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CASE-CONTROL STUDY ON RISK FACTORS OF FEMALE INFERTILITY IN THE SELECTED HOSPITAL, BHUBANESWAR, ODISHA

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Abstract:

Background: Infertility is a failure of women to conceive after one year of regular unprotected sexual relationships. It affects 10 to 14 percent of the population in India and high rates with one out of six couplesaffected in urban areas. Nearly 27.5 million couples suffer from infertility in India. [1]

Method: A case-control studywas conducted in the Dept of Obstetrics and Gynecological OPD, IMS and SUM Hospital, Bhubaneswar, Odisha. Women diagnosed with primary infertility were included as a case and primi mothers were included as a control. Women who conceived with infertility treatment were excluded from the study. A total of 100 cases and 100 controls were included for the study. Pretested self-structured questionnaires were used to collect the data. The data were entered and analyzed in SPSS version 21.

Results: Significant predictors of infertility identified in the study were age of women (p = 0.003, OR = 0.414), duration of married life (p = 0.000, OR = 15.4), BMI (p =0.020, OR = 1.166), history of thyroid disorder (p = 0.001, OR = 4.810), family history of infertility (p = 0.006, OR = 13.2), sleeping problem (p = 0.000, OR = 0.03), duration of attempting pregnancy (p = 0.001, OR = 0.06), any habituation (p = 0.006, OR = 0.07), frequency of menstrual cycle (p = 0.000, OR = 1.77), pattern of menstrual flow (p = 0.000, OR = 1.52), dysmenorrhoea(p = 0.000, OR = 0.31), history of PCOS (p = 0.000, OR = 16.5), food likes (p = 0.000, OR = 4.379), frequency of taking meat (p = 0.000, OR = 7.0), caffeine intake per day (p = 0.000, OR = 0.11), exposure to smoking (p = 0.008, OR = 0.21) and family environment (Stress) (p = 0.025, OR = 4.0).

Conclusion: Early Screening and treatment of risk factors will help in preventing the occurrence of infertility.

Keywords: Case-control,Infertility, Primimother, Risk factors.

Introduction:

Infertility is the failure of women to conceive after one year of regular unprotected sexual relationships. Infertility is classified into two i.e., Primary and Secondary. Primary Infertility, when there is no history of conception or pregnancy.Secondary Infertility, when the inability to conceive after one or more successful pregnancies.[2]Infertility is a serious health issue affecting approximately 8%–10% of couples worldwide.[3] Nearly60–80 million couples suffering from infertility every year worldwide, among them 15 to 20 million (25%) are in India. [4, 5]

According to the study conducted in central India, out of 570 women in the reproductive age group, 51 (8.9%) had primary infertility, leads the prevalence of primary infertility 8.9% in women with the age group of 15–49 years. [6]According to the report (2017)of World Population Prospects in India, the fertility rate has reduced by more than 50 percent, from 4.97 in 1975-80 to 2.3 in 2015-20. If the fertility rate dips more than this number, the population rate is expected to decline.[7]Advanced age of women,unhealthy food intake, sedentary lifestyle, stress, smoking, alcohol and caffeine intake,excessive and wrong use of birth control measures, medical condition such as polycystic ovarian syndrome, endometriosis, blocked fallopian tube, fibroids, sexually transmitted infection, hormonal imbalance, environmental factorslike silicone, volatile organic solvents, physical agents, chemical dust and pesticides leads to infertility.[8]

Masoumi SZ et al stated in their study that out of 1200 infertile men and women, 834 cases (69.5%) belongs to primary infertility and 366 (30.5%) couples belong to secondary infertility. The causes of female infertility found in the study were menstrual disorders, ovulation problems, uterine dysfunction, blockage or dysfunction of fallopian tubes, cervical factor and other diseases like obesity, thyroid diseases, and diabetes had the highest prevalence respectively.[9]Infertility is a morbidity that affects the women physically and emotionally. Treatments for Infertility is costly, time-consuming, difficult in terms of availability, accessibility, and affect the person emotionally. The majority of the cases of infertility occur due to modifiable causes. Identification of risk factors of infertility in particular geographical areaswill help to modify or reduce the risk of occurrence of Infertility. With that view,the investigator proposed this study to determine the risk factors of female infertility

Methods: Quantitative approach with non-experimental case-control design was adopted to study the risk factors of infertility in theDept of Obstetrics and Gynecological OPD, IMS and SUM Hospital, Bhubaneswar, Odisha. Women diagnosed with primary infertility were included as a case and primi mother were included as a control.Women who conceived with infertility treatment were excluded from the study.A total of 100 cases and 100 controls were included inthe study. Pretested structured questionnaires were used. The socio-demographic matched case and control selected in 1:1 ratio. Face to face interview techniques was used for data collection.The tools used to collect the data were 1. Socio-demographic questionnaire and 2. Risk assessment questionnaire. The tools were first prepared in the English language then translated into the local language (Odia) and back to English to maintain conceptual consistency. Informed written consent was taken from each participant. The data were entered and analyzed in SPSS version 21.

Results:

Table 1: Distribution of study participants according to their demographic characteristics

Demographic variables	Case (n=100) (%)	Control(n=100) (%)	p value	Odds ratio
Age(in yrs)				
>30	17(8.5%)	33(16.5%)	0.003	0.414
<30	83(41.5%)	67(33.5%)		
Educational status				
Lower than SSLC	47(23.5%)	16(8%)	0.503	-
Higher than SSLC	53(26.5%)	84(42%)		
Type of family				
Joint family	76(38%)	33(16.5%)	0.745	-
Nuclear family	24(12%)	67(33.5%)		
Occupation				
Housewife	84(42%)	84(42%)	1.0	-
Working	16(8%)	16(8%)		
Duration of married life				
≥3yrs	68(34%)	13(6.5%)	0.000	15.4
<3yrs	32(16%)	87(43.5%)		

The above table shows that there was no significant association found between educational status, type of family, and occupation with infertility. There was a statistically significant association found between infertility and age (p = 0.003, OR = 0.414) and duration of married life(p = 0.000, OR = 15.4).

Table 2: Distribution of study participants according to their physical factors

Physical Factor	Case(n=100) (%)	Control(n=100) (%)	p value	Odds ratio
BMI				
>25	33(16.5%)	30(155)	0.020	1.166
<25	67(33.5%)	70(35%)		
History of hypertension				
Yes	1(0.5%)	1(0.5%)	0.5	-
No	99(49.5%)	99(49.5%)		
History of diabetes				
Yes	4(2%)	4(2%)	0.5	-
No	96(48%)	96(48%)		
History of thyroid disorder				
Yes	35(17.5%)	10(5%)	0.001	4.810
No	65(32.5%)	90(45%)		
Family history of infertility				
Yes	93(46.5%)	0(0%)	0.006	13.2
No	7(3.5%)	100(50%)		

Sleeping problem Yes No	 3(1.5%) 97(48.5%)	 0(0%) 100(50%)	0.000	0.03
Duration of attempting pregnancy 1-3 yrs >3yrs	 36(18%) 64(32%)	 90(45%) 10(5%)	0.001	0.06
Any habituation Yes No	 7(3.5%) 93(46.5%)	 0(0%) 100(50%)	0.006	0.07

Above table shows that there was no significant association found between infertility with history of hypertension and history of diabetes.There was a statistically significant association found between infertility and BMI (p =0.020, OR = 1.166), History of thyroid disorder (p = 0.001, OR = 4.810), any family history of infertility (p = 0.006, OR = 13.2), Sleeping problem (p = 0.000, OR = 0.03), Duration of attempting pregnancy (p = 0.001, OR = 0.06) and any habituation (p = 0.006, OR = 0.07).

Table 3: Distribution of women according to their menstrual factors

Menstrual Factor	Case(n=100) (%)	Control(n=100) (%)	p value	Odds ratio
Frequency of menstrual cycle >35 days <35 days	 62(31%) 38(19%)	 48(24%) 52(26%)	0.000	1.77
Pattern of menstrual flow Irregular Regular	 26(13%) 74(37%)	 19(9.5%) 81(40.5%)	0.000	1.52
Dysmenorrhoea Yes No	 24(12%) 76(38%)	 50(25%) 50(25%)	0.000	0.31
History of PCOS Yes No	 35(17.5%) 65(32.5%)	 2(1%) 98(49%)	0.000	26.5

Above table shows that there was a statistically significant association found between the infertility and all menstrual factors i.e.,frequency of menstrual cycle(p = 0.000, OR = 1.77), pattern of menstrual flow (p = 0.000, OR = 1.52), dysmenorrhoea(p = 0.000, OR = 0.31) and history of PCOS (p = 0.000, OR = 16.5).

Table 4: Distribution of women according to their nutritional factors

Nutritional factor	Case(n=100) (%)	Control(n=100) (%)	p value	Odds ratio
Type of diet Vegetarian Non-vegetarian	 2(1%) 98(49%)	 6(3%) 94(47%)	0.227	-
Food likes				

Spicy Non-spicy	56(28%) 44(22%)	23(11.5%) 77(38.5%)	0.000	4.379
Preference of food for non-veg Meat Fish	 5(2.71%) 87(47.2%)	 23(12.5%) 69(37.5%)	 0.215	 -
Frequency of taking meat Always Occasionally	 24(13.04%) 68(36.9%)	 4(1.40%) 88(47.82%)	 0.000	 7.0
Frequency of taking fish Always Occasionally	 7(3.8%) 85(46.1%)	 3(1.63%) 89(48.36%)	 0.847	 -
Frequency of taking fruits Always Occasionally	 34(17%) 66(33%)	 82(41%) 18(9%)	 0.000	 0.11
Caffeine intake per day Always Occasionally	 33(16.5%) 77(38.5%)	 40(20%) 60(30%)	 0.151	 -

The above table shows that there was no significant association found between infertility with the type of diet, preference of food for non-veg, frequency of taking meat, frequency of taking fish, and caffeine intake per day. There was a statistically significant association found between infertility and food likes (p = 0.000, OR = 4.379), frequency of taking meat (p = 0.000, OR = 7.0) and caffeine intake per day (p = 0.000, OR = 0.11).

Table 5: Distribution of women according to their environmental factors

Environmental Factor	Case(n=100) (%)	Control(n=100) (%)	p value	Odds ratio
Exposure to smoking Yes No	 21(10.5%) 79(39.5%)	 55(27.5%) 45(22.5%)	 0.008	 0.21
Family environment (Stress) Yes No	 11(5.5%) 89(44.5%)	 3(1.5%) 97(48.5%)	 0.025	 4.0

Above table shows that there was significant association found between infertility with exposure to smoking (p = 0.008, OR = 0.21) and family environment (Stress) (p = 0.025, OR = 4.0).

Discussion:

In the present study,the demographic characteristics associated with primary infertility were age and duration of married life. This finding supported the study conducted by Gurevich who stated that as a woman's age increases above 35years (and especially after age 40 years), the conception rate is reducing upto 10% per month. And when the woman is approaching menopause, reproductive capabilities decline due to less effective production of mature and healthy eggs. And theovaries also respond less to the hormones responsible for ovulation. [10]

Bairdet al andGnothet al. reported that in the last two decades,the mean age of conception has increased and thisisan important cause for infertility. As the age of women increased, the reproductive capacity is declined. Less number of sexual intercourse and less responsive to the fertility hormones may be the reason behind that. Advanced age of woman may lead to complications like chromosomal abnormalities and miscarriage too.[11, 12]In the present study the physical factorsassociated with primary infertility were BMI, history of thyroid disorder, any family history of infertility, sleeping problem, duration of attempting pregnancyand any habits like smoking and alcohol.

Rossi BV et al stated that nutrition directly affects the fertility of the woman. Both under-nutrition and over-nutrition of the woman negatively affect fertility especially ovulation. There is anincreased relative risk of ovulatory dysfunction for BMI below 20.0 (undernourished) or above 24.0 kg/m2 (overnourished). Increase BMI and weight directly affect the reproductive function with the complications like amenorrhea, anovulatory cycle, sub-fertility, and infertility.Many studiesconducted on lifestyle factors shows that time to conception has increased in both overweight (BMI > 35) and underweight (BMI < 19) individuals. As compared to the underweight group, obese women are highly affected by infertility. The negative effect of obesityis caused by ovulatory dysfunction or by other mechanisms such as hormonal imbalance. And also found that smoking and alcohol use are also severely affecting fertility.[13]

In the present study, the menstrual factors associated with primary infertility were frequency of menstrual cycle,the pattern of menstrual flow, dysmenorrhoea, and history of PCOS.Eraky EM also stated in his study that more than half of the sample had menstrual irregularities and nearly half of the sample complained of menstrual abnormalities such as menorrhagia, dysmenorrheal bleeding, and inter-menstrual bleeding. And a statistically significant relation was found between menstrual irregularities, menstrual abnormalities, and secondary infertility (p=009, =0.02).[14]

In the present study, the nutritional factors associated with primary infertility were food likes, frequency of taking meat,and caffeine intake per day.Silvestris E et al stated that fertility directly affected by the type of nutrition and food preferences of the person. An excessive caloric and deficient protein intake directly affect the ovarian function with subsequent decrease infertility. These nutritional factors may affect oocyte maturation, quality of embryos, and effective implantation and thereby affects fertility. Anyhow, more information regarding the role of nutrition infertility is needed for the nutritional management of infertile women.[15]

In the present study, the environmental factors associated with primary infertility were exposure to smoking and family environment (Stress).Cong Jimei, et al. found that underweight, mild and heavy exercises, scanty and excessive menstruation, number of abortions, late-night sleep, and working in high-temperature environments were the risk factor for infertility.[16]

Conclusion:

The significant predictors of infertility identified in the study were age of women, duration of married life, BMI, History of a thyroid disorder, any family history of infertility, sleeping problem, duration of attempting pregnancy, any habituation, frequency of menstrual cycle,the pattern of menstrual flow, dysmenorrhoea, history of PCOS, food likes, frequency of taking meat, caffeine intake per day, exposure to smoking and family environment (Stress). Awareness programs shall be conducted to raise awareness of youth and adults about the risk factors of infertility.

Conflict of Interests: The authors declare they have no conflicts of interest.

Ethical Issues: Approved

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