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Female Factors related with Infertility and Their Pregnancy Outcome after Intrauterine Insemination: Experience of 790 Cases in Bangladesh

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Abstract

Background: Several female factors are related with the cause of infertility. **Objectives:** The purpose of the present study was to assess female factors related with infertility and their pregnancy outcome after intrauterine insemination. **Methodology:** This prospective cohort study was carried out at a private infertility centre (Central Hospital Limited, Dhaka) in Dhaka city of Bangladesh from January 2012 to December 2017 for a period of 6 years. Infertile couples who already had undergone natural cycles of super-ovulation for six months or whose duration of infertility was more than one year were included. Infertile women were evaluated and the causes of infertility were assessed. The follow up was performed to see the pregnancy outcome. **Result:** A total number of 790 women were recruited. The mean age with standard deviation of study population was 28.94±5.386 years. Among 790 infertile women 12 women were become pregnant after IUI. Among these 12 women female factors of infertility was present in 8(66.7%) cases and the rest 4(33.3%) cases were absent. However, 778 women could not pregnant after IUI and among these 277(35.6%) cases had the presence of female factors and the rest 501(64.4%) cases had absence of female infertility causes. The presence of female factor had 3.62 (95% CI 1.08-12.12) times more risk to become pregnant among the infertile women after IUI (p=0.026). Among 790 infertile women 285(36.1%) women had presence of female infertility factors. **Conclusion:** In conclusion female factors are significantly related with infertility and their pregnancy outcome after intrauterine insemination. [*Journal of Current and Advance Medical Research 2019;6(2):87-91*]

Keywords: Female factors; infertility; pregnancy outcome; intrauterine insemination

Introduction

Intrauterine insemination with husband's sperm (IUI-H) is the oldest first-line approach for treatment of infertile couples[1]. This is applied when at least one healthy fallopian tube is diagnosed. It is widely used around the world[2]. Despite various modern treatment options with higher success rates, it would be economical to consider the least expensive treatment for subfertile couples before undergoing expensive and invasive techniques like in vitro fertilization (IVF) and intracytoplasmic sperm injection[3].

Intrauterine insemination (IUI) is a simple noninvasive technique used as a first-line treatment for many subfertile couples[4]. Subfertile couples with indications like male factor subfertility, unexplained subfertility, endometriosis related complications, and others are widely treated with IUI to enhance the probability of conception using either the partner's sperm or donor sperm[5]. In case of unexplained infertility, IUI is usually accompanied with controlled ovarian hyperstimulation using clomiphene citrate/human chorionic gondatotropi (HCG)/human menopausal gonadotropin (HMG), to increase the probability of fertilization[6].

It is difficult to decide on either the seminal or the female parameters having a higher conception potential due to the heterogeneity of the patient sample population[7]. Previous researches have analyzed the relationship among environmental, socioeconomic and lifestyle factors, and pregnancy outcome (PO) following treatment in subfertile couples with unexplained subfertility[8]. This present study was undertaken to assess female factors related with infertility and their pregnancy outcome after intrauterine insemination.

Methodology

This prospective cohort study was carried out at a private infertility centre (Central Hospital Limited, Dhaka) in Dhaka city of Bangladesh. This study was carried out from January 2012 to December 2017 for a period of 6 years. Non-probability convenient sampling technique was applied and was comprised infertile couples. Infertile couples who already had undergone natural cycles of super-ovulation for six months or whose duration of infertility was more than one year were included. Similarly, cases where hysterosalpingography (HSG) showed patent fallopian tubes or husband semen analysis demonstrated sperm count of less

than 5million were also included. Cases in which the age of woman was more than 45 years, fallopian tubes were blocked or sperm concentration was less than 5 million were excluded. Also excluded were cases which showed follicular count of more than 10 in a cycle as they were associated with risk of ovarian hyperstimulation syndrome (OHSS), in which cycles were converted into natural cycles. After informed consent, all couples were inquired about, age, duration of infertility, type of infertility, indication of IUI and the number of previous IUI attempts. Semen samples were collected by the process of masturbation in semen production room after three days of abstinence in sterile, labelled container. Written as well as verbal instructions were given for the production of sample to get good recovery of semen sample. After production all samples were placed in an incubator at 37 degrees Celsius for 30 minutes for liquefaction. Routine semen analysis was performed using World Health Organizations' (WHO) semen analysis criteria like sperm concentration $>15 \times 10^6$ spermatozoa/ml, total sperm count 39×10^6 per ejaculate or more, motility 35.0% or more with forward progression, and morphology 14% or more with normal form. Sperm motility was assessed by microscope appraisal of 200 spermatozoa from different fields. Mecklar counting chamber (SEFI medical instruments) was used for counting of spermatozoa. Then the samples were randomly assigned to be processed either with swim-up or density-gradient procedure. Before preparation, all media were incubated at 37°C for 15 minutes. After liquefaction, 1ml of semen was placed in 15ml labelled conical tube (BD Falcon) and 2ml of medium (GMOP-PLUS, Vitrolife) was overlaid on the semen sample. The tube was incubated at 37°C for 45-60minutes to allow progressively motile sperm to swim into the overlaid medium. Taking care not to disrupt the interface, the overlaid medium was then collected and mixed with 2-3ml of medium (GMOP-PLUS) and centrifuged at 300g for 10 minutes. Then the supernatant was removed and the pellet was re-suspended in 0.3-1ml of fresh medium (GMOP-PLUS, Vitrolife). The follow up was performed to see the pregnancy outcome. SPSS version 21 was used for data analysis. Descriptive statistics like mean and standard deviation (SD) were calculated for pre- and post-preparative sperm count and motility for both days while frequency and percentage for successful outcome and fecundity. Pre- and post-preparative sperm count were compared for statistical difference using Mann-Whitney U test for each procedure while Fisher's exact test was applied to measure the difference between conceived and non-conceived group for

parameters of success. P<0.05 was considered statistically significant.

Result

A total number of 790 women were recruited after fulfilling the inclusion and exclusion criteria. Majority of the study population were in the age group of 20 to 40 years which was 732(92.7%) cases followed by 41(5.2%) cases and 17(2.2%) cases respectively. The mean age with standard deviation of study population was 28.94±5.386 with the range of 19 years to 46 years (Table 1).

Among 790 infertile women 12 women were become pregnant after IUI. Among these 12 women female factors of infertility was present in 8(66.7%) cases and the rest 4(33.3%) cases were absent. However, 778 women could not pregnant after IUI and among these 277(35.6%) cases had the presence of female factors and the rest 501(64.4%) cases had absence of female infertility causes.

Table 1: Age Distribution among the Study Population

Age Group	Frequency	Percent
Less Than 20 Years	41	5.2
20 to 40 Years	732	92.7
More Than 40 Years	17	2.2
Total	**790**	**100.0**
Mean±SD	28.94±5.386 (19 to 46)	

The presence of female factor had 3.62 (95% CI 1.08-12.12) times more risk to become pregnant among the infertile women after IUI. The difference between the pregnancy outcome and presence of female factors was statistically significant (p value 0.026) (Table 2).

Table 2: Association of Female Factors of Infertility and Pregnancy Outcome after IUI

Female Factor	Outcome		Total	Crude OR (95% CI)	P value
	Pregnant	**Not Pregnant**			
Present	8(66.7%)	277(35.6%)	285(36.1%)	3.62 (1.08-12.12)	0.026
Absent	4(33.3%)	501(64.4%)	505(63.9%)		
Total	**12(100.0%)**	**778(100.0%)**	**790(100.0%)**		

Pearson Chi-Square was performed corrected by Fisher's Exact Test to measure the level of significance.

Among 790 infertile women 285(36.1%) women had presence of female infertility factors. Among 285 women PCOS was the most common female infertility factors which was 116(40.7%) cases

Table 3: Female Factors Responsible for Infertility

Factors	Frequency	Percent
Oligomenorrhea	22	7.7
Fibroid	21	7.4
Tubal Block	14	4.9
IUD	9	3.2
Endometriosis	32	11.2
PCOS	116	40.7
Os Tight	3	1.1
Unexplained	27	9.5
Hypothyroidism	11	3.9
Ovarian Cyst	10	3.5
Others	20	7.0
Total	**285**	**100.0**

followed by endometriosis, unexplained causes, oligomenorrhea and fibroid which were 32(11.2%) cases, 27(9.5%) cases, 22(7.7%) cases and 21(7.4%) cases respectively. Tubal block was found in 14(4.9%) cases. Hypothyroidism was found in 11(3.9%) cases. Intrauterine device users were in 9(3.2%) cases. Ovarian cyst was in 10(3.5%) cases. Others factors were in 20(7.0%) cases (Table 3).

Discussion

Despite technical improvements in sperm preparation and controlled ovarian stimulation, the success rates with IUI-H have been limited[9]. It has been found that a pregnancy rate per cycle (PR) is 12.4% after IUI-H compared with 28.9% after IVF and this pregnancy rate per cycle (PR) has been relatively stable from year to year[10]. Several factors such as women's age and indication, the number of mature follicles obtained, and the sperm quality have been reported to influence the PR after IUI-H, and no consensus has established IUI-H over IVF as a first line of treatment. This present study has been analyzed IUI-H cycles to determine

which prognostic factors contribute to positive pregnancy outcomes.

Treatments other than assisted reproductive technology (ART), such as IUI-H, are the most commonly used. In Europe, 162,843 IUI-H cycles were performed in 2009 compared with 135,621 cycles of classic in vitro fertilization (IVF) during the same period[11]. Treatment with IUI-H is shorter, less invasive, and less expensive with a lower multiple delivery rate (10.4% vs. 20.2%) and lower morbidity than IVF[12]. The pregnancy rate per cycle (PR) with IUI-H is otherwise comparable to that observed after IVF with mild ovarian stimulation.

Secondary infertility of women appears to be a positive predictive factor of successful pregnancy. Women who have already become pregnant with normal or pathological pregnancies, for the present couple or otherwise had a greater chance of achieving a pregnancy after IUI than those with primary infertility[13]. These results disagree with some studies that has been concluded that whether the infertility is primary or secondary has no significant impact on the IUI outcome. The impact of secondary infertility on pregnancy rates has, however, been studied in IVF. It has been showed that the chances of pregnancy are higher in cases of secondary infertility than in cases of primary infertility[14].

The woman's age is another prognostic factor of pregnancy that was highlighted in this work. It has been found that PR is decreased after age 30, with a statistically significant decrease after 40 (5.4%). Many studies have shown that an increase in the woman's age leads to a decrease in the PR, significantly so after 40 years old[15]. The European data has shown a childbirth rate/cycle of 10.5% among women aged <40 years old and 5.5% in those older than 40[16]. Even if the pregnancy rate is lower in patients older than 36 years, one should consider up to four IUI attempts in women aged 36 to 38 years if the time lapse to perform these four attempts does not overtake 1 year. For ages 39 and 40, IUI could be a legitimate line of treatment in women with secondary infertility who present with a good ovarian reserve, but it should be limited to two to three attempts. No IUI cycle should be proposed in women after 40 years[17].

This analysis has been showed that the pregnancy rates in younger aged females are significantly higher than that in the older aged females. Similarly, younger aged males have a significantly higher success rates in IUI as compared to older aged males. Various studies have reported that a higher pregnancy rate is seen in the younger women than those of the older women[11]. In agreement to the previous studies, this study population also showed least pregnancy rate among females of age group 40 years and above. Women in the age groups of less than 25 years had a higher chance of pregnancy. This could be due to the lowered uterine receptivity as the age of the female increases[9]. The presence of any menstrual irregularities in the female partners significantly reduced the success of IUI. Types of infertility and bathing conditions in male did not significantly affect the outcome of IUI in this study.

Infertility due to ovulation disorder was also one of predictive parameters found in this study. It has been obtained the best PR in PCOS (25.4%) and in idiopathic ovulation disorders (20.8%). Comparable results have been given in the literature[5,8]. Ovarian reserve status seems to influence the outcome of IUI attempts. Indeed, it has been observed a significant decrease of PR when the basal FSH levels were >7 IU/L, probably indicating a diminished ovarian reserve.

Conclusion

In conclusion female factors are significantly related with infertility and their pregnancy outcome after intrauterine insemination. There are several female factors are reported in this study. The most common is the PCOS followed by endometriosis, unexplained causes, oligomenorrhea and fibroid. Large scale study should be conducted in multi-center basis.

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