples (22.22%) reported weight gain.
9. Approximately half of the samples (40, 44.44%) reported intimate relations with their wives at least once a day, while 39 samples (43.33%) engaged in intimacy at least once a week, 10 samples (11.12%) once every 15 days, and 1 sample (1.11%) once a month.
10. With respect to erection difficulties, 68 samples (75.55%) reported no difficulties, while 22 samples (24.45%) indicated experiencing difficulty with erections.
11. Regarding ejaculation problems, 42 samples (46.66%) reported issues, including 37 samples (41.11%) with premature ejaculation, 2 samples (2.22%) with delayed ejaculation, and 3 samples (3.33%) with retrograde ejaculation.
12. The majority of participants (75, 83.34%) reported no issues with sexual intercourse, while 15 samples (16.66%) experienced problems, including 5 samples (5.55%) with painful intercourse and 7 samples (7.78%) citing other issues such as stress related to family or finances.
13. Data indicated that 80 samples (88.89%) reported no experience of loss of libido, while 10 samples (11.11%) had experienced loss of libido.
14. Out of 90 samples, 77 (85.55%) reported no history of urinary tract infections, while 13 samples (14.45%) had a history of urinary tract infections.
15. A total of 66 samples (73.34%) did not use lubricants during intercourse, while 24 samples (26.66%) reported using lubricants, with 15 samples (16.66%) using Vaseline.
16. Among the samples, 80 (88.89%) had not previously conceived with other women, while 10 samples (11.11%) reported having previously conceived.
17. Regarding nocturnal emissions, the majority (78, 86.67%) reported no experience of nocturnal emissions, while 12 samples (13.33%) reported such experiences.

Male Medical and Surgical History

1. Data revealed that the majority of males (80, 88.88%) were evaluated by a urologist, while 10 samples (11.12%) were not.
2. All males underwent semen analysis, with 39 samples (43.33%) having fewer than 3 semen analyses and 43 samples (47.78%) having more than 3 analyses.
3. Of the 90 samples, 3 samples (3.33%) experienced retrograde ejaculation into the bladder, while 87 samples (96.67%) did not.

4. All participants (90, 100%) reported no prior exposure to sexually transmitted diseases or infections.
5. Most males (83, 92.23%) did not have a history of undescended testicles, while 7 samples (7.77%) had a history of undescended testicles, with all cases being unilateral.
6. Concerning scrotal or testicular pain, 56 samples (62.22%) reported no pain, while 34 samples (37.78%) experienced testicular or scrotal pain.
7. Of the samples, 82 (91.12%) did not experience mumps after puberty, while 8 samples (8.88%) reported having had mumps after puberty.
8. The majority (83, 92.22%) reported no prior injuries to the testicles requiring hospitalization, while 7 samples (7.77%) reported such injuries.
9. Among the samples, 82 (91.12%) had not experienced fever in the last three months, whereas 8 samples (8.88%) had experienced fever during this time.
10. Data showed that 48 samples (53.33%) were not diagnosed with any other diseases. However, 19 samples (21.11%) had varicocele, 8 samples (8.89%) had hydrocele, and 1 sample (1.11%) had Koch's disease, 1 sample (1.11%) had cancer, 1 sample (1.11%) had a hernia, 9 samples (10%) had high blood pressure, and 3 samples (3.33%) had diabetes mellitus.
11. Most participants (80, 88.88%) had not undergone varicocele repair, while 10 samples (11.12%) had undergone such a procedure.
12. Of the 90 samples, the majority (80, 88.88%) had not undergone hernia surgery, while 10 samples (11.12%) reported having had hernia surgery.
13. Nearly all samples (89, 98.89%) reported no history of bladder or penis surgery during childhood, with only 1 sample (1.11%) having had a history of penis surgery during childhood.
14. All participants reported no history of testicular cancer.
15. Regarding allergies to medications, 87 samples (96.66%) reported no allergies.
16. Concerning previous exposure to radiation or X-rays, 84 samples (93.34%) reported no exposure, while 6 samples (6.66%) had exposure mainly for investigative purposes.

Psychological Aspects

1. Data revealed that the majority of participants (62, 68.89%) felt social pressure to have children or to have more children.
2. Findings indicated that fertility problems negatively impacted relationships between husband and wife, with 27 samples (30%) affirming this impact, while 63 samples (70%) denied any negative impact.
3. Among the samples, 71 (78.89%) reported feelings of sadness and depression related to their fertility problems.

Causative Factors of Infertility

Data identified the most common causes of infertility as oligospermia and asthenozoospermia, both affecting 22 samples (24.44%). This was followed by azoospermia (19 samples, 21.12%), mixed pathology (19 samples, 21.12%), and low semen volume (8 samples, 8.88%).

RESULT

Table 2: chi square values association between causative factors of male infertile & socio demographic variable p≤0.05

S.No.	Demographic Variables	Causes of Infertility					$\chi 2$ value	table value
		Azoo Spermia	Oligozoo spermia	Asthenozoo spermia	Mixed	Low volume		
1	**Age**						20.41, df=12	21.03 NS
	A) <30years	9	16	9	15	4		
	B) 31-35 years	8	4	7	2	2		
	C) 36-40 years	1	1	5	2	2		
	D) >40 years	1	1	1	0	0		
2	**Educational status**						11.54, df=16	26.30, NS
	A) Illiterate	0	0	1	0	0		
	B) Primary	2	1	0	1	0		
	C) Higher secondary	9	12	9	8	4		
	D) Graduation	6	8	8	9	2		
	E) Post graduation	0	0	4	2	2		

3	**Working status**							
	A) Government	1	1	2	4	0	14.66 df=12	21.03 NS
	B) Private	9	5	11	5	4		
	C) Self –employed	8	16	9	10	4		
	D) Unemployed	1	0	0	0	0		
4	**Occupational exposure**							
	A) Noxious chemicals	0	0	0	1	0	df=16 14.98	26.30 NS
	B) Pesticides	3	6	4	5	2		
	C)Prolonged exposure to heat	4	8	4	1	3		
	D)Industrial solvent	1	0	0	1	0		
	E) Not applicable	11	8	14	11	3		
5	**Types of family**							
	A) Nuclear	7	3	8	4	3	df=4 4.56	9.49 NS
	B) Joint	12	19	19	15	5		
6	**Body mass Index**							
	A)17-18.49	2	3	1	3	0	df=16 8.68	26.30 NS
	B)18.50-24.99	7	6	8	6	1		
	C)> 25	0	2	2	1	0		
	D)25-29.99	8	9	9	7	5		
	E)>30	2	2	2	2	2		
7	**Any family history of infertility in first line relation.**						df=6 11.49	12.59 NS
	A) Yes	1	3	0	1	0		
	B) No	15	13	19	18	6		
	C) Not know	3		3	0	2		
8	**Area of residence**						df=4 1.36	9.49 NS
	A) Urban	11	15	15	11	6		
	B) Rural	8	7	7	8	2		
9	**Duration of marriage**						df=4 3.53	9.49 NS
	A)1-5 years	13	12	10	12	6		
	B)>5 years	6	10	12	7	2		
10	**Religion**						df=4 4.60	9.49 NS
	A) Hindu	19	19	21	17	8		
	B) Muslim	0	3	1	2	0		
11	**Age of Puberty**						df=8 9.77	15.51 NS
	A) Early	1	3	0	0	0		
	B) Normal	18	18	21	19	8		
	C)Delay	0	1	1	0	0		
12	**Types of infertility**						df=4 4.17	9.49 NS
	A) Primary	16	18	15	15	8		
	B) Secondary	3	4	7	7	0		

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$*** **S**=Significant NS=Non Significant

Data presented in table no 02, assess the association between the causes of male infertility and the demographic variables, the chi-square test was employed. The results indicated that the p-values for all examined associations were greater than 0.05, suggesting no statistically significant association between the causes of male infertility and the demographic variables. Therefore, H1 is rejected.

Table 3: chi square values association between causative factors of male infertility & selected associated factors in males

SN	Selected associated factors in males	Azoospermia	Oligospermia	Asthenospermia	Mixed pathology	less volume	df	X^2	Table value
1	**Caffeinated beverages)**								
	<2cup	3	2	5	5	1			
	2-4cup	14	15	13	13	4	12	**9.47**	21.03
	>5cup	2	4	2	1	2			
	No	0	1	2	0	1			
2	**Smoking**								
	Yes	10	10	8	4	4	4	4.81	9.49
	No	9	12	14	15	4		NS	
3	**Alcohol Consumption**								
	Daily	2	1	2	1	2			
	Weekly	1	3	4	3	2			
	Occasionally	13	8	6	5	1	16	17.78	26.30
	Monthly	1	2	2	2	1		NS	
	No	2	8	8	8	2			
4.	**Tobacco**								
	Yes	2	4	2	1	2	4	17.45 NS	9.49
	No	0	1	2	0	1			

p≤0.05*, p≤0.01**, p≤0.001*** **S**=Significant NS=Non-Significant

The data presented in Table 03 indicate the calculated chi-square values for various causative factors of male infertility, including azoospermia, oligospermia, asthenospermia, mixed pathology, and low semen volume. The calculated chi-square values for these factors in relation to associated factors such as caffeinated beverages, smoking, and alcohol consumption are 9.47, 4.81, and 17.78, respectively. Since the calculated chi-square values are less than the critical table value, the H_2 is rejected for these factors. In contrast, the chi-square value for tobacco consumption is 17.45, which exceeds the table value of 9.49. Therefore, we accept the H_2 for tobacco. This indicates a significant association between tobacco use and the causative factors of male infertility.

DISCUSSION

Socio-Demographic variables

The findings of the study revealed no significant association between the causative factors of male infertility and selected demographic variables, including age, educational status, working status, occupational exposure, history of infertility in first-degree relatives, religion, type of family, duration of marriage, area of residence, and Body Mass Index (BMI). This indicates that the research hypothesis is rejected, while the null hypothesis is accepted. The lack of statistical significance ($p \leq 0.05$) is likely attributed to the small sample size, which limits the ability to establish a proven association.

Association between causative factors of male infertility and selected associated factors

While the association between causative factors of male infertility and selected associated factors was generally not statistically significant, one exception was noted with tobacco use. The analysis revealed a significant association (df = 4, χ^2 = 17.45, table value = 9.49), supporting previous literature linking tobacco consumption to male fertility. A study conducted by Avi Harley et al. highlighted the adverse effects of smoking on sperm parameters, seminal plasma, and other fertility factors. The authors concluded that smoking has a stronger measurable effect on semen quality and function in fertile men compared to sub fertile men. Additionally, oxidative stress (OS) and the resultant genetic and epigenetic changes due to smoking may correlate directly with reduced sperm function and

fertility. This correlation suggests that there is close dependent relationship between smoking and semen quality[10].

Although this study was unable to statistically prove significant associations due to a limited sample size, several common causative factors of male infertility were identified, including- Azoospermia, Oligospermia, Asthenospermia, Mixed pathology, Reduced semen volume. These findings are consistent with a prospective clinical-epidemiological study conducted by M. Punab et al. at the Andrology Centre of Tartu University Hospital, which examined 8,518 patients between 2005 and 2013. Among these patients, 1,737 (20.4%) were diagnosed with severe male factor infertility[11]. The study found that the causal factors behind the most severe forms of impaired spermatogenesis were relatively well understood: causes were identified for 100% of aspermia cases, 82.7% of azoospermia cases, and 41.5% of cryptozoospermia cases. In contrast, 75% of oligospermia cases remained unexplained, highlighting the complexity of male infertility.

CONCLUSION

The findings of this study highlight the complex and multifaceted nature of male infertility, with a particular emphasis on the potential impact of tobacco use as a contributing factor. The challenges encountered during data collection underscore the necessity of building rapport with male participants, which proved to be time-consuming yet essential for obtaining reliable information. While the study did not find strong correlations between socio-demographic variables and the identified causative factors, it does provide critical insights into the common causes of male infertility. To further validate these findings and enhance the robustness of the data, it is recommended that future research involve a larger sample size and a mixed-methods approach. Additionally, the role of nurse-midwives in facilitating initial assessments and promoting healthy lifestyle changes is crucial for improving reproductive health among couples, thereby addressing modifiable risk factors that may contribute to infertility.

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Authors' Contribution: Pratibha Turiya Raghuwanshi conceptualized and designed the study, conducted the literature review, collected and analysed data, and interpreted the findings. She was responsible for drafting the manuscript and ensuring adherence to ethical research guidelines. The study was conducted independently under the academic guidance of faculty members, who provided mentorship and critical feedback. All aspects, including research methodology, participant selection, and data interpretation, were managed objectively to maintain scientific rigor. The author takes full responsibility for the integrity and accuracy of the research, with the primary aim of contributing to evidence-based knowledge in male infertility and reproductive health.

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