

# Intrauterine Insemination: A Retrospective Review on Outcome and Predictors of Success

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## ABSTRACT

**Aims & Objectives:** To assess the outcome of IUI among infertile couples seeking care at a tertiary hospital and to identify the predicting factors that can influence the IUI outcome.

**Materials and Methods:** This record based cross sectional analytical study was conducted in the Department of OBG, ESIC Medical College, PGIMSR and Model Hospital, Rajajinagar, Bengaluru. For the retrospective study data was collected from the registers maintained in the Department of OBG. A total of 114 patients undergoing 145 stimulated cycles between January 2018 and December 2021 were studied.

**Results:** There were overall 22 pregnancies. The clinical pregnancy rate per cycle was 15.2%. The pregnancy rate per couple was 19.3%. Of these 15 pregnancies resulted in live births (68.2%), 3 (13.6%) resulted in miscarriage, 2 (9%) pregnancies were biochemical and 1 (4.5%) was ectopic pregnancy. There was one quadruplet pregnancy.

**Conclusion:** There was a trend towards decreasing pregnancy rates as age of the woman increased and as the duration of infertility increased. Also, pregnancy rates were higher in women who had  $\geq 3$  or more follicles. Careful patient selection criteria along with successful ovarian stimulation enhances the treatment outcome.

**KEYWORDS:** Intrauterine insemination, pregnancy rate, infertility, predictive factors

## INTRODUCTION AND NEED FOR THE STUDY

Intrauterine Insemination (IUI) is one of the first treatment modalities chosen by subfertile couples in recent times. The fact that IUI is simple, inexpensive, easy and affordable makes couples and clinicians opt for this treatment before attempting other sophisticated assisted reproductive technologies like In vitro fertilisation and ICSI. IUI is recommended for treatment of infertility due to cervical factors, ovulatory dysfunction, mild to moderate endometriosis, immunological causes, male factor and unexplained infertility<sup>(1)</sup>.

Controlled ovarian stimulation together with IUI remains the mainstay of infertility treatment. The pregnancy rates per IUI cycle are quite variable in literature ranging from 8-20%.

The present study is planned to assess the outcome of IUI and to identify prognostic factors that can influence the IUI outcome. This is needed for planning effective infertility treatment and improving pregnancy outcomes.

## Aims and Objectives

- i) To assess the outcome of IUI among infertile couples seeking care at ESIC Model Hospital & PGIMSR, Bangalore.

- ii) To identify the predicting factors that can influence the IUI outcome.

## **MATERIALS AND METHODS**

This record based cross sectional analytical study was conducted in the Department of OBG, ESIC Medical College, PGIMSR and Model Hospital, Rajajinagar, Bengaluru. For the retrospective study data was collected from the registers maintained in the Department of OBG. The study included 114 individuals who had 145 stimulation cycles between January 2018 and December 2021.

A detailed history including baseline characteristics, menstrual, obstetric, coital and medical history was taken. Ovulatory dysfunction, endocrine disorders, male factor, combination male and female factor, and unexplained infertility were among the common aetiologies.

Male factor infertility was defined as semen concentration <16 million sperms/ml, morphology < 4%, and total motility (a + b) < 42 %. (WHO 2021 reference values).

Couples whose results from a routine infertility evaluation were normal (standard tests include a normal semen analysis, ovulatory cycles, and an HSG or laparoscopy indicating patent tubes) were regarded to have unexplained infertility.

After taking informed consent, ovulation induction was done either with clomiphene citrate alone or in combination with gonadotropins. Assessment of follicular development was performed using transvaginal ultrasound. When at least one dominant follicle measuring  $\geq 18$  mm with an endometrial thickness of  $>7$  mm was achieved, human chorionic gonadotropin trigger was administered. IUI was done post 36 hrs of trigger. The preferred technique for preparing sperm was the double density gradient approach. Natural micronized progesterone vaginal pessaries were given to all women for luteal support.

### **Inclusion criteria**

1. Age 20-40 years

2. Women with infertility i.e.; seeking treatment after 1 year of unprotected intercourse.
3. Normal uterine cavity by transvaginal scan
4. At least one patent tube as demonstrated by hysterosalpingogram
5. Male factor infertility (Oligoasthenoteratospermia)

### **Exclusion criteria**

1. Severe endometriosis
2. Abnormal uterine bleeding
3. Pelvic Inflammatory Disease
4. Bilateral Tubal Block
5. H/o ovarian surgery

## **STATISTICAL ANALYSIS**

Data was entered into Microsoft Excel and statistical analysis was carried out in SPSS software version 20.0. Qualitative variables were presented as frequency and percentages. Quantitative variables were presented as mean or median (range) depending upon the distribution of data.

## **RESULTS**

A total of 145 stimulated IUI cycles done in 114 women were evaluated. Of the total COH/IUI cycles analysed, 112 were 1<sup>st</sup> treatment cycles, 27 were 2<sup>nd</sup> treatment cycles and 6 were third treatment cycles. The mean number of IUI cycles per patient was 1.3. The mean female age was 28.8 years. The mean duration of infertility was 6.1 years. Causes of infertility were Male Factor infertility (51, 35%), Unexplained Infertility (47, 32 %), Anovulation (21, 14%), Mild to moderate endometriosis (16, 11%), Fibroid uterus-post myomectomy (5, 3.4%), Low ovarian reserve (1, 0.7%) and unilateral tubal block (4, 2.7%).

There were overall 22 pregnancies. The clinical pregnancy rate per cycle was 15.2%. The pregnancy rate per couple was 19.3%. Of these 15 pregnancies resulted in live births (68.2%), 3 (13.6%) resulted in miscarriage, 2 (9%) pregnancies were biochemical and 1 (4.5%) was ectopic pregnancy. There was

one quadruplet pregnancy. The patient opted for fetal reduction to singleton pregnancy but had a spontaneous complete abortion at 18 weeks gestation.

**Table 1. Pregnancy rates with reference to age of the woman.**

Age (years)	No. of patients	No. of cycles	Mean no. of cycles per patient	No. of pregnancies	Pregnancy rate per patient (%)	Pregnancy rate per cycle (%)
< 30	60	75	1.3	16	26.6	21.3
30-34	42	54	1.3	05	12	9.3
35-39	11	14	1.3	01	9	7.1
40-44	01	02	2	00	0	0
Total	114	145	1.3	22	19.3	15.2

**Table 2. Factors affecting pregnancy rate in IUI**

	Pregnancy positive	Pregnancy negative
Mean Age (female)	27.9	29.8
Mean duration of infertility (yrs)	5.6	6.4

**Table 3. Pregnancy outcomes of IUI**

Parameters	Outcome (%)
Multiple pregnancy	1 (4.5)
Ectopic pregnancy	1 (4.5)
Miscarraige	3 (13.6)
Biochemical Pregnancy	2 (9%)
Live births	15 (68.2)

**Table 4. Etiology affecting pregnancy rates in IUI**

Factors	Pregnancies/cycle	Percentage
Unexplained	11/47	23.4
Anovulation	3/21	14.2
Male Factor	6/51	11.7
Endometriosis	1/16	6.2
Fibroid uterus-post myomectomy	1/5	20
Low ovarian reserve	0/1	0
Tubal block(unilateral)	0/4	0

**Table 5. Number of preovulatory follicles` affecting pregnancy rate in IUI**

Number of preovulatory follicles	Pregnancies/cycle	Percentage
1	10/78	13
2	7/49	14
>/=3	5/11	45

**Table 6. Endometrial Thickness affecting pregnancy rate in IUI**

Endometrial Thickness	Pregnancies/cycle	Percentage
</= 6 mm	1/13	7.7
> 6 mm	21/132	15.9

## DISCUSSION

The present retrospective study was done in the Department of OBG, ESIC Medical College, PGIMSR and Model Hospital, Bengaluru between January 2018 and December 2021.

The clinical pregnancy rate per cycle with ovulation induction/IUI in our study was 15.2% and live birth rate per cycle was 10.3%. The pregnancy rate per couple was

19.3%. Wadhwa L et al<sup>(2)</sup> in their study observed a pregnancy rate per cycle of 14.1% with overall pregnancy rate per couple of 17.3%. In a prospective interventional study by Khemka SS et al<sup>[3]</sup>, the pregnancy rate per cycle and per couple was 15.3% and 22% respectively. Guan et al<sup>[4]</sup> in their retrospective study reported a clinical pregnancy rate of 13.7% per cycle and 28.9% per couple. 6 (9.8%) had

abortion, 1(1.6%) was ectopic pregnancy, 59 (96.7%) were singleton pregnancies; and 2 3.3% were twins. In our study 3 (13.6%) had miscarriages, 15 (68.2%) were live births, 1 (4.5%) ectopic and 1 (4.5%) multiple pregnancy.

Among the clinical parameters, female age is a significant factor as declining oocyte quality associated with advancing age is well documented. The pregnancy rate was higher in the younger age group of <30 years and decreased as the age increased. Sicchieri et al <sup>(5)</sup> in their retrospective observational study found patient age was inversely and significantly correlated with pregnancy rates (p=0.001). However, Jain et al <sup>(6)</sup> in their study, reported that female age was not related to successful IUI outcomes.

The success rate was lower with an increase in the duration of infertility with mean duration of infertility being 5.6 years in those women who conceived when compared to the mean duration of infertility of 6.4 years in the women who did not conceive. Kamat et al <sup>(7)</sup> stated that the success rate was significantly lower, with an increase in the duration of infertility (5.36 vs 6.71 years, p =0.032).

In our study pregnancy rates were higher when the number of preovulatory follicles were 3 or more than 3 (45%). The findings were similar to a study by Azadeh PP et al <sup>(8)</sup> who also observed an increase in pregnancy rates with an increase in the number of preovulatory follicles. This was in contrast to a study by Khemka SS et al <sup>(3)</sup> who reported maximum number of pregnancies when there was monofollicular growth (63.49%) when compared to a pregnancy rate of 22.27 % and 9.09% when there were 2-3 follicles and 4 or more follicles respectively.

In the present study, the pregnancy rate per cycle was higher when the endometrial thickness was more than 6 mm (15.9%) and lower (7.7 %) when the endometrial thickness was less than 6 mm. Jain et al reported a higher pregnancy rate when the endometrial thickness was more than 10mm. However, Weiss et al <sup>(9)</sup>, in their meta-

analysis found no difference between endometrial thickness and pregnancy rates in IUI cycles. Their pooled data showed that women treated with clomiphene citrate had a marginally thinner endometrium than women treated with gonadotropins.

Among the indications for IUI, the success rate was higher in unexplained and anovulatory infertility followed by male factor infertility when compared to endometriosis a unilateral tubal block as the causes of infertility. This was similar to a study by Azadeh PP et al <sup>(8)</sup> who also reported higher pregnancy rates when the cause of infertility was anovulation and unexplained infertility. One meta-analysis <sup>(10)</sup> documented a trend towards lower pregnancy rates in women with endometriosis, with pregnancy rates reduced to half in comparison with other infertility indications.

The purpose of this study was to determine prognostic factors for predicting IUI success. Several factors were associated with positive pregnancy rates like number of preovulatory follicles, endometrial thickness and duration of infertility, whereas female age, cause of infertility and mean number of cycles per patient did not play a role .

This was a pilot study and the limitations of this study were its retrospective nature and relatively small sample size. A larger study with bigger sample size will be provide better statistical significance.

## CONCLUSION

Intrauterine insemination is a useful and cost-effective treatment option for infertility. The overall pregnancy rate for cycles with COH/IUI in our study was 15.2% and the pregnancy rate per couple was 19.3%. There was a trend towards decreasing pregnancy rates as age of the woman increased and as the duration of infertility increased. Also, pregnancy rates were higher in women who had  $\geq 3$  or more follicles. Careful patient selection criteria along with successful ovarian stimulation enhances the treatment outcome. This information will help in counselling

infertile couples and help patients choose the treatment which is appropriate for them.

**Declaration by Authors**

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