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Original Research Article

Study of demographic profile and causative factor in female infertility

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ABSTRACT

Background: Infertility is a global health concern affecting millions of couples worldwide, with a significant impact on physical health and societal disparities. This study investigates female infertility in a specific population in India.
Methods: The study, conducted at Nehru Hospital, BRD Medical College, Gorakhpur during September 2019 to August 2020 involved 150 infertile couples seeking conception assistance. Demographic profiles, causative factors, and management approaches were explored. Data were collected through medical histories, physical examinations, and various investigations.
Results: Of the infertile women, 57.33% experienced primary infertility, and 42.66% had secondary infertility, with the 26-30 age group being the most affected. A majority resided in rural areas (64.67%), followed Hinduism (87.33%), and 65.33% had at least a matriculation level of education. Most women were housewives (90%). Male partners exhibited addictive habits in 37.33% of cases. The study revealed the complexity of female infertility, with factors such as pelvic inflammatory disease, polycystic ovarian syndrome, myoma of the uterus, uterine anomalies, endometriosis, and tubal pathology playing crucial roles.
Conclusions: This study provides valuable insights into the multifaceted nature of female infertility. It highlights the importance of tailored diagnosis and treatment approaches to address specific causes. The findings challenge assumptions about the correlation between demographic factors, such as religion, education, and occupation, and infertility outcomes. Male factors, particularly addictive habits, are also significant contributors to infertility. Further research is needed to gain a broader understanding of infertility factors in diverse populations.

Keywords: Female infertility, Demographic profile, Causative factors, Management approaches, Pelvic inflammatory disease, Polycystic ovarian syndrome

INTRODUCTION

Infertility is a global health concern affecting approximately 8-10% of couples worldwide. According to the world health organization (WHO), an estimated 60-80 million couples globally grapple with infertility. It is not only a physical health issue but also one fraught with social discrimination and disparities.[1] The WHO defines infertility as the "failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse." This condition is further categorized into primary infertility, where no previous pregnancies have occurred, and secondary infertility, in which a prior pregnancy, although not necessarily a live birth, has taken place. Globally, primary infertility is more prevalent.[2]

In India, the prevalence of primary infertility varies across states, with estimates ranging from 3.7 percent in some regions to as high as 15% in others. It also varies among tribes and castes within the same region.[3] The likelihood of conception depends on factors such as the duration of sexual exposure, the frequency of intercourse, and the age of the couple. Typically, a young couple has a 25% chance of conceiving after one month of unprotected intercourse,

with 70% conceiving within six months and 90% within a year. Only about 5% of couples will conceive after one and a half to two years.[5] The sexual response cycle, which involves physical and emotional changes during sexual arousal, plays a crucial role in promoting fertility. Hormones like follicle-stimulating hormone (FSH) and luteinizing hormone (LH) control the reproductive system, stimulating follicles in the ovaries to develop. Each month, numerous follicles begin to grow in response to FSH, but only one mature egg is released. Estrogen, produced by the dominant follicle, increases until a surge triggers the release of LH, leading to ovulation.[6]

Infertility can be attributed to various causes, with males contributing to 30-40% of cases, females to 40-55%, and both partners in 10% of instances. Biological and social factors, including economic status, religious beliefs, age of marriage, urbanization, literacy, contraceptive use, and nuclear families, also significantly impact fertility rates. Infertility has various adverse effects, such as causing instability in couples' lives and potentially leading to higher rates of remarriage among infertile women. It can result in personal suffering, psychological disorders, and sexual dysfunction, including marital discord and clinical depression. However, it's essential to note that infertility is a clinical presentation rather than a disease.[2] Stress is a complex factor intertwined with infertility. It can both directly and indirectly affect fertility by altering hormonal pathways and causing physical symptoms like tubal spasm, vaginismus, dyspareunia, and frigidity. Stress hormones like catecholamines interact with reproductive hormones such as gonadotropin-releasing hormone (GnRH), prolactin, LH, and FSH.[3-4] Female infertility causes can be grouped into three main categories: ovary-related factors (including polycystic ovary syndrome), tubal factors (including pelvic infections and previous tubal surgery), and uterine and cervical factors (including fibroids and immunological issues). In some cases, infertility remains unexplained.[6]

Aim and objectives

Aim and objectives of current study were to know the socio demographic profile and causative factor in female infertility and management of infertility in even limited facilities.

METHODS

The study was conducted at Nehru Hospital, BRD Medical College, Gorakhpur during September 2019 to August 2020 focusing on infertile couples seeking conception assistance. This observational study included reproductive-aged females (above 18 years) and males (above 21 years) desiring children while excluding those who had completed their families, unmarried individuals, and postmenopausal women. Data collection involved detailed medical history and physical examinations. The history encompassed age, marriage duration, previous marriages and fertility outcomes, obstetric history, menstrual details, sexual function, medical history, surgical history, contraceptive use, habits, family history, and specific symptoms.

Physical examinations covered general health, cardiovascular and respiratory systems, abdomen, and pelvic examinations. Pelvic exams included speculum, bimanual, and rectal assessments. Investigations included blood typing, CBC, HIV, HCV, HBsAg, VDRL, OGTT, urine analysis, culture/sensitivity, and TORCH infection screening. Special investigations comprised abdominal and transvaginal ultrasounds for comprehensive pelvic assessment. Folliculometry, endocrinological markers, and diagnostic laparoscopy were utilized for ovulation factors. Tubal factors were explored through hysterosalpingography/sono-salpingography and laparoscopy as needed. Husband's semen analysis followed standard procedures, with sample collection after three days of abstinence.

Statistical analysis

Data were presented in a graphical manner and in the form of tables. Data were coded and recorded in MS Excel spreadsheet program. SPSS v24.0 (IBM Corp.) software was used for data analysis. Descriptive statistics were elaborated in the form of mean/ standard deviation and proportions.

RESULTS

The (Table 1) summarizes the demographic characteristics of 150 infertile women in the study. Among the women, 57.33% experienced primary infertility, while 42.66% had secondary infertility. In terms of age distribution, 41.33% were in the 26-30 age group, 28.66% were in the 31-35 age group, 16.66% were in the 18-25 age group, and 13.33% were over 35 years old. A majority (64.67%) resided in rural areas, while 35.33% lived in urban areas. The study had a predominantly Hindu population, accounting for 87.33%, with 12.66% being Muslim. Education-wise, 65.33% of infertile women had at least a matriculation level of education, while 34.67% had education below matriculation. The majority (90%) were housewives, while 10% were engaged in income-generating activities.

In terms of socioeconomic status, 30.66% belonged to the "Lower Middle" class, followed by "Upper Middle" at 29.33%. "Upper" and "Lower" classes comprised 4% and 8%, respectively, and 27.33% fell into the "Upper Lower" category. Most infertile women came from joint families (66.66%) rather than nuclear families (33.33%).

Regarding BMI, 62.66% were overweight, 32% had a normal weight, 4% were obese, and 1.33% were underweight. Knowledge about the fertile period was limited, with only 2.66% having awareness of it, while 97.33% had no knowledge. A majority (46.66%) had regular menstrual patterns, with the rest displaying various menstrual irregularities.

Table 1: Demographic characteristics of infertile women.

Characteristic	N	%
Type of infertility		
Primary	86	57.33
Secondary	64	42.66
Age (years)		
18-25	25	16.66
26-30	62	41.33
31-35	43	28.66
>35	20	13.33
Residence		
Rural	97	64.67
Urban	53	35.33
Religion		
Hindu	131	87.33
Muslim	19	12.66
Education level		
Below Matriculation	52	34.67
Matriculation and above	98	65.33
Occupation		
Housewife	135	90
Income generating activity	15	10
Socioeconomic status		
Upper	6	4
Upper middle	44	29.33
Lower middle	46	30.66
Upper lower	41	27.33
Lower	12	8
Type of family		
Joint	100	66.66
Nuclear	50	33.33
BMI		
Underweight	2	1.33
Normal weight	48	32
Overweight	94	62.66
Obesity	6	4
Knowledge about fertile period		
Know	4	2.66
Not know	146	97.33
Cohabitation with husband		
Regular	126	84
Irregular	24	16
Habits of male partner		
Alcohol	25	16.66
Tobacco	23	15.33
Both	8	5.33
Husband semen analysis		
Oligospermia	4	2.66
Aspermia	1	0.66
Azoospermia	3	2
Fertile	142	94.66
Menstrual pattern		
Regular	70	46.66
Amenorrhea (6 mo. 2 yrs)	5	3.33
Oligomenorrhea (Prolonged cycle)	40	26.66
Hypomenorrhea (Scanty flow)	17	11.33

Continued.

Characteristic	N	%
Menstrual pattern		
Menorrhagia (Heavy flow)	11	7.33
Metrorrhagia (Irregular)	2	1.33
Polymenorrhagia (Short cycle)	5	3.33
Medical history		
Hypertension	11	7.33
DM type 2	16	10.66
Hypothyroidism	26	17.33
Hyperthyroidism	1	0.66
No problem	96	64

A fraction had medical histories: 17.33% had hypothyroidism, 10.66% had type 2 diabetes, 7.33% had hypertension, and 0.66% had hyperthyroidism, while 64% had no documented medical problems. The (Table 2) presents the various causes and factors contributing to infertility among the study participants.

Table 2: Causes of infertility and associated factors.

Causes and factors	N	%
Pelvic inflammatory disease		
Tubercular	37	72.54
Non-tubercular	14	27.45
Polycystic ovarian syndrome	28	-
Myoma of uterus		
Present	32	21.33
Size <1 cm	30	20
Size 3-4 cm	2	1.33
Uterine anomalies		
Septate/sub-septate uterus	6	4
Bicornuate uterus	1	0.66
Endometriosis	19	-
Tubal factor		
Unilateral tubal obstruction	5	3.33
Bilateral tubal obstruction	15	10
Bilateral tubes patent	130	86.66
Premature ovarian insufficiency	7	-
Hormonal problems		
Hypothyroidism	26	17.33
Hyperthyroidism	1	0.66
Hyperprolactinemia	3	2

The primary cause was pelvic inflammatory disease (PID), with 72.54% of cases attributed to tuberculosis, and 27.45% to non-tubercular reasons. Polycystic ovarian syndrome (PCOS) was associated with 18.66% of infertility cases. Myoma of the uterus was present in 21.33% of women, with varying sizes. Uterine anomalies like septate/sub-septate uterus and bicornuate uterus were less common (4% and 0.66%, respectively). Endometriosis contributed to 12.66% of cases, while tubal factors, including unilateral and bilateral tubal obstructions, were involved in 13.33% of cases. Premature Ovarian Insufficiency (POI) affected 4.66% of infertile women, while hormonal problems like hypothyroidism, hyperthyroidism, and hyperprolactinemia were identified in 20% of cases. The (Table 3) provides an overview of the causes and contributing factors to infertility among the study participants. The major factors included Pelvic Inflammatory Disease (PID), accounting for 34% of infertility cases, while polycystic ovarian syndrome (PCOS) and Myoma of the uterus affected 18.66% and 21.33% of women, respectively. Thyroid problems were found in 18% of cases, while hypertension, DM Type 2, raised serum prolactin, and Tubal Pathology contributed to smaller percentages of infertility cases. Endometriosis was identified in 12.66% of cases. Additionally, ovarian insufficiency was found in 4.66% of the infertile population. These factors collectively shed light on the complex and varied causes of infertility within the study group.

Table 3: Problems present in infertile patients.

Causes and factors	N	%
Hypertension	11	7.33
Thyroid problems	27	18
Raised serum prolactin	3	2
DM type 2	16	10.66
PID	51	34
PCOS	28	18.66
Myoma (intramural)	32	21.33
Uterine anomalies	7	4.66
Endometriosis	19	12.66
Tubal pathology	20	13.33
Ovarian insufficiency	7	4.66

DISCUSSION

Among the participants, 57.33% experienced primary infertility, with 42.66% facing secondary infertility, a pattern consistent with earlier studies Baby et al. shows higher incidence of primary infertility (90.5%) among the infertile couple and rest 9.5% had secondary infertility.[6] Most cases (41.33%) were observed in the 26-30 age group, with an average age of 28.34 years, echoing findings by Singh et al accounted mean age was 28.24 years and Baby et al. shows that majority 51.35% women were in the age group of 20-29 years.[6-7] The study found that 64.67% of the participants resided in rural areas, which was similar to study done by Pal et al and William

et al found the majority of infertile couple 60.5% belonged to rural area.[8-9] Hinduism was the dominant religion among the infertile couples, with 87.33% of participants adhering to this faith, consistent with the 88.42% regional demographic Shashank et al.[10]

Approximately 65.33% of women had an education level of matriculation or higher and 90% were homemakers, similarly 64.9% and 87.9% in Pal et al challenging assumptions about the correlation between education and infertility.[8] About 37.33% of males exhibited addictive habits, primarily involving tobacco and alcohol consumption, as highlighted in studies on tobacco smoking and semen quality in infertile male's result shows oligozoospermia significantly higher in smokers by Bundhun et al.[11] The most prevalent cause of female infertility was PID, accounting for 34% of cases and often associated with Tuberculosis 72.54%. PCOS followed at 18.66%. Similar to the study, Nirmalya et al found maximum of 64% of women suffered from PID followed by 19% had PCOD. In a study conducted by Deshpande et al PCOS and tubal pathology were the most common causes contributing 46% and 33.8% respectively.[12-13] Around 20% of women with infertility were associated with hormone problem in which 17.33% had hypothyroidism and 2% hyperprolactinemia. Similarly, Singh K et al. observed that 24% had hypothyroidism while, in contrast to our study Ubong et al shows prevalence of hyperprolactinemia is significantly high in infertility women 37.4% and hypothyroidism was rare.[6,4] Tubal pathology (13.33%), endometriosis (12.66%), and premature ovarian insufficiency (4.66%) were also identified as contributing factors similarly, the prevalence of tubal factor causing infertility was found to be 15-20% by Masoumi et al, Elussein et al.[14-15]

Limitations

The findings are based on a specific population within a particular geographic region, and therefore, may not be generalized to broader demographics. Additionally, the study may have been impacted by selection bias, as it focused on individuals seeking medical assistance for infertility, potentially excluding those who did not seek such help. Despite these limitations, this research underscores the importance of tailored diagnosis and treatment approaches for individuals facing infertility, addressing specific causes to enhance their chances of conception. Further research and wider demographic studies are essential to gain a more comprehensive understanding of the factors contributing to infertility.

CONCLUSION

In conclusion, this study provides valuable insights into the complex and multifaceted nature of female infertility among the study participants. It is evident that primary infertility is more prevalent than secondary infertility, with a significant proportion of cases observed in the 26-30 age group. The predominance of rural participants in this study contradicts findings from some previous research, which often reported higher infertility rates in urban areas. The influence of religion and education on infertility outcomes is highlighted, with Hinduism being the dominant religion and a substantial proportion of women having an education level of matriculation or higher. Notably, a significant number of homemakers were affected by infertility, challenging assumptions about the correlation between occupation and fertility. Male factors, particularly addictive habits like tobacco and alcohol consumption, also contribute significantly to infertility. The primary causes of female infertility are PID caused by tuberculosis and PCOS, with various other factors such as uterine anomalies, endometriosis, and tubal pathology playing a role.

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