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Original Research Paper

Estimation of Factors Influencing Pregnancy Rates In intrauterine Insemination

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ABSTRACT:
Introduction: Around 10-15 % of couples with infertility reported in outpatient department, intrauterine insemination has long been used and is considered as low cost, effective accessible approach to majority of patients when compared with other assisted methods. **Aims**: To estimate the factors influencing success rate of Intra uterine insemination. **Methodology:** It is a prospective descriptive study done over a period of 2 years from October 2020 to September 2022 at infertility clinic, Jay kay lon hospital over 66 patients. All eligible women were given ovulation induction with intra uterine insemination and followed up. **Results**: Mean age of participants was 31 years, pregnancy rate was 15.2%, out of 66, 10 conceived women, 1 was ectopic gestation,4 aborted, 5 carried pregnancy till term. Pregnancy rate of 4.54% with one follicle and 10.65% with two follicles observed with the cut off follicular size 16 mm. The mean endometrial thickness in the conceived group was found 9.38mm. 4 patients conceived with 1 IUI cycle , 4 patients with 2 IUI and 2 patients with 3 IUI cycles respectively.9 patients conceived with the total motile sperm count of20-30 million/ml. **Conclusion**: IUI is a low-cost technique with basic supplies, simple training and accessible for majority of couples seeking infertility treatment. Amongst variable factors studied, the mean endometrial thickness, follicular number, the dominant follicle size, total motile sperm count and total number of UI cycles were found statistically significant.

Keywords: Infertility, intrauterine insemination, pregnancy..

INTRODUCTION:

The idea of introducing seminal fraction with motile sperms into the female reproductive tract by other means to impregnate her was successfully applied around 200 years ago by Dr. John Hunter in 1770s with the rationale to increase gamete density at the site of fertilization (1). since then, there were many modifications done in above technique to optimize the results. Infertility which is defined as failure to conceive after 1 year of unprotected intercourse affects approximately 10-15% population. (2,3,4). It is having a major psychosocial impact over the couple's life which needs to be taken into consideration. The World Health Organization (WHO) estimates that 60 to 80 million couples worldwide currently suffers from infertility(5). The major causes of infertility include ovulatory dysfunction (20-40%), tubal and peritoneal pathology (30-40%), and male factors (30-40%); uterine pathology is relatively uncommon, and the remainder is largely unexplained. Artificial insemination is an accepted form of treatment in couple with cervical factor, male factor, vaginismus, unexplained infertility and allergy to seminal plasma. The available data suggests that the cycle fecundity ranges between 3% -10% when intra uterine insemination (IUI) is performed using infertile partner sperms and is approximately 3 times higher (9-30%) when donor sperm are used (6) In randomized control studies , induction with IUI has resulted in increased cycle fecundity(9.5%) compared with natural cycles and timed intercourse(3.3%) (7) As the success rate is low, we aimed to find out the influencing factors which affects the conception rate of an IUI. These details could be used by clinician during counselling and selection of the couple undertaking infertility treatment to increase the success rate of an IUI therapy and to arrive at a decision with regards to their treatment options.

MATERIAL AND METHODS:

It is a prospective descriptive study done over a duration of 24 months from October 2020 to September 2022 at the infertility clinic, jay kay lon hospital, Government medical college, Kota, Rajasthan. All females in the age group 19-45 years seeking treatment for primary / secondary infertility due to cervical factor, male factor and unexplained infertility with normal ovarian reserve and patent fallopian tubes were recruited after explaining the nature of study and taking an informed consent all

eligible participants were enrolled in the study. Total 66 patients were enrolled in our study. All patients underwent few investigations before procedure as follows: CBC; HIV; HbsAg; VDRL; blood group; thyroid profile; serum prolactin; FSH; LH; S. AMH; s. Estradiol level. For antral follicle counts a transvaginal sonography done on 3rd or 4th day of menstruation. Ovulation induction was given with clomiphene citrate or Letrozole (preferred in patient with PCOS) from day 3-7 of menses. Transvaginal ultrasound follicular imaging done on 10th day onwards to assess follicular number and growth; endometrial thickness and colour doppler flow. Ovulation is triggered pharmacologically when the leading follicle is >18mm in size and IUI is timed 36- 48 hours later. Semen sample was collected, prepared and assessed for count and motility. The removal of seminal plasma done by centrifuging spermatozoa through density gradients then it is loaded in the IUI cannula along with 0.3 ml of air to accommodate for the volume of cannula. Patients after emptying the bladder kept in modified lithotomy position, cusco's speculum is inserted and cervical mucosa is cleaned with normal saline. Catheter is slowly introduced in the cervix just beyond the internal os, plunger is gently and slowly pushed to release the prepared semen in the uterine cavity over 60-80 seconds, remove the catheter slowly. Patient is asked to rest there for 10-15 minutes. leuteal support with progesterone given to all of the patients and asked to come for follow up after resuming menses/ amenorrhoea.

Statistical Analysis: Statistical analysis was done by using SPSS verion 22.0. Nominal/categorical variables were described as percentages and were compared using chi=square test/ Fisher exact test. P value< 0.05 was taken as significant.

Ethical clearance from the institutional committee was obtained before conducting the study.

RESULTS:

Total 66 patients were recruited for the present study. 75% women were seeking treatment as primary infertility and remaining 25% as secondary infertility. The mean age of study participants was 31 years, 75 % women were residing in urbans whereas 25% from rurals, 65% women had a married life of less than 5 years and 35% had more than 5 years. 40% of women seeking infertility treatment for more than than 3 years. The pregnancy rate in our study was 15.2 % as shown in table no.1.

Table 1: Outcome of study participants

Outcome	N	%
Conceived	10	15.2
Not conceived	56	84.8
Total	66	100.0

When we compared the follicular number and pregnancy outcome, the maximum females i.e. 70% conceived with the follicular count of two as shown in table no. 2, the obtained p value was statistically significant.

Table 2 : Follicle number

Follicle number	Outcome					
	Conceived		Not conceived		Total	
	N	%	N	%	N	%
1	3	30.0%	27	48.2%	31	47.0%
2	7	70.0%	22	39.3%	28	42.4%
3	0	0.0%	7	12.5%	7	10.6%
Total	10	100.0%	56	100.0%	66	100.0%

Chi-square =6.096 with 2 degrees of freedom; p value = 0.0474

In our study, 6 women conceived with the dominant follicle size of 16-19 mm and 4 women conceived with the size ≥ 20mm as shown in table no. 3.

Table 3: Dominant follicle size

Dominant follicle size	Outcome					
	Conceived		Not conceived		Total	
	N	%	N	%	N	%
16-19 mm	6	60.0%	49	87.5%	55	83.33%
≥ 20 mm	4	40.0%	7	12.5%	11	16.67%
Total	10	100.0%	56	100.0%	66	100.0%

Fisher exact test p value-0.031

The mean endometrial thickness in the conceived group was found 9.38mm and in not conceived group 8.51 mm with statistically significant p value of 0.014. Out of 10 conceived women, 4 conceived in one IUI cycle, 4 with 2 IUI cycles and 2 women conceived with 3 IUI cycles as shown in table no.4

Table 4: Total No. of IUI cycles given

Total cycles	Outcome					
	Conceived		Not conceived		Total	
	N	%	N	%	N	%
One	4	40.0%	44	78.6%	48	72.8%
Two	4	40.0%	12	21.4%	16	24.2%
Three	2	20.0%	0	0.0%	2	3.0%
Total	10	100.0%	56	100.0%	66	100.0%

Chi-square = 14.143 with 2 degrees of freedom; p = 0.000

The total motile sperm count was directly proportionate to the conception rate in our study, maximum 9 women conceived when their male partners had a total motile sperm count >30 millions/ml while only one patient conceived with 20-30 millions/ml.

Table 5: Total motile sperm count

Total motile sperm count	Outcome					
	Conceived		Not conceived		Total	
	N	%	N	%	N	%
≤20 million/ml	0	0.0%	17	30.35%	17	25.57%
20.1-30 million/ml	1	10.0%	14	25.00%	15	22.72%
>30 million/ml	9	90.0%	25	44.64%	34	51.51%
Total	10	100.0%	56	100.0%	66	100.0%

Chi-square = 7.264 with 2 degrees of freedom; p = 0.026

DISCUSSION:

The present prospective observational study was conducted on 66 women over a duration of two years. The results obtained were compared with the available literature on similar researches. In our study the conception rate was 15.2 % in which 40% women aborted, 10% had ectopic gestation, 10% delivered vaginally, 30% had full term caesarean section and 10% patient had reterm caesarean section. A study done by Wang X et al found that the pregnancy rate was 16.3% and 15% abortion rate after IUI.(8) pregnancy rate in women with primary infertility was 7% and secondary infertility was 3%, the pregnancy rate in primary infertility was 7.9% and in secondary infertility was 8.8% obtained in a study done by Patel AP et al(9). In our study it was found out that when only one follicle was present , the pregnancy rate was 4.54% and with two follicles it was 10.65% which was statistically significant with the cut off 16 mm of follicular size, although our results didn't matched well as in a study done by RP Dickey et al , 9.8% pregnancy rate observed with one follicle and 14.3% with two follicles with a cut off of 15 mm size.(10) The mean endometrial thickness in the conceived group was found 9.38mm and in not conceived group 8.51 mm with statistically significant p value of 0.014 , in a study done by Vargas Tominaga L (11) et al, the pregnancy rate was 6.5 % versus 9.8% when endometrial thickness was < 9mm and >9mm respectively with a significant difference of p= 0.05. The total motile sperm count acts as important prognostic factor for the successful IUI as Out of 17 patients with their partner's Total motile sperm count of <20 million/ml, none of them conceived. Out of 15 patients with 20-30 million/ml sperm count of their partner, only 1 conceived. Rest 34 patients with >30 million sperm count, 9 patients conceived. Increase in conception rate with increase in total motile sperm count observed in our study. This distribution of outcome on the basis of total motile sperm count was statistically significant (p value =0.026). In study by Patel AP et al, found a higher pregnancy rate (15.8%) when TMF was 10–20 million. Lower pregnancy rates were observed when the TMF was around 5–10 million (4.2%), and disappointing rates (1.8%) though TMF was around 20 million.(50) The pregnancy rate after IUI is correlated significantly with frequency and timing of IUI. In our study, 48 patients had one IUI cycle, 4 of them conceived; 16 patients with 2 IUI cycle, 4 conceived; 2 patients with 3 IUI cycle, both conceived. Out of 66 patients 10 conceived. Results obtained shows a higher statistical significance with p value <0.05. The highest pregnancy rate per cycle (18%) is attained within first cycle of IUI. Almost all pregnancies (99/102; 97%), occurred within first 4 treatment cycles while none were achieved either in sixth or seventh cycles in study done by Sinikka Nuojua-Huttunen et al.(12) The data from study done by Wang X et al shows that the pregnancy rate was

higher in double IUI when compared to single. Ragni et al(13)in her study also came up with similar findings where in pregnancy outcome is better in double than in single IUI per cycle.

CONCLUSION:

Infertility poses a big psychosocial impact over the affected couple. Ovulation induction with IUI is considered as a low complexity assisted reproductive technology which required basic supplies, simple training, low -cost technique and is accessible when it comes to a couple with cervical factor infertility, moderate male factors infertility, unexplained infertility and immunological infertility. Patients' selection and optimization of results are always debatable. The Pregnancy Rate of the present study was 15.2%. Amongst variable factors studied, the mean endometrial thickness, follicular number, the dominant follicle size, total motile sperm count and total number of IUI cycles were found statistically significant.

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