



FACTORS AFFECTING INFERTILITY'S PREVALENCE AND CAUSES IN A PUBLIC HEALTH ENVIRONMENT

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ABSTRACT

The study focuses primarily on the causes, prevalence, and management of infertility. Research from earlier studies demonstrates new assisted reproductive techniques that offered better treatment options and inspired hope. Demographic changes are a result of infertility. The study's objectives were to determine the prevalences and individual factors that contributed to infertility in the population visiting a tertiary level public health centre, as well as to understand the causes of infertility. This cross-sectional, observational study was conducted in a government-affiliated hospital and infertility clinic. 150 couples who sought evaluation and treatment for infertility were included in the study. Based on the couple's medical history and examination results, the cause of their infertility was determined. Each cause's frequency was assessed. The results were collated, and it was determined how common each particular factor was. The prevalence of primary infertility accounted 53.4% and was higher than that of secondary infertility i.e., 46.6%. Most of the cases were due to female factors, with polycystic ovarian syndrome being the main contributor (41%). Both slim and obese polycystic ovarian syndrome subjects had infertility. Infertility caused by the tubal factor was strongly correlated with infectious causes such pelvic inflammatory disease and tuberculosis. As the marriage age rose, the causes of infertility altered. Polycystic ovarian syndrome was the primary cause in marriages of less than five years, however afterwards, male factor and unexplained infertility were the most frequently observed causes. 32% of cases of infertility were caused by male factors, and reports of abnormal semen were highly correlated with smoking and drinking. The age of the partner and the age of marriage affects the causes of infertility differently. While polycystic ovarian syndrome continues to be the main contributing factor, infections are a significant impact in tubal factor infertility, and tobacco and alcohol make the male factor worse. A third of the cases are still unsolved. Male factor infertility, oligospermia, prevalence, lean and obese polycystic ovarian syndrome, and public health sector.

KEYWORDS: Prevalence, public health sector, Oligospermia, Infertility, PCOS, male factor and female factor.

INTRODUCTION

Couples who experience infertility, or the inability to conceive, go through a stressful time. However, in the previous few decades, innovative methods for assisted reproduction have given infertile couples hope, had a significant impact, and enhanced their quality of life. These novel methods raised numerous moral questions and produced a moral conundrum that has to be resolved. The new methods allowed couples to reproduce and have children at any age, whether they were married or single, and it was possible to discern the sex of the child.^[1] 15% of people worldwide struggle with infertility. The WHO lists infertility in young people as the sixth most significant disability in the world. The Maternal Health Task Force^[2] estimates that there are 75 million infertile couples globally. Theologians, scientists, moralists, philosophers, and ethical experts have all contributed to this discussion and provided a wide range of viewpoints, from the most conservative, who are sceptical of every

new development in reproductive technology, to the most liberal, who are open to all kinds of innovations. Although stress, the male factor, and other factors have largely supplanted infections like gonorrhoea and sexually transmitted illnesses as the leading causes of infertility today, a significant portion of cases of infertility remain undiagnosed.

Furthermore, it has been demonstrated that the problem of infertility is exacerbated by the rising frequency of lifestyle diseases like obesity and addiction in young people as well as medical conditions like diabetes, hypertension, and hypothyroidism. Numerous studies have been conducted internationally and in India to identify the common causes of infertility; however, extrapolating the results of one study to the entire population is not possible because infertility is a multifactorial issue that must be understood in the context of the local factors that contribute to it. In nations

like India where tuberculosis (TB) prevalence is high, infectious disorders that cause infertility become a significant factor.^[3] Infertility must therefore be understood in relation to the local population.

Additionally, infertility causes significant psychological and financial hardship for the couples in addition to being a medical difficulty.^[4] In order to ensure the quick and efficient therapy of these patients, we undertook this study to identify the most prevalent local causes of infertility as well as the prevalence of each factor. The exposure to sexually transmitted infections and the lack of awareness about reproductive and sexual health, particularly in sub-Saharan Africa, are two of the many predisposing factors that contribute to infertility. Consequently, in order to build programmes for infertility prevention, it is necessary to address these variables, especially in low-resource nations. Infertility is also brought on by ovulatory issues in women, such as polycystic ovarian syndrome (PCOS), endometriosis, and cervical and uterine abnormalities. Men's reasons include azoospermia, low sperm count and quality, vas deferens occlusion/damage (congenital or caused by inflammation), congenital defects like undescended testes, hereditary issues, and iatrogenic causes, such as those brought on by medical procedures like hernia repair surgery.

From a moral perspective, infertility causes handicap. Access to healthcare is covered by the Convention on the Rights of Persons with Disabilities since infertility is the fifth most prevalent disability worldwide. The impact of infertility as a whole is substantial, largely understated, and has not decreased over the past 2 decades. Infertility can be categorised in a variety of ways, including male or female infertility (where one or both partners may be affected), idiopathic infertility (where there is no known cause), and iatrogenic infertility (where infertility is brought on by a medical error, such as causing adhesions that block the fallopian tube during laparotomies).^[5-9] The most typical categorization, though, is into primary and secondary infertility. Secondary infertility is the inability to conceive after a previous pregnancy, whereas primary infertility is infertility among couples who have never had a child. The study's primary goal is to identify the factors that contribute to infertility in patients who visit an infertility clinic in a tertiary care facility. Second, to comprehend the percentage of specific causes contributing to infertility among clients of infertility clinics.

Table 1: Demographical Characteristics of The Study Population.

Study parameter	GENDER	
	Female (n=150)	Male (n=150)
Mean age	26.87	35.32
Education (%)	SSC (55)	Intermediate (80)
Occupation (%)	Homemaker (82)	On job (90)
Addictions (%)	2.3	38.4

MATERIALS AND METHODS

Accordingly, the study was planned, and it was carried out for around a year in accordance with the approved protocol. The study's cross-sectional, observational, descriptive methodology was used in a tertiary care hospital's department of obstetrics and gynaecology's infertility clinic. After obtaining signed, valid, and informed consent, a substantial representative sample of 150 patients was chosen by simple random sampling and included in the study. Women in the age range of 20 to 60 who had been married for more than a year, those who shared a home or lived together, and those who did not use contraception in cases of primary or secondary infertility all took part in the study.

The study included patients who visited an infertility clinic, and on the initial visit, a thorough history of the couples was obtained. Oral interviews, physical examinations, and records reviews were used to gather information from the willing patients. Demographic information, a thorough infertility history, including a history of any prior treatments, a surgical history, and a coital history were all documented in a structured case record form. The results of the examination, both in general and in detail, were documented. Investigations were reported on, and any information on prior infertility treatments was also recorded.

STATISTICAL ANALYSIS

Analysis of the data was done using the Origin 9.9.5. Version software for Windows. The study used both quantitative and qualitative data, and graphs and tables were used to present the findings.

RESULTS

To determine the level of significance, the study population's qualitative and quantitative data were evaluated using means, medians, and percentages as well as the Fisher's exact test [Table 1]. Women aged 25 to 35 made up the majority of the patient population (82/150), followed by adults aged 35 and older (59/150). Before receiving treatment, marriages lasted an average of 5.6 ± 2 years. We had almost equally as many couples who were married for up to five years as those who were married for longer (57 vs. 93). Table 2 compares the most common causes of infertility based on the length of the marriage.

Table 2: Causes and Prevalence of Factors Causing Infertility According To Age of Marriage.

Factor	PREVALENCE	
	Couples married <=5 years (%)	Couples married >5 years (%)
Male Factor	11.5	22
Female Factor	21.3	26
PCOS (Polycystic ovarian syndrome)	24	18
Unexplained Infertility	42	51

Thus, infertility caused by the tubal factor, the male factor, and unidentified factors rises as marital age rises. The history of addictions analysed showed that, while the frequency was insignificant in women, more than one in three men had an addiction, with 95% of them using cigarettes in some way. The 150 couples' infertility issues were broken down into the following four categories: A female factor, B a male factor, C a group of related factors, D a mysterious infertility. The primary ovarian cause (polycystic ovarian syndrome [PCOS]) was identified in our research population as the female component after a thorough analysis of its role in infertility (Fig 1, 2).

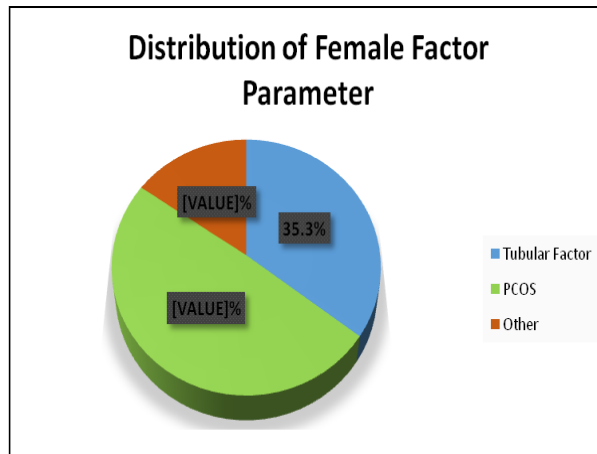


Figure 2: Distribution pattern of Infertility causes due to female factor.

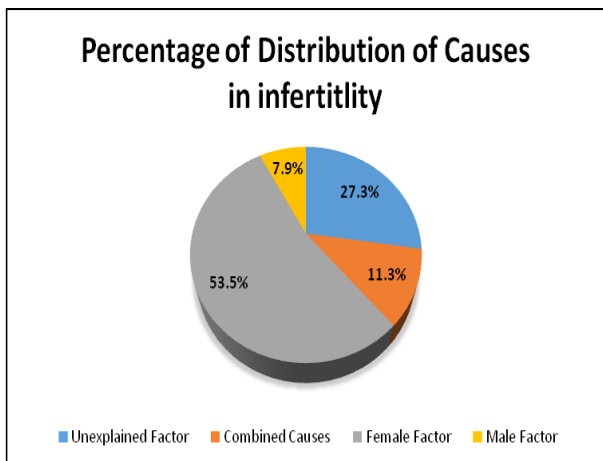


Figure 1: Distribution pattern of Infertility causes in the study Population.

Endocrine factors represented 30% of the causes of tubal diseases, which included pelvic inflammatory disease (PID), genital TB, and endometriosis, as well as uterine causes (malformations and fibroids). Premature ovarian failure only occurred in one instance. The majority of the ladies did not have any medical comorbidities, however endocrine abnormalities were the most often observed ones. The most prevalent endocrine condition was hypothyroidism, which was followed by diabetes mellitus. Ten cases of TB and three instances of multiple endocrine disorders were reported (Fig 3).

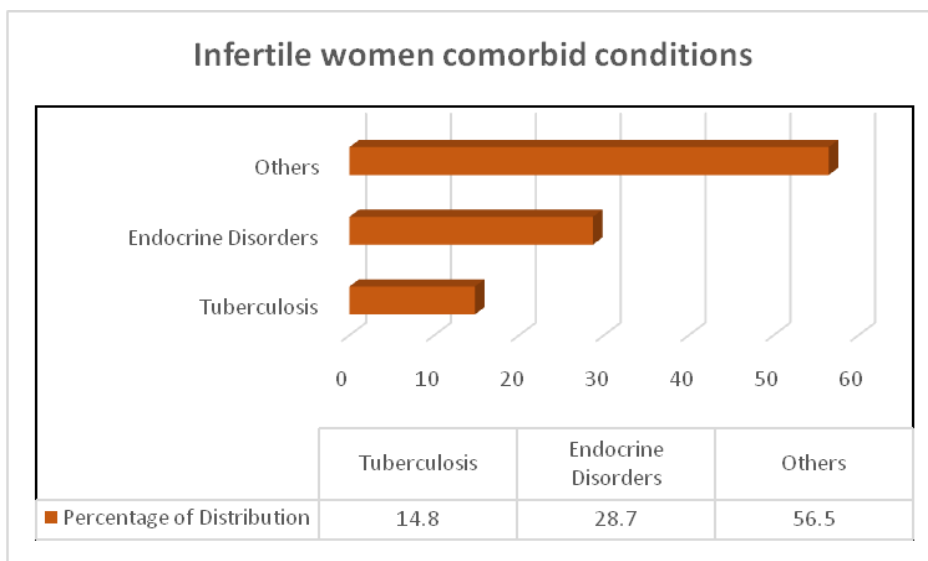


Figure 3: Percentage of Distribution of disorders in infertile women in comorbid conditions.

Hysterosalpingography was a research intervention that was carried out on more than half of the female partners in the study group (HSG). When no reason could be determined by TVS or examination and tubal illness was suspected, an HSG was carried out as a secondary study. Table 3 provides an overview of the common findings mentioned. 23 patients who had an HSG had a hysteroscopy and a laparoscopy for further assessment.

By contrasting the HSG findings with those from a laparoscopy, it was discovered that the test's sensitivity for detecting a tubal block was 66.23% and its specificity was 47.84%. Semen analysis was performed on all guys to evaluate male infertility, and 26 males showed abnormal results. Figure 4 displays the age distribution of males with abnormalities of the sperm.

Table 3: Results of Hysterosalpingography In The Study Population (N=50).

HSG(Hysterosalpingography) findings	Frequency, n (%)
Normal	24 (48)
Unilateral tubal block (left/right)	5 (10)
Bilateral tubal block	8 (16)
Peritubal adhesions	10(20)
Uterine anomaly	3 (6)

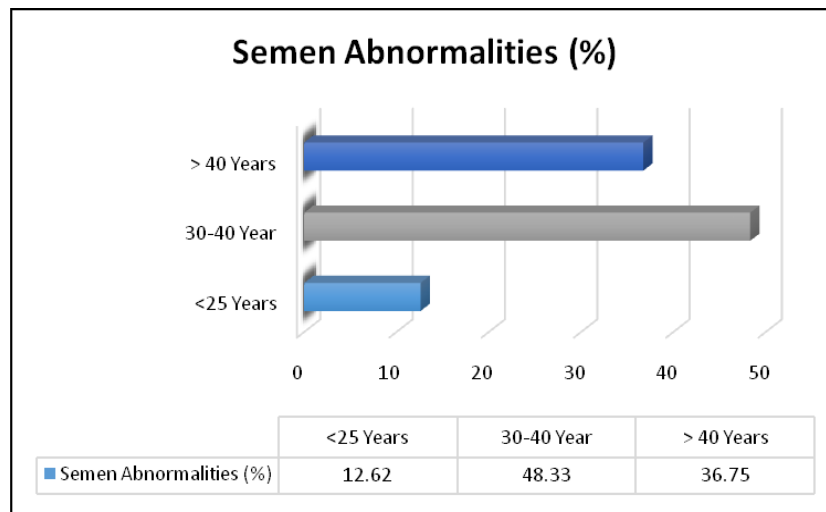


Figure 4: Age wise categorization of semen abnormalities in the study Population.

As a result, as the partners' male ages rise, so does the fraction of aberrant semen. Figure 5 provides a summary of the semen features in the study cohort, identifying the different categories of anomalies. Additionally, a

statistically significant link between men with abnormalities of the semen and alcohol, tobacco use, tobacco chewing, or a combination of the three was discovered ($P \leq 0.001$).

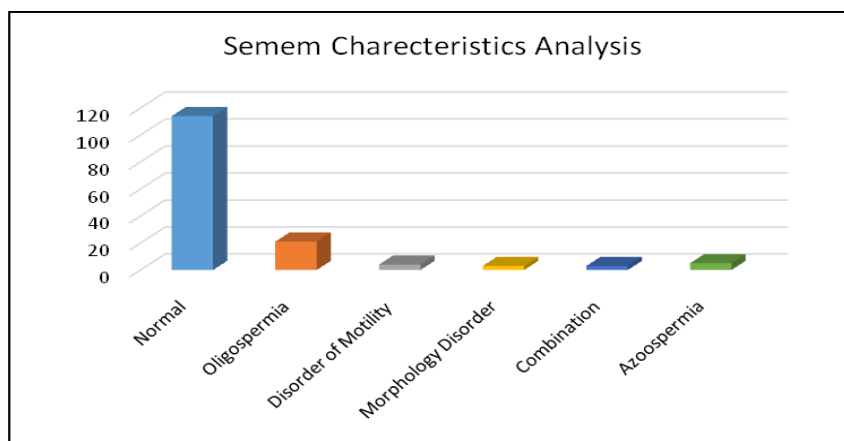


Figure 5: Semen characteristic analysis based on the different conditions.

DISCUSSION

The stark figures about population growth frequently obscure a more serious issue with current population dynamics: "infertility." In industrialised countries, this occurs at a higher rate—more than 8.86%—than in poor countries.^[10] According to 225 demographic and health surveys used in a study by researchers to evaluate trends in infertility from 2010 to 2020, infertility prevalence was highest in North Africa/the Middle East, South Asia, Central/Eastern Europe, Central Asia, and Sub-Saharan Africa.^[11] According to the National Family Health Survey, primary infertility is more common in metropolitan areas than secondary infertility on a constant basis.^[12] The prevalence of primary infertility was 53.4% in our study, compared to 46.6% for secondary infertility. Additionally, research conducted worldwide reveals that primary infertility occurs more frequently than secondary infertility.^[13-15]

The primary factor of both spontaneous and assisted reproduction pregnancies is female age. Late childbirth is frequently characterised as after the age of 35 as being risky for both mother and child because fertility declines as early as 33 years old and fecundity declines in the fourth decade.^[16] In our investigation, it was discovered that the average age of the female partners seeking infertility therapy was more than 30 years. Psychosocial treatments for infertile women Numerous studies have examined the effectiveness of psychological therapies for infertile women, with outcomes including pregnancy rates/live birth rates and other psychological distress assessments.

Additionally, the frequency of infertility rises as marital age rises. The average age of marriage is 9.2 years, while the ranges from 2 to 20 years.^[17] The age of marriage also affects the aetiology of infertility, in addition to the individual ages of the female and male partners. The percentage of unexplained infertility and the male factor increased in couples who had been married for five years. This is connected to the declining amount and quality of both eggs and sperms brought on by the ageing of both couples. A prevalence of 53.5% was identified for female factors exclusively causing infertility. PCOS and tubal disease were the most prevalent causes of female infertility, accounting for 49.2% and 35.3% of all cases, respectively. Studies conducted by prior researchers and other colleagues also indicated that PCOS is the primary female factor causing infertility.^[18,20] Additionally, we discovered that there was no statistically significant difference between PCOS patients who were overweight or obese and those with normal body mass index, demonstrating that lean PCOS patients are just as susceptible to infertility as obese PCOS patients. The second most frequent cause of female infertility, accounting for 35.3% of cases, was tubal factor infertility. Between 20% and 25% of cases of infertility were shown to be caused by the tubal factor.^[21] The rising prevalence of PID and genital TB in most Asian nations can be linked to the increased prevalence

of the tubal component producing infertility. To address this cause of infertility, early detection and prompt treatment of PID are therefore absolutely necessary.

It can be concluded that HSG can be utilised to determine tubal status in a context with limited resources. However, laparoscopy is a more dependable choice because to the limited specificity of HSG. Laparoscopy corroborated HSG findings of patent tubes in 94% of patients, indicating a good negative predictive value for HSG, but only 56% for positive predictive value. Uterine fibroids, endocrine disorders, or a combination of the aforementioned variables accounted for about 20% of the causes of female infertility. Endocrine problems are the most prevalent comorbidity in female infertility patients. When the infertile population was examined for endocrine abnormalities, thyroid diseases were the most prevalent, accounting for 21.6% of cases.^[22] Thus, a baseline screening for hypothyroidism must be performed on all infertile women. In one-third of infertile couples, the male element is to blame for the infertility. Around 10% of the couples experienced infertility due to the male factor alone, and another 10% of these couples experienced infertility due to a combination of male and female factors. A case of male factor infertility can be diagnosed with a basic semen analysis with a sensitivity of 89.6%, according to one study.^[23] About 7% of infertile couples have abnormal semen parameters.^[24] In our study, 24.2% of the males had them. Additionally, and maybe more significantly, low numbers with aberrant forms are becoming increasingly common. The semen parameters have declined qualitatively as a result. Our study identified two significant contributing factors—age husband's and past addictions—as being accountable for this.

According to our study, alcohol and cigarette use are the most common addictions that have a substantial impact on semen quality. Prevalence of many infertility-related factors. We estimate it to be 11.6%. Ovulatory problems with abnormal semen were the most frequent combination of female and male causes, followed by tubal infertility mixed with abnormal semen. Ovulation disorders and tubal factor were also the most typical combination identified in combined female factors. As a result, it is clear that in cases of infertility, it is crucial to assess both partners.

When investigation of the male and female components fails to pinpoint a particular reason for infertility, the diagnosis of unexplained infertility is made as an exclusion. Being an observational study, we were only able to compile data on historical investigations and ones conducted just at the point of contact. There was no way to intervene in the form of research or care. As a result, crucial tests for infertility, like those for serum thyroid stimulating hormone, were occasionally omitted. Additionally, it was observed that not all cases of unexplained infertility were treated with diagnostic

hysterolaparoscopy, particularly in such circumstances. The majority of developing nations have poor health systems. Recent advancements in the treatment of infertility led to significant increases in the price of delivering the new ART procedures. Due to the enormous value placed on children in developing nations, there is also a strong demand for infertility treatments.^[25] Infertile women are often viewed negatively in poorer nations. A newlywed woman's standing rises and her marriage becomes more secure if she becomes pregnant and gives birth to children, particularly males. After three to four months of marriage, women in poor nations go to their doctors with complaints of infertility. As a result, we won't understand what caused the problem in such patients. The study's location only has capabilities for the basic diagnosis of male and female infertility and the provision of IUI, which is a type of assisted reproductive technology. The main impediments noticed that kept the patients from seeking treatment earlier were the inability to finance infertility therapies and a lack of understanding about the same for the socioeconomic class that the hospital serves.

CONCLUSION

Couples who experience infertility, or the inability to conceive, go through a stressful time. New methods of assisted reproduction offered hope and improved treatment options, but they also raised a number of moral and ethical issues that need resolution. Primary infertility is more common than secondary infertility in the population visiting a public sector tertiary care facility. Increased marriage age has an impact on the causes, with unexplained infertility and the male component becoming more prevalent. Infertility continues to be mostly caused by female factors, followed by unexplained causes. PCOS continues to be the most prevalent female cause, followed by tubal factor. Obese and thin PCOS individuals both experience infertility at similar rates. The fact that PID and TB have a strong correlation with tubal factor infertility confirms that infections account for a sizable amount of infertility in our country. In low resource settings, HSG is still the test of choice for ruling out the tubal component, whereas laparoscopy is still the gold standard for doing so. The workup for infertility should include a screening for hypothyroidism in all individuals. Male factor is a substantial contributor to infertility, and semen characteristics are influenced by age, tobacco and alcohol usage, among other factors. Understanding the causes of infertility is the first step in resolving this problem because it is now a global concern. For patients, receiving an infertility diagnosis can be extremely stressful. A significant issue is the anguish and suffering of infertile patients. Patients need to be guided and encouraged as they undergo treatment. However, it is evident that psychological therapies for infertile women can reduce anxiety and sadness and may even increase pregnancy rates dramatically. The couple's failure to have children is commonly seen as a personal tragedy

and a threat, affecting the entire family and even the neighbourhood.

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