

Changing Trends in Etiology of Infertility and Their Prevalence at A Tertiary Care Centre

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Abstract

Bearing and raising of children are important endeavours in every Woman's life. It is critically related with completeness, happiness and family integration. Human existence reaches completeness through a child and satisfies the individual's need for reproduction. Causes of infertility change according to local demographics and thus it's important to find local causes to direct management strategies.

This study was aimed at studying the changing trends in aetiology of infertility, proportion of individual causes and highlighting the growing prevalence of non-communicable diseases in infertile couples.

A cross sectional, observational and descriptive study was executed amongst 500 couples attending the infertility clinic at our tertiary hospital. Our study showed that 74.1% of participants had primary infertility. Female factor was nearly 61.9%, male factor was seen in 18.2%, 2.2% had both male and female factors and 17.7% had unexplained causes of infertility. Of the study population, 16.2% women had non communicable diseases.

Keywords: Infertility; Male infertility; Female infertility; Tubal factor; Pre-pregnancy optimization.

Introduction

India is the World's second populous country having 1.3 billion people and it is projected by the United Nations that it will outnumber China (1.4 billion) in population after 2022.¹ The 2017 revision report has stated that the fertility rate observed in Indians has decreased by more than half from 4.97 to 2.3 further it will be reduced to 2.1 during 2025

to 2030. However the fertility rate of 2.2 is generally considered as the fertility replacement level and if it goes below this number the population rate will definitely decline.¹ Currently the rate of infertility, among the Indians is 10 to 14% which is higher in urban areas where 1 out of 6 couples are facing this issue. In 1994, "Problem of Infertility" was first discussed in Cairo at the International Conference on Population and Development.² Low income countries have particularly high rates of up to 30%. In India, childlessness is estimated to be around 2.5 percent. It is nearly 5.5 % for 30-49 age group and 5.2 % for 45-49 age group.

Nearly 13-19 million Indian couples are expected to be infertile at a given point of time.³

Greater interest in advanced education and careers among women, later marriages and more frequent divorce, delayed child bearing and decreased family size all have contributed in increasing infertility. In women, obesity is associated with menstrual dysfunction, decreased

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fertility and increased miscarriage rates. In men, it causes abnormal semen parameters and cause infertility.

Child marriage, early age of first pregnancy, no antenatal or prenatal care during previous pregnancies, unwanted pregnancies, and still births, post partum infections, HIV and other STIs are now considered as an obstetric warning signs for future secondary infertility.³ Researchers have stated that a prevalence of infertility above 5% suggests preventable or treatable causes.⁴ Hence, the primary aim should always be prevention rather than cure. The prevention strategies should be tediously designed especially in developing countries where the majority of cases are due to home delivery or unsafe abortion and STIs.⁵

With this backdrop, the present study has attempted to focus the current infertility situation.

Materials and Methods

It was a cross sectional, observational and descriptive study conducted in an infertility clinic in the department of Obstetrics and Gynaecology of a tertiary care centre. The study was conducted for a duration of 6 months. A sample of 500 couples were selected by simple random sampling and after taking a written, valid and informed consent were included. Inclusion criteria included couples married for more than 1 year in the age group of 19 to 43 years; cohabiting for more than one year and no history of contraceptive usage.

Patients attending the OPD fulfilling the inclusion criteria were enrolled in the study. Detailed history was taken at the primary visit. Data collection was by detailed history taking, examination and review of previous records if any. The data was then entered in a pre designed case record form with the following information demographic details, age at marriage, duration of marriage, medical and surgical history and family history.

General and specific examination findings were documented. Investigation reports previously done and newly done were also noted.

Results

The qualitative and quantitative data of the study population were analysed using means, median and percentages of Chi square test to obtain the degree of significance.

Table 1: Demographic characteristics of the study population.

Characteristics	Male (n=500)	Female (n=500)
Mean age	28	22
Education	Graduation	12th pass
Occupation	Self-employed	Homemaker
Addictions	40% (200)	10% (50)
BMI	26kg/m2	27kg/m2

Majority of the patients were in the age group of 22-32 years(620).

Couples were married for a mean duration of 5 years before taking treatment.

The comparison of common causes of infertility according to the duration of marriage is summarized in Table2.

Table 2: Causes and prevalence of factors causing infertility according to age of marriage.

Factor	Prevalence in couples married for up to 5 years (%)	Prevalence in couples married for more than 5 years (%)
Ovarian	24	14
Tubal	4	5.3
Male	8	10.2
Unexplained	11	13.7
Uterine	8	6.5

Thus as the duration of marriage increases, infertility due to tubal factor, male factor and unknown cause increases. History of addictions revealed that while, in women the prevalence was negligible, men had some form of addiction, of which 5.1% consumed some form of tobacco and 3.3% were alcoholics.

The causes of infertility in 500 couples were divided into 4 categories as follows:

- Female factor
- Male factor
- Combined causes
- Unexplained causes

Female factors responsible for infertility included tubal, ovarian and uterine causes. Of which ovarian cause contributed maximum in this sector.

Ovarian causes included PCOD, cysts, endometriosis and reduced reserve. Tubal pathologies included pelvic inflammatory diseases (PID), genital tuberculosis and endometriosis. Uterine pathologies included fibroids, congenital anomalies and endometrial factors.

For the diagnosis of PCOS, clinical parameters including obesity, acne and menstrual

abnormalities were included. TVS was also done to see the polycystic ovaries picture and biochemical parameters to see hyperandrogenism were also done. Tubal pathologies were ruled out by HSG. Few patients underwent hysteroscopy and laparoscopy to reach the diagnosis and plan treatment accordingly.

Tubal pathologies were found in 93 females of which 43 had tubal blocks, 30 had peritubular adhesions and 20 had some form of uterine anomaly; found on HSG and hysteroscopy.

Semen analysis was done to rule out male factor infertility and 182 of them had abnormal semen reports.

Discussion

The overwhelming population growth usually buries a graver problem of population dynamics—"infertility" that we are facing today. After a comprehensive review of 28 studies that were published since 1900, ESHRE in 2007, has stated the overall prevalence of infertility to be 9%. The prevalence varies from 3.5%–16.7% in developed countries and 6.9%–9.3% in developing nations.⁶ All National Family Health Surveys 1,2,3 and 4 have shown that prevalence of primary is constantly more than secondary infertility.⁷ Our study also the primary infertility was seen in 74.1% and 25.9% had secondary infertility. Studies done by Allow et al., Farhi and Ben Haroush, and Masoumi et al. show that the incidence of primary is more than that of secondary infertility.^{8,9,10} The most important determinant of spontaneous as well as pregnancies from assisted reproduction is female age. Fecundity starts to decline from the fourth decade and fertility as early as 32 years.¹¹ Apart from individual age of the partners, the duration of marriage also influences the cause of infertility. PCOS and tubal pathologies were significantly contributing in cohabitation less than 5 years. Male factor and Unexplained cause of infertility were major contributors in couples cohabitating for more than 5 years. The quality and quantity of both ova and sperms reduce as the age of the partners increase.

In present study, 61.9% of infertility was contributed by female factor. Among the causes of female infertility found, ovarian pathologies contributed 38.1%, uterine factors contributed 14.5% and tubal factors contributed 9.3%. Metabolic syndrome is typified by glucose intolerance, central obesity, dyslipidemia and hypertension. These conditions set an oxidative stress in the body which cause hypogonadism. Hyperglycemia is known to

induce apoptosis in GnRH cell line, contributing to hypogonadism. The existing hyperinsulinemia and insulin resistance can potentially trigger the development of PCOS.

Studies done by Mittal et al. in Haryana, Patel et al. in Indore, and Rajashekar et al. in Bangalore also also highlighted PCOS as the main female factor causing infertility.^{12,13,14} Worldwide studies have stated PCOS as the single most common cause of female factor infertility.^{15,16}

The 2nd leading cause of infertility is due to uterine factors which includes fibroids, endometriosis and congenital anomalies. This is in contrast to other studies, where tubal etiologies contribute to 2nd most common cause. In our study, tubal factors contribute 9.3% of which PID, hydrosalpinx and tubal blockage were the main causes. The prevalence of tubal factor contributing to infertility was between 15% and 20% as shown by Elusseine et al., Masoumi et al., and Farhi and Ben-Haroush.^{9,10} Among the comorbidities in infertile females, the most common ones are the endocrine abnormalities. The prevalence of non-communicable diseases was 16.2% in our study population, of which 5.5% had hypothyroidism, 3.5% of them had diabetes and 2.9% had hypertension.

Nearly one third of infertility cases are contributed by male factor. The prevalence due to male factor is between 30%–45% as per the studies by Elusseine et al., Masoumi et al., and Farhi and Ben Haroush.^{9,10} In the present study, male factor was the sole cause of infertility in around 18.2% of the couples and contributed as a combined cause in another 7% of the infertile population.

A basic semen analysis has been found to have a sensitivity of 89.6% to diagnose a case of male factor infertility.¹⁷ In all our patients, a semen analysis was done, and isolated semen abnormalities without any local or hypothalamic cause were most commonly seen. Worldwide and two large studies done in South India and AIIMS have shown that the average sperm count of males is reducing. Furthermore, more importantly, the prevalence of low counts with abnormal forms is increasing. This represents a qualitative deterioration in the semen parameters.¹⁷ Two notable factors responsible for this found in our study were husband's age and history of addictions.

Abnormal semen parameters were seen in nearly 10 percent of the infertile couples of our study. In 2012, Sharma et al. proved that heavy smoking resulted in oligospermia and alcohol consumption is associated with an increase in morphologically abnormal sperms.¹⁷ The present study confirms

the above, with tobacco and alcohol being the most prevalent addictions, significantly affecting semen quality.

Prevalence of combined causes for infertility as seen by Phillipov et al. is 38%, Bayasgalen 18.8%, whereas Zarger from Kashmir, India, reported it only to be 5.2%. In the present study we found it at 2.2%.

In the combined causes, ovulatory disorders with abnormal semen was the most frequent combination followed by tubal infertility combined with abnormal semen.

Unexplained infertility is a diagnosis of exclusion after thorough evaluation of the male and female factors. The incidence of unexplained infertility is stated to be nearly 30 percent.¹⁸ In the present study, 24.7% of the couples were experiencing unexplained infertility. Gelbaya et al. in their review of literature from 1950 to 2013 found that even after doing standard fertility tests, in 15%–30% of couples, no cause will be identified.^{19,20} In the last 10 years, the proportion of unexplained infertility is increasing. This is clearly demonstrated in studies conducted by Elusseine et al. in 2008 and Farhi and Ben Haroush in 2011, the incidence of unexplained infertility as 13% and 20.7%, respectively and 24.7% in our study.^{9,10}

Being an observational study, we were just able to gather information regarding history and investigations done at the point of contact.

Conclusion

A considerable sector of Indian couple experiences primary infertility at the present date. Struggling with infertility is like dealing with the five stages of grief every single month. 'Denying, bargaining, getting angry, crying and accepting to start all over again!'. The mushrooming of "infertility clinics" is a good indication of people looking for solutions. The study revealed positive relationship between the age of women and their infertility crisis. Overweight and obese women were more likely to suffer from infertility. Smoking cessation, achieving a BMI between 20 and 25 kg/m² and limiting alcohol consumption can reduce the burden of infertility. With the increased awareness and acceptance of contraception, shifting trends from tubal factor to ovarian factor are increasingly being noted. All couples need to be explained the importance of pre-pregnancy optimization and lifestyle modification pertaining to BMI, co morbidity control and stress free life to achieve the desired fecundity.

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