

Article

A study of causes of infertility and its associated risk factors in tertiary care centre

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Abstract: Background and Aim: The condition of infertility is recognised as a major healthcare concern across different communities. The issue's significant prevalence has resulted in its intensified importance. Environmental conditions and acquired risk factors have been found to be associated with a substantial proportion of cases of infertility. Diverse environmental conditions have underscored the necessity to investigate the distinct aetiologies of infertility in various regions.

Objective: The aim of this study was to determine the frequency causes of infertility in infertile couples.

Materials and Methods: In this cross sectional descriptive study 340 infertile couples that were referred to infertility clinic of tertiary care hospital during study period, were examined. This centre is the only governmental centre for infertility. Information about the patients was obtained from medical examinations and laboratory findings. To analyze the data, descriptive statistics such as frequencies and the mean were used.

Results: Among the various causes of infertility women factors (88.6%) had the highest regard. In the causes of female infertility, menstrual disorders, diseases (obesity, thyroid diseases, and diabetes), The causes of infertility in the 340 couples were divided into four standard categories as follows: Female factor 58.7% , Male factor 28.2%, Combined causes 3%, Unexplained infertility 10.1%. The prevalence of primary and secondary female infertility was 70.5% and 29.5% respectively. Tubal cause account most in female infertility.among male sperm morphology was measure cause.

Conclusion: Urban Central India has a lower rate of primary infertility than developing nations. Healthcare professionals and policymakers must understand infertility incidence and risk factors to develop and implement various infertility prevention and management strategies.

Keywords: Male infertility; Female infertility; Etiology.

1. Introduction

The global prevalence of infertility is a significant health concern, with an estimated impact on around 8% to 10% of couples worldwide [1]. According to estimates, India accounts for approximately 25% of the 60-80 million couples globally who experience infertility annually, which translates to a range of 15-20 million couples [2,3]. As per a report published by the World Health Organisation (WHO), infertility affects 25% of couples in developing nations. The urgency of addressing the issue is warranted given the significant scale of the problem, especially considering that a majority of infertility cases are preventable.

The primary obstacles to accurately determining the true extent of infertility are the limited number of studies conducted at the population level and the divergent criteria employed in the scant high-caliber investigations that have been published. The prevalence rate of 12 months in underdeveloped nations varies between 6.9% and 9.3%. Significant variations in prevalence across geographical locations have been observed, which can be primarily attributed to diverse environmental, cultural, and socioeconomic factors, as well as disparities in healthcare accessibility [4,5]. The prevalence of the condition in question exhibits significant variation across sub-Saharan Africa, with rates ranging from 9% in Gambia to 11.8% in Ghana, while northwestern Ethiopia reports a prevalence of 21.2%. In Nigeria, the prevalence ranges between 20% and 30% [6-11]. There is a dearth of available data pertaining to countries spanning the Asian to Latin American regions.

As per the World Health Organisation (WHO), the occurrence of infertility among couples of reproductive age in these regions ranges from 8% to 12% [1,12].

India is a nation characterised by a significant degree of diversity. The presence of diversity is evident in various aspects such as customs, traditions, quality of life, access to healthcare systems, and climatic conditions. The infertility rate in India exhibits significant variation not only across different states but also within the same region across various tribes and castes, owing to a multitude of factors. Furthermore, the variability in the definition employed to characterise infertility across different research studies poses a challenge in comparing the prevalence rates among them. Furthermore, there is a dearth of information pertaining to infertility in India, with no available data from the central region.[13] Apart from the fundamental prevalence of infertility resulting from physiological factors, there exist other instances where preventable conditions such as infection, menstrual hygiene, lifestyle factors, maternal age, age at marriage, delayed childbearing for a year or more, socioeconomic status, and occupational hazards contribute to infertility. Therefore, the present study was designed with the primary aim to study the cause of infertility in the patients attending infertility OPDs of the tertiary care center. The secondary aim of the study was to calculate the proportion of risk factors associated with infertility.

2. Material and methods

this is an observational and descriptive study in an infertility clinic in the department of obstetrics and gynecology of a tertiary care center. The study was conducted for a duration of 6 months. A sample of 340 patients and their partners were selected by simple random sampling from and included in the study after taking a written, valid, and informed consent. Women married for more than 1 year in the age group of 19–49 years, cohabiting women, and women without the use of contraceptives either as cases of primary or secondary infertility were included in the study. Data was collected through face to face interviews with the help of a predesigned and protested questionnaires Informed consent was taken from the study participants after explaining them the objectives of the study and ensuring the confidentiality of the data.

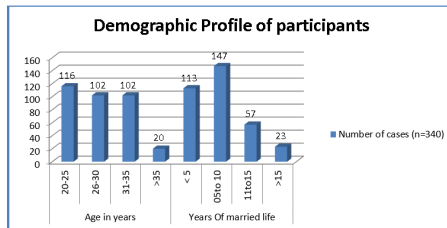
2.1. The following definitions were used in this study

1. Epidemiological definition of primary infertility [14,15] Women of reproductive age (15–49 years) at risk of becoming pregnant (not pregnant, sexually active, not using contraception, and not lactating) who report trying unsuccessfully for a pregnancy for 2 years or more is labeled as primary infertile.
2. The definition of reproductive age group women by the WHO [14,16] Women of reproductive age (or women of childbearing age) refer to all women age 15–49 years.

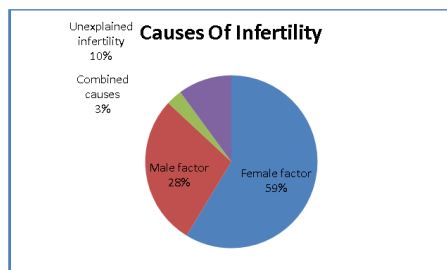
3. Results

The causes of infertility in the 340 couples were divided into four standard categories as Female factor 58.7% was most common followed by , Male factor 28.2% ,Combined causes 3% and Unexplained infertility 10.1%.

Particular	Sub-Particular	Number of cases (n=340)	(%)
Age in years	20-25	116	34
	26-30	102	30
	31-35	102	30
	>35	20	6.67
Years Of married life	<5	113	33.33
	5-10	147	43.33
	11-15	57	16.67
	>15	23	3.33



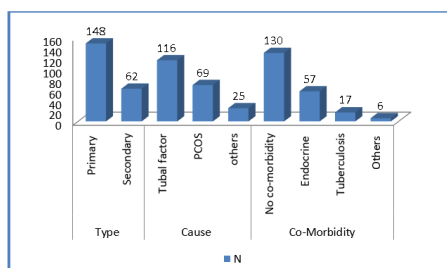
Causes Of Infertility	N	%
Female factor	200	58.7
Male factor	96	28.2
Combined causes	10	3
Unexplained infertility	34	10.1



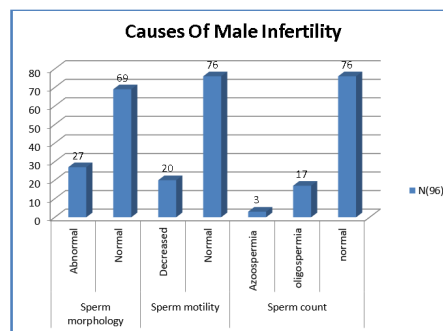
3.1. Causes Of Female Infertility

Analyzing the female factor in detail where it was responsible for infertility, it was found that the main cause found in our study population was the Tubal factor which accounts for 55.3%. Tubal pathologies included pelvic inflammatory disease (PID), genital TB, and endometriosis. Followed by PCOS (32.8%) others included uterine causes (malformation and fibroids) with endocrine causes contributed to 11.9%. Analyzing the female factor in detail where it was responsible for infertility, it was found that the main cause found in our study population was the Tubal factor which accounts for 55.3%. Tubal pathologies included pelvic inflammatory disease (PID), genital TB, and endometriosis. Followed by PCOS (32.8%) Others included uterine causes (malformation and fibroids) with endocrine causes contributed to 11.9%.

Type & Causes Of Female Infertility		N(210)	%
Type	Primary	148	70.5
	Secondary	62	29.5
Cause	Tubal factor	116	55.3
	PCOS	69	32.8
	others	25	11.9
Co-Morbidity	No co-morbidity	130	62
	Endocrine	57	27
	Tuberculosis	17	8
	Others	6	3



Causes Of Male Infertility		N(96)	%
Sperm morphology	Abnormal	27	28.125
	Normal	69	71.875
Sperm motility	Decreased	20	20.8333
	Normal	76	79.1667
Sperm count (millions/ml)	Azoospermia	3	3.125
	oligospermia	17	17.7083
	normal	76	79.1667



4. Discussion

The outcomes of this study indicate that primary infertility was observed with greater frequency among couples experiencing infertility. The present study's results exhibit resemblance to those of previous studies conducted in Iran [17,18], while they differ from the outcomes of studies conducted in other regions of the world [19,20]. The study found that the average duration of infertility was between 5 to 10 years, which was observed to be greater than the duration of infertility in other developing nations [21]. However, it was found to be consistent with previous reports from various studies [20,22,23]. The present investigation revealed that the female factor exhibited the highest percentage, a finding that is consistent with the results of a previous study conducted in Iran [12]. In a research conducted in Sari, Iran, it was found that the predominant cause of infertility was attributed to female factor [17]. On the other hand, a study carried out at the Royan Institute in Tehran, Iran revealed that male factor was identified as the primary cause of infertility [25]. The majority of studies have indicated that the male factor accounts for 20-40% of cases, while the female factor accounts for 30-55%. Combined factors have been reported to contribute to 35% of cases, while the aetiology of 5-15% of cases remains unknown [24,26]. The notable variance could potentially be attributed to varying factors that may be implicated in infertility. The present investigation has identified uterine factors as a contributing element to female infertility. Whilst the uterine factor has been identified as a contributing factor to recurrent pregnancy loss and preterm delivery, recent research has reported the prevalence of uterine anomalies in fertile women to be approximately 2-3%, with infertile women exhibiting a slightly higher prevalence of 3%. Notably, women with a history of recurrent miscarriages have been found to exhibit a higher prevalence of uterine anomalies, with rates ranging from 5 to 10%. [27] The findings of our research indicate that hormonal disorders play a significant role in the occurrence of ovulation disorders. Hormonal disorders have been observed to result in a reduction in ovarian reserve and a decline in the quality of oocytes. The absence of ovulation in a subset of women, ranging from 5 to 10%, can be attributed to diminished levels of gonadotropins and secondary estradiol, which is caused by a decrease in the secretion of hypothalamic GNRH (28). According to a particular study, ovarian causes were identified as the primary cause of infertility, followed by tubal factor as the secondary factor in female infertility [17]. According to a study conducted in Babol, Iran, it was found that 26% of the causes of infertility were attributed to ovulation dysfunction [29]. The presence of tubal obstruction is a significant factor in cases of infertility related to tubal factors, as evidenced by our study. Tubal disease accounts for nearly 20% of female infertility, with 10-25% of cases attributed to obstruction in the proximal portion of the fallopian tube [30]. According to a research conducted in Sari, Iran, tubal factor was identified as the second most prevalent cause of infertility among women [31]. Cervical stenosis was identified as an additional etiological factor for infertility in our research, specifically related to the cervical factor. Cervical stenosis and closure are infrequent aetiologies of infertility, as reported in literature [17]. As per the definition

provided by the World Health Organisation, asthenospermia refers to a condition characterised by a reduction in sperm motility, wherein less than 50% of the total sperm exhibit mobility. Varicocele has the potential to elevate the temperature of the testes and result in the reflux of harmful metabolites from the adrenal vein to the left kidney. Oligospermia is a medical condition characterised by a diminished quantity of spermatozoa, which is recognised as a contributing factor to male infertility [27].

The present investigation identified sperm morphology, decreased sperm motility, oligospermia, and azoospermia as the primary contributors to male factor infertility. According to Karimpur et al.'s (2011) study, varicocele accounted for 42.7% of male infertility cases [17]. According to a study conducted in Shiraz, Iran, varicocele was identified as the predominant cause of male infertility among patients seeking treatment at infertility clinics, accounting for 32% of cases. The examination of both male and female factors is crucial in evaluations of infertile couples, as multiple factors are often cited as contributing to infertility.

5. Conclusion

The incidence of primary infertility among the urban population of Central India is comparatively lower than the documented patterns of infertility in developing nations. Understanding the incidence of infertility and its correlated risk factors is of paramount significance for healthcare professionals and policymakers in devising and executing diverse strategies pertaining to the prevention and management of infertility.

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