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RESEARCH ARTICLE

ETIOLOGY AND RISK FACTORS OF FEMALE INFERTILITY IN PRAVARA RURAL HOSPITAL, LONI

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Abstract

Objectives: Parenthood is one of the most important aspects of adult life in both women & men. Infertility is a medical condition that can cause psychological, physical, spiritual, mental & medical detriments to the patient. The aim of the present study was to investigate the etiology and risk factors associated with female infertility in Pravara Rural Hospital, Loni.

Materials and Methods: This descriptive cross-sectional study was conducted in Pravara Rural Hospital, Loni. Overall, 133 infertile females were included. The variables including socio-demographic characteristics, smoking, body mass index (BMI), and infertility status (e.g., type of fertility, duration, etc.) etc. were assessed by a self-administered and validated questionnaire.

Results: The most common causes of female infertility were ovarian factors out of which PCOS was the leading cause. There was a significant association between female factor infertility and age of women, women's age at marriage, number of abortions, presence of an underlying disease and BMI, etc.

Conclusions: The review is helpful to all the scientific, medical researchers who can put efforts to put an end to female infertility. Maintaining a healthy lifestyle, getting regular checkups with the doctor and maintenance of normal body weight can avoid fertility problems. The medical and socio-economic support of infertile women, which means easier access to medical services, higher insurance coverage, broader social support, and information are important requirements for resolving the problem.

Introduction:-

Infertility is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (WHO). Infertility is broadly classified into two types, primary and secondary. Primary infertility patients are those who have never conceived before, while secondary infertile patients are those who have at least one prior conception, irrespective of the outcome, infertility affects about 10-15% of reproductive age couples and is estimated that one in every 10 couples are experiencing primary and/or secondary infertility.

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Causes of infertility:

Female factors are responsible for 40-45% of infertility etiologies whereas male factors account for 35% of the cases and 10-20% have combined factors. Unexplained infertility is diagnosed in people in whom all standard investigations that is ovulation study, tubal patency, and semen analysis are normal but have yet not conceived after 1 year of unprotected intercourse or 6 months if female is greater than 35 years of age[7] About 15-30 % are cases of unexplained infertility[8] Female infertility rate in India is 8.8% of which 6.7% is primary infertility and 2.1% is secondary infertility. The prevalence of currently infertile women is 4.6%.

Several factors influence the process of conception, the failure of which can be due to defects in any of these. For normal conception to occur there must be

1. Normal spermatogenesis
2. Semen deposition in the vagina at the time of ovulation
3. Normal ovulation
4. Functionally normal fallopian tubes able to pick up the ovum.
5. Normal uterine cavity for the implantation as well as the continuation of pregnancy
6. Cervical secretion which are under cyclic hormonal control and are normal to allow passage of the sperms
7. There should be no immunological incompatibility.
8. The male partner alone may be at fault in approximately one-third of the cases, the female partner alone in another third and in the remaining third both may be at fault some of the defects may be remediable.[26]
9. Ovarian factors account for 20% - 40% of the cases.
10. Tubal factors account for 35% [3] [2] cases of infertility.
11. Uterine factors (20%)
12. Peritoneal factors,
13. Cervical factors,
14. Vaginal factors.

Male factors of infertility can be mainly due to 4 causes

1. Hypothalamic-pituitary disorders about 1-2% which can be congenital, acquired, or a result of systemic illness.
2. Primary gonad disorders (30-40%) both congenital and acquired.
3. Disorders of sperm transport (10-20%)
4. Idiopathic (40-50%)

Evaluation:

Formal evaluation of infertility is generally indicated in women attempting pregnancy who fail to conceive after a year or more of regular, unprotected intercourse as 85% of couples will achieve pregnancy without assistance within one year of time. Earlier evaluation and treatment are indicated in women with

1. Age 20-40 Years
2. History of oligomenorrhea/ amenorrhea
3.Known case of uterine/tubal disease, endometriosis, or diminished ovarian reserve
4. A partner who is known to be or suspected to be sub-fertile.

The extent of evaluation should take into account the couple's wishes, both the partner's age, the duration of infertility, and unique features of the medical history and physical examination.

The couple must be considered as a single unit as each partner contributes a share to the infertility potential of the couple. Initial consultation with the infertile couple should include a complete medical and menstrual history including a review of lifestyle and social habits, physical examination, and pre conception counseling. The evaluation of female infertility assesses each component of reproductive physiology to identify an abnormality: cervix, uterus, the endometrial, the ovarian function, the fallopian tube, the peritoneum. The initial screening evaluation of the male partner should include, at a minimum, a reproductive history and two properly performed semen analysis. A careful h/o history and physical evaluation of each partner can direct further investigation. Evaluation of both partners should be initiated simultaneously as it is imperative that infertility is approached as a couple disorders.

Material and Methods:-

The present study was descriptive and cross-sectional done on 133 cases. It was carried out at a tertiary care hospital in western Maharashtra at a rural setup, from the period of December 2020 to November 2022. The study was conducted after the IEC RMC approval with well written and informed consent of the study population.

Inclusion Criteria:

Women with history of infertility attending the outpatient department of Pravara Rural Hospital, Loni taking into consideration the following:

1. Age 20yrs to 40yrs
2. Couples with unprotected coitus for 1year or more.
3. Couples who fail to conceive following a previous pregnancy, in absence of contraception, breastfeeding or postpartum amenorrhea for a period of two years.
4. Ready to give written informed consent.

Exclusion Criteria:

1. Patients who are not willing to participate.
2. Age less than 20 years and more than 40 years.

Methodology:-

The above study will be commenced after obtaining the institutional ethical committee clearance and obtaining written informed consent from the patient. All female patients satisfying the above inclusion & exclusion criteria will be included in the study. All the groups will be assessed with the help of the following variables like: - age, weight, height, BMI, menstrual irregularities, occupation, education, religion, family history, periods of infertility, type of infertility, age of menarche, obstetrics history, history of genital infection, history of abdominal or gynecological surgery, history of PCOS, Coital history, chronic medical disorder and addictions using the measurement method, scale and statistics.

Study Conduct:

This will be a descriptive cross-sectional study done in Pravara Rural Hospital Loin. All the patients satisfying the above inclusion criteria will be studied using predesigned interview & questionnaire. The interview will be conducted in the outpatient department by Principal Investigator. It would include the following:

1. Demographic Profile
2. Menstrual History & Marital History
3. Coital History, Past Obstetric History, History of treatment for infertility, Previous Gynecological history, Medical History, Surgical History, Family History, Drug History
4. General Examination
5. Systemic Examination & Pelvic Examination
6. Investigations

Sources of data collection would be hospital records.

Results:-

Table 1:- Age Distribution.

Age in years	Frequency	Percentage
<20	18	13.5
21- 30	105	78.9
>30	10	7.5
Total	133	100

In the present study, majority 78.9% were in age group of 21 to 30 years. Mean age in years was 24.28+4.7. Ranging from 19 to 43 years.

Table 2:- Distribution on socioeconomic status.

Socioeconomic status	Frequency	Percentage
Lower	18	13.5
Middle	36	27.06

Upper	79	59.3
Total	133	100

In the present study, majority 59.3% belonged to upper class, 27.06 were middle and 13.5% to lower class.

Table 3:- Duration of married life.

Duration of married life in years	Frequency	Percentage
<5	102	76.6
>5	31	23.3

In the present study, majority 76.6% had duration less than 5 years. Mean duration of married life in years was 4.37+2.6, ranging from 1 to 11.

Table 4:- Type of infertility.

Type of infertility	Frequency	Percentage
Primary	104	78.1
Secondary	29	21.8
Total	133	100

In the present study, majority 78.1% had primary type of infertility and 21.8% had secondary type.

Table 5:- Age at menarche.

Age at menarche in years	Frequency	Percentage
<14	82	61.6
>14	51	38.3
Total	133	100

In the present study, majority 61.6% attained menarche before 14 years of age. Mean age at menarche in years was 14+1.5, ranging from 12 to 16.

Table 6:- Clinical presentation.

Clinical presentation	Frequency	Percentage
Dysmenorrhea	88	66.1
Menorrhagia	30	22.5
Vaginal discharge	17	12.7
Dyspareunia	38	28.5
Oligomenorrhea	76	57.14
Hirsutism	83	62.4
Acne	71	53.3
Abortion	34	25.5

In the present study, most common complaint was dysmenorrheal 66.1%, hirsutism 62.4% and acne 53.3%.

Table 7:- History of frequency of sexual intercourse.

Frequency of sexual intercourse	Frequency	Percentage
Once a week	83	62.4
Twice a week	32	24.06
Occasionally	20	15.03
Total	133	100

In the present study, majority 62.4% had frequency of sexual intercourse once a week, 24.06% twice week and 15.03% occasionally.

Table 8:- Total live birth.

Total live birth	Frequency	Percentage
No	104	78.19
Yes	29	21.8

In this study, 21.8% had total live births.

Table 9:- Contraceptive use.

Contraceptive use	Frequency	Percentage
No	131	98.4
Yes	2	1.5
Total	133	100

In the present study, only 1.5% had history of contraceptive use.

Table 10:- Treatment history.

Treatment history	Frequency	Percentage
Ovulation induction	77	57.8
Laparoscopy	45	33.8
None	13	9.7
Total	133	100

In the present study, 57.8% had ovulation induction, 33.8% had laparoscopy done and 9.7% were not on any treatment.

Table 11:- Co-morbid condition.

Co-morbid condition	Frequency	Percentage
Endometriosis	10	7.5
Hypothyroidism	7	5.2
Pelvic Inflammatory Disease	18	13.5

In the present study, 13.5% had PID, 7.5% had endometriosis and 5.2% had hypothyroidism

Table 12:- Surgical history.

Surgical history	Frequency	Percentage
None	88	66.1
Laparoscopy	45	33.8
Total	133	100

In the present study, 33.8% had laparoscopy.

Table 13:- Family history

Family history	Frequency	Percentage
No	132	99.2
Yes	1	0.75
Total	133	100

In the present study, only 0.75% had family history of infertility.

Table 14:- BMI.

BMI	Frequency	Percentage
<18.5	22	16.5
18.5 to 24.9	55	41.3
25 to 29.9	56	42.1
Total	133	100

In the present study, majority 42.1% had raised BMI ranging 25 to 29.9. Mean BMI was 23.43+3.71, ranging from 15.5 to 28.4 kg/m^2

Table 15:- AMH Levels.

AMH	Frequency	Percentage
Decreased	26	19.5
Normal	107	80.4
Total	133	100

In present study, AMH was decreased in 19.5% females.

Table 16:- Hormonal Levels.

Hormones	Groups	Frequency	Percentage
LH	Normal	69	51.8
	Borderline	41	30.8
	Abnormal	23	17.2
FSH	Normal	87	65.4
	Borderline	25	18.7
	Abnormal	21	15.7
Prolactin	Normal	100	75.1
	Borderline	27	20.3
	Abnormal	6	4.5

In present study on hormonal investigation, 17.2% had abnormal LH, 15.7% had abnormal FSH, and 4.5% had abnormal prolactin levels.

Table 17:- Distribution on USG findings.

USG findings	Frequency	Percentage
Normal	24	18.04
PCOD	55	41.3
Fibroid	36	27
Ovarian cyst		
Simple	6	4.5
Chocolate cyst	4	3
Adenomyosis	1	0.75
Tubal block		
Corneal block	5	3.75
Hydrosalpinx	2	1.5

In present study, on USG findings, 41.3% had PCOD, 27% had fibroid, 4.5% had simple ovarian cyst, 3% had chocolate cyst, 0.75% had adenomyosis, 3.75% had cornual block and 1.5% had hydrosalpinx.

Table 18:- Final diagnosis.

Final diagnosis	Frequency	Percentage
PCOD	55	40.7
Endometriosis/ adenomyosis/ fibroid	47	34.8
Tubal block	7	5.2
Poor ovarian reserve	26	19.2
Unexplained	3	2.2

In present study on final diagnosis, 40.7% had PCOD, 34.8% had endometriosis, 5.2% had tubal block, 19.2% had poor ovarian reserve and 2.2% had unexplained reason.

Discussion:-

A cross sectional study was carried out amongst 133 females having infertility at Rural Medical College, Loni. Main aim of the study was to find the factors associated with infertility.

Demographic parameter

In present study mean age in years was 24.28+4.7. ranging from 19 to 43 years. Majority 78.9% were in age group of 21 to 30 years. Study by Bano A et al [(5)] had majority 47% cases in 26 to 30years, Singh S et al [(6)] had majority 52% cases in 26 to 30year, Dawle et al [(7)] had majority 35.5% cases in 26 to 30years and Boricha YG et al [(8)] had majority 40% cases in 26 to 30years. An important factor to be viewed seriously and considered differentially in the investigation and management of infertility is the age of the patient. There is a known reduction in the rate of fertility and fecundity with advancing age. In our study majority of patients of primary infertility 78.9% were in age group of 21 to 30 years and patients with secondary infertility belonged majorly to an older age group compared to that of primary infertility which was corresponding with other studies. While there is no universally accepted definition of advanced reproductive age, 35 years is considered as the limit in fertility terms (American Society of Reproductive Medicine 2006). A woman reaches her peak fertility potential at the age of 30. An equally important

consideration like age in the management and successful outcome of the problems of infertility is the period of infertility.

In present study majority 59.3% belonged to upper class, 27.06% were middle and 13.5% to lower class. F Grodstein et al [28]stated that approximately 70% of infertile women in his study were belonging to relatively high socio-economic status. In present study, majority 76.6% had duration less than 5 years. Mean duration of married life in years was 4.37+2.6, ranging from 1 to 11. Karla L. Bretherick et al [29]stated in their study that as the marital age increases, incidence of infertility increases.

In present study, 78.1% had primary type of infertility. 61.6% attained menarche before 14 years of age. Study by Panda SR et al [(1)] showed 64.9%, Benkism et al [(2)] 67.37%, Mishra S et al [(3)] 64%, and Nayak P et al [(4)] 69% had primary infertility. Study by Sami F et al [25] showed that 51.6% had primary infertility.

In present study, 21.8% had total live births. Dhont N et al [(13)] showed 13.8% had live births.

Primary infertility is a common distressing problem in India as is in other parts of the World. The present study clearly points at the fact that primary infertility is more dominating than secondary infertility in this area which was also observed in other studies like Panda S R[1], Benkism[2], Mishra S[3], Nayak P[4]

In present study, most common complaint was dysmenorrhea 66.1%, hirsutism 62.4%, and acne 53.3% and so on. Study by Sami F et al [25] showed that majority 74% had dysmenorrhea.

In present study, majority 62.4% had frequency of sexual intercourse once a week, 24.06% twice week and 15.03% occasionally. Only 1.5% had history of contraceptive use.

In present study, most common treatment taken was 57.8% had ovulation induction, 33.8% had laparoscopy done and 9.7% dint had any treatment. And 13.5% had PID, 7.5% had endometriosis and 5.2% had hypothyroidism

In present study, 33.8% had laparoscopy. The significance of endoscopic evaluation of infertile females is uncontested. Hysterolaparoscopy is now considered a gold standard hence investigation of a female is incomplete without hysterolaparoscopy.

In present study, only 0.75% had family history of infertility. Majority 42.1% had raised BMI ranging 25 to 29.9. Mean BMI was 23.43+3.71, ranging from 15.5 to 28.4 kg/m^2. B M Zaadstra et al [27]in their study concluded that body fat distribution in women of reproductive age seems to have more impact on fertility than age.

In present study, on hormonal investigation, 17.2% had abnormal LH, 15.7% had abnormal FSH, and 4.5% had abnormal prolactin levels. Study by Khmil M et al [24] showed that the LH/FSH ratio was 30.35% higher in women with infertility. In study by Shinde K et al [26] showed that FSH level in patients with normal AMH (mean and SD) is 7.11±6.42.

In present study, AMH was decreased in 19.5% females. In study by Shined K et al [26] showed that Low anti-mullein hormone (AMH) levels were found in 7 infertile women.

In present study, on USG findings, 41.3% had PCOD, 27% had fibroid, 4.5% had simple ovarian cyst, 3% had chocolate cyst, 0.75% had adenomyosis, 3.75% had cornual block and 1.5% had hydrosalpinx. Study by Several et al [(9)] showed 94.6%, Ramesh B et al [(10)] 76%, Jaya Krishnan K et al [(11)] 87.4% and Tsuji I [(12)] 78% had abnormal finding. Study by Sutaria R et al [(18)] showed 15% had tubal blocks and 3.3% had hydrosalpinx.

In present study on final diagnosis, 40.7% had PCOD, 34.8% had endometriosis, 5.2% had tubal block, 19.2% had poor ovarian reserve and 2.2% had unexplained reason. In study by Gandotra N [(14)] had 36.7% tubal factor, 21.7% had ovarian factor, 15% had uterine, 16.6% had peritoneal and 10% had unexplained reason and Saini DVK et al [(15)] showed had 22% tubal factor, 34% had ovarian factor, 10% had uterine, 20% had peritoneal and 14% had unexplained reason. Rajesh B et al [(10)] had 4.8%, 6.45%, Parvenu SA et al [(16)] had 18.4%, 1.6% and Samsudeen et al [(17)] had 10.1% and 5.06% had fibroid uterus and uterine anomaly respectively. 17.5%, 26.15%, 18.99%, 19.35% had PCOD in study by Solaria R et al [(18)], Several P et al [(9)], Shaba D et al [(19)], and parvenu et al [(16)]. Ahmed MS et al [(20)]

had endometriosis in 3.3%. In the present study majority of the cases had tubal cause (32.85%) of infertility which was also seen in Andorra N [21] and was followed by ovarian cause in both studies. In Saini DVK [22] the most common cause was ovarian followed by tubal cause of infertility. In all studies after tubal and ovarian factors the most common was peritoneal factor followed by uterine cause of infertility. Unexplained cause of infertility was seen in 13.04% in the present study which was comparable to that seen in the other two studies with 10% and 14%. Many studies have been done which showed that patients with normal tubal pathology on hysterosalpingography had been observed with defects in diagnostic hysterolaparoscopy. Hence diagnostic hysterolaparoscopy with chromopertubation is considered as the best diagnosed factor for tubal pathology [23]

Summary:

1. Majority 78.9% were in age group of 21 to 30 years. Mean age in years was 24.28+4.7. ranging from 19 to 43 years.
2. Majority 59.3% belonged to upper class, 27.06 were middle and 13.5% to lower class
3. Majority 76.6% had duration less than 5 years. Mean duration of married life in years was 4.37+2.6, ranging from 1 to 11.
4. 78.1% had primary type of infertility
5. 61.6% attained menarche before 14 years of age. Mean age at menarche in years was 14+1.5, ranging from 12 to 16.
6. Most common complaint was dysmenorrheal 66.1%, hirsutism 62.4%, acne 53.3% and so on.
7. Majority 62.4% had frequency of sexual intercourse once a week, 24.06% twice week and 15.03% occasionally.
8. 21.8% had total live births
9. Only 1.5% had history of contraceptive use
10. 57.8% had ovulation induction, 33.8% had laparoscopy done and 9.7% dint had any treatment
11. 13.5% had PID, 7.5% had endometriosis and 5.2% had hypothyroidism
12. 33.8% had laparoscopy.
13. Only 0.75% had family history of infertility
14. Majority 42.1% had raised BMI ranging 25 to 29.9. Mean BMI was 23.43+3.71, ranging from 15.5 to 28.4 kg/m^2
15. AMH was decreased in 19.5% females.
16. On hormonal investigation, 17.2% had abnormal LH, 15.7% had abnormal FSH, and 4.5% had abnormal prolactin levels.
17. On USG findings, 41.3% had PCOD, 27% had fibroid, 4.5% had simple ovarian cyst, 3% had chocolate cyst, 0.75% had adenomyosis, 3.75% had cornual block and 1.5% had hydrosalpinx.
18. On final diagnosis, 40.7% had PCOD, 34.8% had endometriosis, 5.2% had tubal block, 19.2% had poor ovarian reserve and 2.2% had unexplained reason.

Conclusion:-

Childbearing and family are considered a right of every human being. Infertility is a health problem that requires appropriate treatment strategy. In present study, it is found that female infertility is more common in the women between 21- 30yrs age. It is mainly seen in the upper socio-economic strata. Primary infertility still remains the leading cause. The most common cause is anovulation (PCOD, Low AMH) followed by endometriosis and tubal blockage. Hence female factors of infertility should be evaluated early and thoroughly starting from the history, examination and investigations. Poly Cystic Ovarian Disease (PCOD) is the major cause of female infertility which is increasing in rate due to lifestyle changes. PCOD is also easily treatable and the prognosis is good when compared to the other causes of infertility. PCOD may co-exist with other medical disorders like thyroid dysfunction and hyperprolactinaemia, which should be evaluated and treated accordingly for better results. The common associated risk factors also includes maternal age. Semen analysis plays a major role in evaluation of infertility and is an initial investigation though its not a part of this study.

Maintaining a healthy lifestyle, getting regular checkups with the doctor and maintenance of normal body weight can avoid fertility problems. The medical and socio-economic support of infertile women, which means easier access to medical services, higher insurance coverage, broader social support, and information are important requirements for resolving the problem.

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