ASSESSMENT OF RISK FACTORS INVOLVED IN PRIMARY FEMALE INFERTILITY AMONG WOMEN'S OF REPRODUCTIVE AGE GROUP - A CROSS SECTIONAL STUDY

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ABSTRACT

Infertility is a condition of psychological, economic, medical implications resulting in trauma, stress, particularly in women of reproductive age group. There are several factors sequentially involved in the cause of infertility of which BMI, lifestyle factors, environmental factors, associated medical issues, stress, hormonal factors, contraception, male associates factors are considerably the primary ones. The main objective of the present investigation is to determine the risk factors of primary female infertility in women of fertile age group. Study executed with the sample size of 50 participants with the diagnosis of infertility as confirmed by laboratory findings. Data collected from all the participants including demographic characteristics like age, gender, literacy, occupation, marital status. anthropometric details (medical history and type of addictions), x-ray, hormonal abnormalities, family history of primary infertility, menstrual history, previous usage of contraceptive pills etc. Results of the study reveals some evidence based data's like 24% of women had previous treatment history for hormonal abnormality, 36% of women had family history of primary infertility, 16% of women were taken contraceptive pills for regulation of menstrual cycle, poly cystic ovarian syndrome (PCOS) and menorrhagia. 16% of women were taken contraceptive pills for regulation of menstrual cycle, PCOS and menorrhagia. On analyzing the male factors, it was noticed that 42% of women's partners had oligospermia, 22% of women's partners had Asthenozoospermia, 20% of women's partners had normal reports and 8% of women's partners had Teratozoospermia and only 2% of women's partners had Azoospermia. From the data's obtained from the present study it was concluded that PCOS, increased age, family history of infertility, being overweight, hormonal imbalances and tubal abnormalities were the major risk factors for primary female infertility. In addition to this male factors like oligospermia, premature ejaculation, and erectile dysfunction were also having some impact on primary female infertility.

KEY WORDS: *Female Infertility, Risk factors, Demographic characteristics, PCOS, Male factors.*

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1. Introduction

Infertility is a major problem in modern society and recurs in as much as 20–30% of the fertile female population. The American Society of Reproductive Medicine (ASRM) delineates infertility as the failure to conceive after one or more years of attempts of natural fertilization [1], with the World Health Organization (WHO) reporting up to 80 million women world-wide having been affected by this disease to date, with a prevalence of ~50% of all women in developing countries [2].

There are no reliable figures for global prevalence of infertility [3], but estimates suggest that nearly 72.4 million couples globally experience fertility problems [4]. As per the WHO estimates 60–80 million couples worldwide currently suffer from infertility [5]. It varies across regions of the world and is estimated to affect 8–12% of couples worldwide [6,7].

In India as per the WHO, the overall prevalence of primary infertility ranges between 3.9% and 16.8% [8]. Also, the estimates of infertility vary widely among Indian states from 3.7% in Uttar Pradesh, Himachal Pradesh, and Maharashtra [9], to 5% in Andhra Pradesh [10], and 15% in Kashmir [11]. Moreover, the prevalence of primary infertility has also been shown to vary across the tribes and castes within the same region in India [12].

Causes of infertility are numerous such as anatomical, physiological and genetic factors. Many environmental and acquired factors also influence fertility and may lead to infertility. Menstrual and ovulation dysfunction and uterine factors are the most common causes of impairment in fertility. Etiology of infertility prevalence and patterns of causes of infertility in different regions are diverse. This discrepancy is due to existence of differences in environmental conditions associated with reproductive behaviors, such as age at marriage, environmental pollution, smoking and alcohol abuse, changing in lifestyle and diet [13,14].

Besides lifestyle factors, woman's age is a major factor influencing the spontaneous probability of conception that already starts to decrease by 25–30 years of age. Given the age-correlated deterioration of the ovarian reserve and oocyte quality, it is expected that the global trend of postponing maternity will result in increasing involuntary childlessness. The improvement of oocyte vitrification resulting in pregnancy and live birth rate increases comparable to using fresh oocytes, which has offered a chance to cryopreserve oocytes for upcoming practice, presenting women with the possibility to delay their motherhood [15]. A stressful life, particularly in hard-working women, may contribute to cause infertility since symptoms related to anxiety and depression are described as more frequent in infertile than in fertile females. These features concur to produce a condition of psychological stress that may alter the physiological oocyte maturation [16]. Understanding the etiology may essential helpful in actually ruling out the underlying cause of infertility and proper knowledge adequately helps the affected individuals in successful overcome the primary issues involved in infertility. Hence the main objective of the present investigation is to determine the risk factors of primary female infertility in women of fertile age group.

2. Materials and Methods

2.1. Study design

Cross- Sectional study conducted in Aringnar Anna Government Hospital of Indian Medicine, Chennai at special outpatient department.

2.2. Study Approval

This study was approved by institutional ethical committee (IEC No: GSMC-CH-ME-2/025/2019) and registered in Clinical Trial Registry India (CTRI Register No: CTRI/2019/07/020172).

2.3. Sample Size

Sample size for this study was 50 participants with the diagnosis of infertility in the special outpatient department at Aringnar Anna Government Hospital of Indian Medicine, Chennai, Tamil Nadu, India. Study conducted during the period of July 2019 to September 2019.

2.4. Inclusion Criteria

Inclusion criteria consisted of women under reproductive age group and with confirmed diagnosis of primary infertility substantiated with the laboratory reports.

2.6. Exclusion Criteria

Exclusion criteria included women with psychiatric illness and lack of laboratory reports. The data were collected through a questionnaire and the questionnaire was filled by a paper and pen method. Infertility is defined as no pregnancy after 1year

unprotected coitus, primary infertility is defined as failure to achieve clinical pregnancy after 12 months or more unprotected coitus.

2.6. Data Collection

Data collected from all the participants including demographic characteristics like age, gender, literacy, occupation, marital status. anthropometric details (medical history and type of addictions), x-ray, hormonal abnormalities, family history of primary infertility, menstrual history, previous usage of contraceptive pills. The purpose of this study was fully explained to the participants and data were collected by interviewing questionnaire. The collected data were dealt with the high level of anonymity and confidentiality. Descriptive statistics and statistical analysis was performed using the software package SPSS version 26.

3.Results

3.1. Result Analysis on Socio demographic Impact on Study population

Result of the present study reciprocates that among 50 infertile women the mean age of the total study population was 30.6 (range: 20-40 years). High percentage was experienced among Degree holders that account 34% and very less prevalence was experienced among Diploma and Doctorate holders. 64% was estimated among home makers and salaried employees account 36 %. 44% of primary infertility was estimated among women married between five to ten years longer and very less percentage was estimated among women married more than 10 years longer. Details of socio demographic characters were briefed in Table 1.

3.2. Result Analysis on BMI, ultrasonogram and medication history in Study population

Results have clearly shown that the mean BMI of the total study population was 25.29 (SD: ± 4.4, range: 16.20-37.22). Among the total study population only 20% of women undergone pelvic x-ray. In this study all the study subjects were undergone ultrasonogram, 24% of women had previous treatment history for hormonal abnormality. Pelvic x-ray results, ultrasonogram results and hormonal abnormality were shown in table 2. 82% of women did not take any prescribed medications within the last year. 4% of women had taken medications for abdominal tuberculosis, 2% of women were taken medications

for rubella positive infection, 2% of women were taken medications for shoulder pain, 2% of women were taken medicine foe uterine fibroid, another 2% of women were taken medicine for hepatitis B infection, another 2% of women were taken medications for malarial fever, 2% of women were taken medications for PCOS, 2% of women were taken medications for both rubella and cytomegalo virus infections. Results were tabulated in Table 2.

3.3. Result Analysis on History of contraception and other assisted reproductive technique

Results clearly reflects that among the total study population 36% of women had family history of primary infertility. 84% of women did not take any contraceptive pills or IUD (Intrauterine device) before coming here for treatment. Remaining 16% of women were taken contraceptive pills for regulation of menstrual cycle, PCOS and menorrhagia. And this study also reveals that no women had a previous history of IUD usage. 68% of women did not undergo any assisted reproductive techniques. 24% of women undergone IUI (Intrauterine insemination), 6% of women were undergone IVF (In vitro fertilization), and 2% of women were undergone both IUI and IVF. No one had successive assisted reproductive technique results. 84% of women had previous infertility treatment history.

3.4. Result Analysis on Etiology and Medication history of in Study population

Among 84% of study population 82% of women were taken Allopathy medicine and only 2 % women were taken both Allopathy and siddha system of medicine for infertility. Only 94% of women partners had semen analysis, among them only 42% of women's partners had oligospermia, 22% of women's partners had Asthenozoospermia, 20% of women's partners had normal reports and 8% of women's partners had Teratozoospermia and only 2% of women's partners had Azoospermia. 26% of women's partners had premature ejaculation, 24% of women's partners had erectile dysfunction. After investigating demographic characteristics with etiological factors it was found that there was statistically significant relationship between age group with increased duration of infertility (P value: < 0.001) and there was statistically not significant relationship was found between ultrasonogram results with BMI (P value: 0.748),

ultra-sonogram results and increased duration of infertility (P value: 0.095).

4.Discussion

Overweight and obesity are diffused pathological conditions during the woman's reproductive age, with an incidence up to 20–25% among patients consulting for infertility. WHO estimates that 9% to 25% of females in industrialized countries are obese and at greater risk of generating obese children, particularly when affected by gestational diabetes. Through insulin resistance (IR) and high levels of insulin and androgens, the adipose tissue is responsible for ovulatory disorders in disposed patients and the anovulation associated to obesity is responsible for higher risk of miscarriages and infertility [17].

It was observed from the present investigation that Results have clearly shown that the mean BMI of the total study population was 25.29 (SD: ± 4.4, range: 16.20-37.22). Among the total study population only 20% of women undergone pelvic x-ray. In this study all the study subjects were undergone ultrasonogram, 24% of women had previous treatment history for hormonal abnormality. Pelvic x-ray results, ultrasonogram results and hormonal abnormality were shown in table 2. 82% of women did not take any prescribed medications within the last year. 4% of women had taken medications for abdominal tuberculosis, 2% of women were taken medications for rubella positive infection, 2% of women were taken medications for shoulder pain, 2% of women were taken medicine foe uterine fibroid, another 2% of women were taken medicine for hepatitis B infection, another 2% of women were taken medications for malarial fever, 2% of women were taken medications for PCOS, 2% of women were taken medications for both rubella and cytomegalo virus infections.

Globally 63% of women in the reproductive age group are reported to be using contraception, for a total of 716 million women worldwide [18]. While developed regions have shown little change in their contraceptive prevalence, there has been a significant increase in contraceptive use in developing countries. Available contraceptive methods both for men and women aim at inducing reversible infertility without interfering with hormones secreted by the hypothalamus, pituitary gland, and the testis or ovaries, targeting specific interactions within the reproductive system at the level of the ovaries and testes, as well as between spermatozoa and ova.

Results of our investigation clearly reflects that among the total study population 36% of women had family history of primary infertility. 84% of women did not take any contraceptive pills or IUD (Intrauterine device) before coming here for treatment. Remaining 16% of women were taken contraceptive pills for regulation of menstrual cycle, PCOS and menorrhagia. And this study also reveals that no women had a previous history of IUD usage. 68% of women did not undergo any assisted reproductive techniques. 24% of women undergone IUI (Intrauterine insemination), 6% of women were undergone IVF (In vitro fertilization), and 2% of women were undergone both IUI and IVF. No one had successive assisted reproductive technique results. 84% of women had previous infertility treatment history.

Principle infertility treatment initially includes preconception guidelines and the use of drugs to induce mono- or bifollicular ovulation. Other therapeutic modalities may also be employed, such as exogenous gonadotropins or laparoscopic ovarian drilling, which are considered to be second-line treatments, or in vitro fertilization (IVF), which is a third-line treatment [19]. Thus, the choice of the most appropriate treatment depends on the patient's age, presence of other factors associated with infertility, experience and duration of previous treatments and the level of anxiety of the couple.

Male infertility refers to a male's inability to result pregnancy in a fertile female. The most significant of these are low sperm concentration (oligospermia), poor sperm motility (asthenozoospermia), and abnormal sperm morphology (teratozoospermia). Other factors less well associated with infertility include semen volume and other seminal markers of epididymal, prostatic, and seminal vesicle function [20]. As high as 90% of male infertility problems are related to count and there is a positive association between the abnormal semen parameters and sperm count [21]. The problem with sperm count, motility, and morphology stems from disarray in control mechanism, including pre-testicular, testicular, and post-testicular factors [22]. Our study also substantiates that only 94% of women partners had semen analysis, among them only 42% of women's partners had oligospermia, 22% of women's partners

had Asthenozoospermia, 20% of women's partners had normal reports and 8% of women's partners had Teratozoospermia and only 2% of women's partners had Azoospermia. 26% of women's partners had premature ejaculation, 24% of women's partners had erectile dysfunction.

5.Conclusion

Infertility is one of the major health care problems in all societies worldwide. The average prevalence of infertility in developed countries is 3.5-16.7% and in developing countries is 6.9-9.3%. The World Health Organization declares infertility as a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months of regular unprotected sexual intercourse. The main disorders involved in infertility include pathologic spermiogram, ovulation problems/anovulation, tubal diseases, pelvic adhesion/endometriosis, cervical factors and other idiopathic reason. From the data's obtained from the present study it was concluded that PCOS, increased age, family history of infertility, being overweight, hormonal imbalances and tubal abnormalities were the major risk factors for primary female infertility. In addition to this male factors like oligospermia, premature ejaculation, and erectile dysfunction were also having some impact on primary female infertility.

Acknowledgement

6. References

1. Habbema JD, Collins J, Leridon H, Evers JL, Lunenfeld B, te Velde ER. Towards less confusing terminology in reproductive medicine: a proposal. Hum Reproduc. (2004) 19:1497–501.

2. Ombelet W, Cooke I, Dyer S, Serour G, Devroey P. Infertility and the provision of infertility medical services in developing countries. Hum Reproduc Update. (2008) 14:605–21.

3. Mascarenhas MN, Cheung H, Mathers CD, Stevens GA. Measuring infertility in populations: Constructing a standard definition for use with demographic and reproductive health surveys. Popul Health Metr. 2012;10:17.

4. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: Potential need and demand for infertility medical care. Hum Reprod. 2007;22:1506–12.

5. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004. World Health Organization. Infecundity, Infertility, and Childlessness in Developing Countries. DHS Comparative Reports No 9.

6. Sciarra J. Infertility: An international health problem. Int J Gynaecol Obstet. 1994;46:155–63.

7. Population Council. New Delhi: Population Council; 2004. Infertility. Looking Back, Looking Forward: A Profile of Sexual and Reproductive Health in India; pp. 67–72.

8. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004. World Health Organization. Infecundity, Infertility, and Childlessness in Developing Countries. DHS Comparative Reports No 9.

9. Talwar PP, Go OP, Murali IN. New Delhi: National Institute of Health and Family Welfare and Indian Council of Medical Research; 1986. Prevalence of infertility in different population groups in India and its determinants. Statistics and Demography.

10. Unisa S. Childlessness in Andhra Pradesh, India: Treatment-seeking and consequences. Reprod Health Matters. 1999;7:54–64.

11. Zargar AH, Wani AI, Masoodi SR, Laway BA, Salahuddin M. Epidemiologic and etiologic aspects of primary infertility in the Kashmir region of India. Fertil Steril. 1997;68:637–43.

12. Kumar D. Prevalence of female infertility and its socio-economic factors in tribal communities of Central India. Rural Remote Health. 2007;7:456.

13. Macaluso M, Wright-Schnapp T, Chandra A, Johnson R, Satterwhite C, Pulver A, et al. A public health focus on infertility prevention,detection, and management. Fertil Steril. 2010;93:16.

14. Safarinejad M. Infertility among couples in a population-based study in Iran: prevalence and associated risk factors. Int J Androl. 2008;31:303–314.

15. Vander Borght M, Wyns C. Fertility and infertility: definition and epidemiology. Clin Biochem. (2018) 62:2–10.

16. Klonoff-Cohen H, Natarajan L. The concerns during assisted reproductive technologies (CART) scale and pregnancy outcomes. Fertility Steril. (2004) 81:982–8.

17. WHO Obesity and Overweight. Geneva (2013).

18. United Nations (UN) World Contraceptive Use 2007 [wall chart] New York: UN Department of Economic and Social Affairs, Population Division; 2008.

19. Thessaloniki ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group (2008) Consensus on infertility treatment related to polycystic ovary syndrome. Hum Reprod. 2013;23(3):462–77.

20. Harris ID, Fronczak C, Roth L, Meacham RB. Fertility and the aging male. Rev Urol. 2011;13:e184–90.

21. Sabra SM, Al-Harbi MS. An influential relationship of seminal fluid microbial infections and infertility, Taif Region, KSA. World J Med Sci. 2014;10:32–7.

22. Wamoto TI, Nozawa S, Yoshiike M. Semen quality of Asian men. Reprod Med Biol. 2007;6:185–93.

Table 1: Impact of Socio demographic characters on Study population

Variables	Groups	Frequency	Percentage
Age group	20-25	6	12
	26-30	19	38
	31-35	20	40
	36-40	5	10
Educational qualification	5th-10th standard	15	30
	11th-12th standard	6	12
	Diploma	2	4
	Degree	17	34
	Post graduate	8	16
	Doctorate	2	4
Occupation	Home maker	32	64
	Assistant professor	4	8
	Software engineer	5	10
	Account executive	2	4
	Technical assistant	2	4
	Cooley	5	10
Duration of infertility	<5 years	22	44
	5-10 years	23	46
	>10 years	5	10

Table 2: Risk factors for primary female infertility

Variables	Groups	Frequency	Percentage
BMI	Under weight	3	6
	Normal	25	50
	Over weight	15	30
	Obesity	7	14
Ultra sonogram results	Bilateral poly cystic ovaries	38	76
	Normal	10	20
	Unilateral salphingitis	2	4
Results of the pelvic x-ray	Normal	2	4
	Bilateral tubal block	4	8
	Bilateral fimbrial block	1	2
	Unilateral tubal block	3	6
	Not taken	40	80
Hormonal abnormality	Hypothyroidism	9	18
	Hyperthyroidism	1	2
	Increased Anti Mullerian Hormone	1	2
	Increased FSH,LH levels	1	2
	No abnormality	38	76

BMI: Normal weight: 18.5-24.9kg/m^2; Overweight: 25.0-29.9kg/m^2; Class I obesity: 30.0- 34.9 kg/m^2; Class II or III obesity: $\geq$ 35 kg/m^2.