ASSESSMENT OF INFERTILITY PROBLEMS AMONG FEMALE IN RAMANATHAPURAM, TAMILNADU

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Abstract:
Infertility is the inability to conceive after one year of unprotected intercourse. Identifiable factors affecting female infertility include hormonal or endocrine disturbances (menstrual or ovulatory disturbances), tubal factors (occlusions, pelvic adhesions and other tubal abnormalities), acquired non-tubal factors (cervical or uterine disturbances), sexual dysfunction and congenital abnormalities. The present research work aimed to study the infertility problem according to demographic and socioeconomic characteristics such as age, education, occupation, BMI and gynecological and clinical characteristics such as PCOS, menstrual irregularities, tubal factor, uterine factor endometriosis, cervical factor, immune factor among female in the study area Ramanathapuram in the State of Tamil Nadu, India.
Key Words: Infertility, Demographic, Socioeconomic, Gynecological, Clinical, PCOS & Menstrual Irregularities

Introduction:

Infertility is defined as the inability to conceive after one year of unprotected intercourse (Tietz, 2006). It is estimated that globally 60-80 million couples suffer from infertility every year, of which probably between 15-20 millions (25%) are in India alone (Sharath *et al*., 2013 and Chander *et al*., 2000). The female factors contribute almost half in the etiologies of infertility followed by male factors (30-40%), and the rest are attributed to a mixture of both or by problems unknown (Kanal and Sharma, 2006). The causes of infertility vary from one geographical area to another with social factors having an influence on the cause. In Africa, most infertile women have tubal infertility whereas in the Western world, it is either male factor infertility or ovulatory disorders (Stuart Campbell & Ash Monga, 2005). Ovulatory disorders (including ovarian and hormonal causes) account for approximately 30%, pelvic factors (including tubal, cervical, and uterine disease) account for approximately 50%, and immunological factors are implicated in approximately 5% of infertility case. Overweight and obesity is associated with various diseases, particularly cardiovascular diseases, diabetes mellitus type 2, obstructive sleep apnea, certain types of cancer, and osteoarthritis (Yamashita *et al*., 1996; Bjorntorp, 1991). Until recently, very few studies have understood the patterns and consequences of infertility in India. There are sparse data on the prevalence of primary infertility in India and almost none from southern India. Thus the purpose of the study is to identify and quantify some risk factors for female infertility and to calculate Odds Ratios. Therefore, this paper aimed to assess the infertility problem according to demographic and socioeconomic characteristics such as age, duration of infertility, education, occupation, BMI and gynecological and clinical characteristics such as PCOS, menstrual irregularities, tubal factor, uterine factor endometriosis, cervical factor, immune factor among female in the study area Ramanathapuram in the State of Tamil Nadu, India.

Materials and Methods:

The data of infertile female belongs to all communities of different socio economic status and medical assistance in private infertility clinic at Ramanathapuram. A total of 1030 cases and controls were selected at random. Size of the sample is around 1022 (511 cases and 511 controls) were selected and calculated. Sample of 1022 was rounded up to 1020 (510 cases and 510 controls). Therefore, 510 gynecological confirmed cases (infertile females) and 510 controls were selected from infertility clinic. These cases were diagnosed by Gynecologists in the infertility clinic. Data was collected using a pretested structured questionnaire including socio-demographic data and gynecological data. BMI was calculated to find the overweight and obesity. Data analysis was done by using SPSS 16 and Sigma Stat 3.5 software. A Chi square test was used to determine the association of various risk factors with primary infertility. Univariate analysis for risk calculation was done by odds ratio with 95% confidence interval. This study protocol was approved by ethics committee of a hospital. Before conducting the interview the investigator explained the purposes of this study, the risks and the benefits, and the voluntary nature of participation to the women and their informed consent was obtained. Privacy and confidentiality was ensured and conducted face to face interview to collect the data. Relevant gynecological

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history included questions about irregular menstrual cycle, PCOS, immune factor, endometriosis, tubal disorder, uterine disorder and cervical disorder. Health records were also verified.

Results:

The percentage of infertile women age around 18 to 44 yrs whoever faced infertility problem by demographic and socio economic characteristics (Age, duration of infertility, education, occupation, BMI) were given in Table 1 (Both cases and controls). Age, duration of infertility, occupation and BMI (over weight) (except education character) determine the association of various risk factors with significant effect on infertility among the studied 510 infertile women. The most prevalent infertility was higher in female who had the duration of fertility below 5 yrs (59.8 %). Among 510 infertility women, below 5 yrs (duration of infertility) 305 female were experienced and 205 female were faced this problem above 5 yrs (duration of infertility). Association with cases of infertility and controls according to clinical or gynecological characteristics (irregularity in menstrual cycle, Tubal factor, uterine factor, cervical factor, endometriosis, immune factor, PCOS) were given in Table 2. Distribution of gynecological and clinical characteristics of infertile female (case) based on age group in the study area were given in Table 3. In the present study the following infertility conditions respectively: Irregular Menstrual cycle (72.16%), PCOS (58.2%), Immune Factor (9.608%), Endometriosis (8.627%), Tubal Disorder (6.471%), Uterine Disorder (3.333%), Cervical Disorder (2.353%), Endometriosis & Immune Factor (1.765%), Tubal Disorder &Immune Factor (0.980%), Tubal Disorder & Endometriosis (0.784%), Uterine Disorder & Immune Factor (0.588%) and Uterine Disorder & Endometriosis (0.196%). Among all the above factors irregularity in menstrual cycle showed 72.16 % (368) in infertile female and 58.2 % (297) were affected with PCOS. In majority of the cases irregular menstrual cycle and PCOS were most prevalent risk factors than other factors. Irregular menstrual cycle and PCOS (126) risk factors were high between 21 to 25 age group. According to this infertility was higher among younger women below 25 yrs in the present study. Figure1explains the percentage of gynecological risk factors on female infertility in the study area. Unexplained factor also one of the reason for female infertility. Figure 2 depicts unexplained fertility in different age group. According to the present study, out of 510 infertile female, apparently 57 had unexplained or unknown factors.

Table 1: Association with cases of infertility and controls according to demographic and socio economic Characteristics

Risk Factors	Cases N=510 (%)	Controls N=510 (%)	Chi Square	P -Value	Odds Ratio	Confidence Limit
Age						
≤ 25	445 (87.3)	420 (82.4)	19.41	0.0002 Significant	1.467	1.04 – 2.07
>25	65 (12.7)	90 (17.6)				
Duration of fertility						
≤ 5 yrs	305 (59.8)	474 (93.14)	155.2	< 0.0001 Significant	0.113	0.08 – 0.17
>5 yrs	205 (40.2)	36 (6.86)				
Education						
Graduate	56 (11)	61 (11.9)	0.241	0.623 Not Significant	0.908	0.62 – 1.34
Below graduate	454 (89)	449 (88)				
Occupation						
Working	16 (3.13)	33 (6.5)	6.196	0.013 Significant	0.468	0.25 – 0.86
Housewife	494 (96.9)	477 (93.5)				
BMI						
≤ 18.5	8 (1.6)	9(1.8)	20.61	0.00013 Significant	0.526	0.398-0.696
18.6 - 24.9	327(64.1)	391(76.6)				
25 to 29.9	163(31.9)	103(20.2)				
> 30	12(2.3)	7(1.4))				

Table 1 Note: The present study showed that 87.3 % infertile female married before age twenty five as compared to control 82.4 %, with an estimated odds ratio OR was 1.467 (95% CL 1.04 – 2.07).

Duration of fertility below 5 yrs reported in 59.8 of the cases as compared to 93.14% with an estimated odds ratio OR was 0.113 (95% CL 0.08 – 0.17)

11% of primary infertility cases received educations of Graduation and compared to 11.9 % of the control and estimated OR of 0.908 (95% CL 0.62 – 1.34).

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Occupations other than housewives were observed in 3.13 % of cases compared to 6.5 % of controls, with an estimated OR of 0.468 (95% CL 0.25 – 0.86).

Over weight was reported in 31.9% of cases compared to 20.2% of controls and obesity was reported in 2.3% of cases compared to 1.4% with an OR 0.526 (95% CL 0.398-0.696).

Table 2: Association with cases of infertility and controls according to gynecological characteristics in the study area.

Risk Factors	Cases N=510(%)	Controls N=510 (%)	Chi Square	P -Value	Odds Ratio	Confidence Limit
Menstrual Cycle						
Regular	142(27.84)	471(92.4)	440.20	<0.001 Significant	0.032	0.02 – 0.05
Irregular	368(72. 16)	39 (7.6)				
Tubal factor						
Present	33(6.4)	6(1.2)	19.435	0.001 Significant	5.811	2.41 – 13.99
Absent	477(93.5)	504(98.8)				
Uterine factor						
Present	17(3.3)	7(1.4)	4.267	0.039 Significant	2.477	1.02 – 6.03
Absent	493(96.7)	503(98.6)				
Cervical factor						
Present	12(2.4)	11(2.2)	0.045	0.833 Not significant	1.09	0.48 – 2.50
Absent	498(97.6)	499(97.8)				
Endometriosis						
Present	44(8.6)	9(1.8)	24.38	0.0001 Significant	5.25	2.54 – 10.89
Absent	466(91)	501(98.2)				
Immune factor						
Present	49(9.6)	7(1.4)	33.33	<0.001 Significant	7.63	3.43 – 17.03
Absent	461(90.4)	503(98.6)				
PCOS						
Present	297(58.2)	36(7)	303.73	<0.001 Significant	18.359	12.53 –26.89
Absent	213(41.8)	474(93)				

Table 2 Note: About 72.16% of cases had irregular menstrual cycle compared to only 7.6 of controls, OR of 0.032 (95% CL 0.02 – 0.05).

Tubal factor were reported in 6.4% of infertile cases compared to 1.2% of controls, OR was 5.811, (95% CL 2.41 – 13.99).

About 3.3 of females with primary infertility had uterine factor compared to 1.4% of controls and an estimated OR of 2.477, (95% CL1.02 – 6.03).

Cervical factor were reported in 2.4% of infertile cases compared to 2.2% of controls, OR was 1.09, (95% CL 0.48 – 2.50).

Endometriosis was reported in 8.6 % of cases and 1.8% of controls and the estimated OR of 5.25, (95% CL 2.54 – 10.89).

Immune factor was reported in 9.6% of cases and 1.4 % of controls and the estimated OR of 7.63, (95% CL 3.43 – 17.03).

PCOS was reported in 58.2 % infertile female as compared to control (7) %, with an estimated odds ratio OR was 18.359(95% CL 12.53 – 26.89).

Table 3: Distribution of gynecological characteristics of infertile female (case) based on age group in the study Area

Risk Factors	Age (yrs)						Cases N=510	%
	≤ 20	21 – 25	26 – 30	31 – 35	36 – 40	>Above 40		
Irregular Menstrual cycle	33	150	124	43	17	1	368	72. 16
Tubal Disorder	0	9	19	2	3	0	33	6.471
Uterine Disorder	0	2	3	8	3	1	17	3.333
Cervical Disorder	0	0	12	0	0	0	12	2.353

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Endometriosis	0	5	21	9	9	0	44	8.627
Immune Factor	1	11	18	12	6	1	49	9.608
Tubal Disorder + Endometriosis	0	1	2	0	1	0	4	0.784
Tubal Disorder + Immune Factor	0	1	3	1	0	0	5	0.98
Uterine Disorder + Endometriosis	0	1	0	0	0	0	1	0.196
Uterine Disorder + Immune Factor	0	0	0	2	1	0	3	0.588
Endometriosis + Immune Factor	0	1	4	3	1	0	9	1.765

Table 3 Note: Approximately 72. 16, 9.608, 8.627, 6.471, 3.333, 2.353, 1.765, 0.980, 0.784, 0.588, and 0.196 had the following infertility conditions respectively: Irregular Menstrual cycle, Immune Factor, Endometriosis, Tubal Disorder, Uterine Disorder, Cervical Disorder, Endometriosis & Immune Factor, Tubal Disorder &Immune Factor, Tubal Disorder & Endometriosis, Uterine Disorder & Immune Factor and Uterine Disorder & Endometriosis.

Figure 1: Percentage of gynecological risk factors on female infertility in the study area
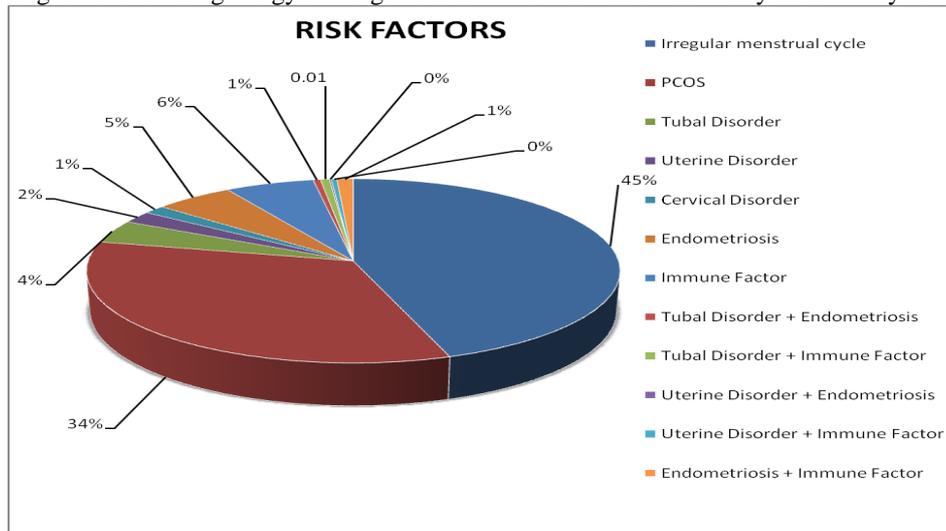
Note: Approximately 45%, 34%, 6%, 5%, 4%, 2%, 1%, 1%, 1%, 0.01%, 0%, and 0% had the following infertility conditions respectively: Irregular Menstrual cycle, PCOS, Immune Factor, Endometriosis, Tubal Disorder, Uterine Disorder, Cervical Disorder, Endometriosis & Immune Factor, Tubal Disorder &Immune Factor, Tubal Disorder & Endometriosis, Uterine Disorder & Immune Factor and Uterine Disorder & Endometriosis.

Figure 2: Unknown factors on female infertility based on age group on the study area
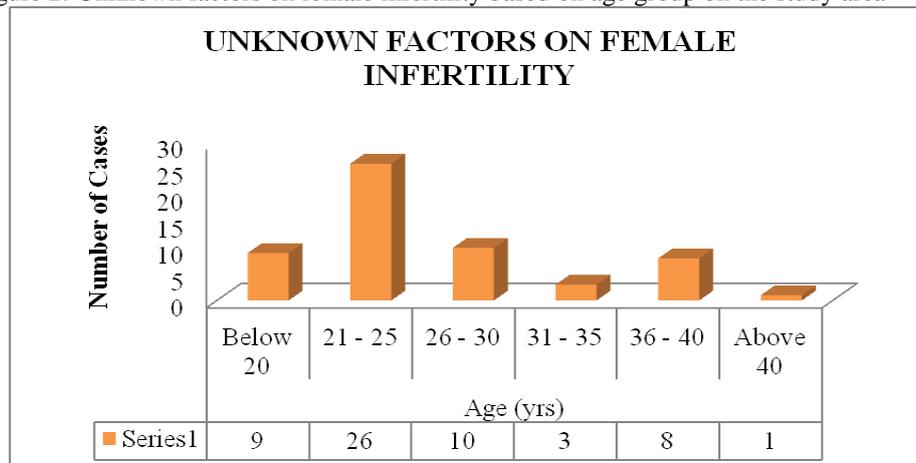
Note: Among 540 infertile female, 26 female between 21-25 yr had unknown factor.

Discussion:

Infertility is a major problem that is affecting women at an increased rate every year. The present study was set out to describe demographic, socio economic and clinical characteristics of infertile female in Ramanathapuram district. This study showed that primary infertility was higher among younger women at the

age group of 21-25 yr. The present study showed that 87.3 % of infertile female were below 25 years. This can be supported with similar study that reported that primary infertility was higher among younger women below 25 yrs and decreases as age of women increases. (Sarkar and Gupta, 2016). The most prevalent infertility was higher in female who had the duration of fertility below 5 yrs (59.8 %). Among 510 infertility women, below 5 yrs (duration of infertility) 305 female were experienced and 205 female were faced this problem above 5 yrs (duration of infertility). Women education was found to be significantly associated with the hazard risks of infertility. Among the infertile female they were associated with rural background with poor education. Among 510 infertile women 454 (89%) had lower basic level education. 11% of primary infertility cases had graduation. More than 75% of women have only basic education (at school level). The results of our study suggest that with decreasing levels of educational attainment among women, primary infertility rate increases. Sarkar and Gupta (2016) reported that higher level of infertility was estimated among the women who had lower level of education and uneducated or less educated women are not aware of their reproductive health consequences as they are getting into marriage and reproduction at early ages that may increase the possibility of infertility. Majority of study case 494 (96.9%) were housewives and 163 (31.9%) were in over weight. Due to lack of education there is no awareness about their diet especially healthy food. Marriage at below 20 years is common in the study area.

Among all the risk factors occurrence of irregular menstrual cycle factor (72.16) was high in infertility female. Similar findings were reported by Shamila in 2011, where she found menstrual irregularity among infertile females in the three study areas (40%, 44.85%, and 44.11% respectively). PCOS were detected in 58.2% of infertile female (510). Voluminous literature showed that the Polycystic ovarian syndrome (PCOS) was a significant risk factor associated with primary infertility (Mokhtar *et al*, 2006, Bablock, *et al*., 2011, Ajeet, 2014). A similar study conducted by Rajashekar (2008), revealed that, among (2270) infertility females seen in the last five years, 46.50% (1057) were PCOS patients and 84.76% of these females had primary infertility, most of whom 71.53% were in the age group of 21-30 years.

High proportion of uterine factor (8) was observed in the age group of 31-35 yr in the study area. Their occurrence of disorder increases with age. Our results are in conformity with those of Eldar Geva *et al*., 1998 who found the occurrence of uterine factor that increases with age. Out of 510 infertile women, only 2.4 % of cases with the age group of 26 to 30yr had cervical problem which is not significant effect on fertility. The present results revealed that endometriosis is the significant risk factors in female fertility. Among 8.6 % of endometriosis, higher proportion of endometriosis (21) were noted in the age group of 26-30 , followed by 9 in the age group of 31-35 and 9 in the age group of 36-40yr. Among 510 infertility women 9.6 % were faced the immune factor problem. Some female were affected by two factors in lower proportions such as Endometriosis & Immune Factor (1%), Tubal Disorder &Immune Factor (1%), Tubal Disorder & Endometriosis (0.01%), Uterine Disorder & Immune Factor (0%) and Uterine Disorder & Endometriosis (0%). Among 510 infertility women, gynecological characteristics such as tubal factor (19), endometriosis (21) and immune factor (18) observed in the age group of 26-30. A higher proportion of. tubal problems (19) observed in women with the age group of 26-30 yr.

Unexplained infertility that is idiopathic in the sense that its cause remains unknown even after an infertility assessment, usually including semen analysis in the man and assessment of ovulation and fallopian tubes in the women. 11. 2 % (26) of the cases in this study had unknown infertility in the age group of 21-25yr. Treatment of infertility is expensive for the families especially in developing countries and identifying the risk factors can be of great help to prevent infertility in females. Efforts are needed to give awareness of the causes and consequences of this condition. Our findings highlight the significance of infertility as a public health issue. These findings can be used to guide future reproductive health programmes in the area.

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