

The Intra-Uterine Insemination in Al-Yarmouk Infertility Center: A Five-Year Records Review

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Abstract

Background: Intra uterine insemination is an assisted reproductive technique using husband or donor sperms, at the time of ovulation in natural or stimulated cycle, to be placed in the uterine cavity or in the cervical canal. It is a common procedure used for the treatment of infertility.

Objectives: To identify factors that can predict successful outcome in intrauterine insemination and the socio-demographic characteristics of couples visiting intra uterine insemination department in Al-Yarmouk Infertility Center through five-year records review.

Patients & Methods: A descriptive study (review of records) was conducted on all available records of infertile couples (259 couples), undergone intra uterine insemination treatment for their infertility problems in Al-Yarmouk Infertility Center, from 2007 through 2011. The necessary data were collected from only 124 couples with complete information.

Results: The overall pregnancy rate was 27.4% (34 cases) in whom 4.8% were delivered successfully; the miscarriage rate was 4%, and no ectopic pregnancy or multiple pregnancies were encountered. Four significant variables were identified for successful outcome: duration of infertility (<10 years 45.2 vs. 5.6%), type of infertility (secondary infertility 46.7 vs. 21.3%), number of trials (twice and more 68.1% vs. 15.7%), and progressive motility of sperm after preparation (couples with >50% normal progressive motility 37.3 vs. 18.5%).

Conclusions: Intrauterine insemination provides better results in couples with secondary infertility, shorter duration of infertility, increasing number of trials, and in those with 50% normal sperm motility or more

Key words: Intrauterine insemination, successful outcome, records review.

INTRODUCTION

Infertility is a disease defined as the failure to achieve a successful pregnancy after 12 month or more of regular unprotected intercourse, earlier evaluation and treatment may be justified based on medical history and physical finding and is warranted after 6 month for women over age 35 years.^[1] Among infertile women undergoing infertility treatment, advanced maternal age is also associated with lower fertilization rates and higher risk of chromosomal abnormalities.^[2]

The prevalence of infertility worldwide is estimated to be 1 in 7 to 1 in 5 couples in their reproductive age (14-20%). The causes of infertility can be male, female or a

combination of both and include ovulatory disorders, tubal disease, endometriosis, chromosomal abnormalities, sperm factors, and unexplained infertility. The majority of infertility cases, both male and female factors, overcome through surgical and medical treatment. Medical treatment options include assisted reproductive techniques (ART) such as in vitro fertilization (IVF), intra-cytoplasmic sperm injection (ICSI), and intrauterine insemination (IUI).^[3,4]

IUI is a relatively simple method; generally considered to be an intermediate step of low to moderate complexity before the application of more sophisticated assisted reproductive technologies (ART) such as IVF with or without ICSI, it is also called artificial insemination

(AI). In the past, IUI has been used as treatment for poor postcoital tests and immunologic infertility,^[5,6] IUI is one of the most commonly performed treatments for infertile or sub-fertile Patients with male factor and consists of instrumental introduction of processed sperm into the uterus via the cervix to deliver motile sperm to the fallopian tubes around ovulation time.^[7] Insemination can be done to clean sperm after liquefaction or by processed sperm when different laboratory technique of spin, rinsing, and condition of spermatozoa were used.^[8]

The current study was conducted aiming to determine the clinico-epidemiological characteristics of couples performing IUI in Al-Yarmouk Infertility Center and to assess the successful and failure rate of these trials in addition to determine factors that might affect IUI successful and failure rate.

PATIENTS AND METHODS

This descriptive study was conducted on the records of infertile couples attended the IUI Department in Al-Yarmouk Infertility Center for the period of five years, from 2007 to 2011, through reviewing all records on couples who were infertile for at least one year, A total of 259 couples records (of the last 5 years records) were checked and only 124 with complete information had been included in the study, The data was collected through a check-list form paper that is designed and planned to be used on the records of couples for the last five years to obtain information in the absence of couples.

For each patient, the following variables were determined according to the questionnaire form that contains the following:

- Demographic characteristics of couples (age, educational level, occupation, residency, date of marriage, smoking, and alcoholic history).
- Information about infertility (type of infertility whether primary or secondary, duration of infertility, parity, history of abortion, or any contraception).
- Menstrual history of the wife (age of menarche, regularity of the cycle, and duration of the cycle).
- Medical and surgical history of the couples.
- Sexual history; if there is any impotence or any premature ejaculation.
- Investigations for wife, hormonal assay and for husband (ultrasound and seminal analysis).
- IUI trials: Information about IUI including; number and date of IUI trials, whether pregnancy occur or not,

duration of pregnancy, and complications of pregnancy).

The statistical analyses were performed using SPSS-20, included the descriptive measures of frequency and percentages and the application of analytic test of significance, the chi-squared test, for testing the significance association between the qualitative variables with the use of $P < 0.05$ as the level of significance.

RESULTS

The overall IUI outcome in Al-Yarmouk infertility center revealed a success rate of 27.4% (Figure 1), while details of this outcome as abortion, loss of follow up and delivery were shown in (Figure 2) with rates as 4.0, 18.5 & 4.8% respectively.

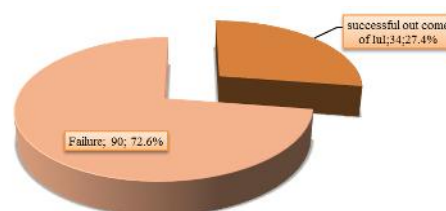


Figure 1: The IUI outcome (successful and failure rate) in infertile couples included in the study.(n=134couple)

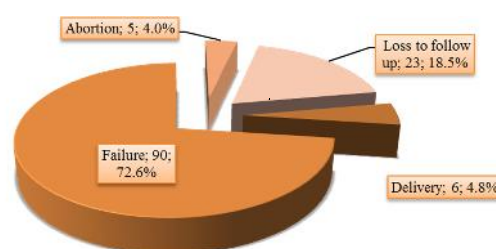


Figure 2: The detailed IUI outcome of infertile couples included in the study

In current study, the distribution of wives according to their socio demographic, characteristics including their age and occupation (highest rate at 30-34 years, mostly housewives; 79.8%), education (highest rate of primary education; 60.5%), residency (majority from urban; 84.7%), and smoking status (most of them were non-smoker; 95.2%) (Table 1).

Table 1: The distribution of wives according to their socio-demographic characteristics.

Age (years)	15--19	6	4.8
	20--24	15	12.1
	25--29	30	24.2
	30--34	34	27.4
	35--39	19	15.3
	=>40	20	16.1
Employment	Governmental employee	25	20.1
	Housewife	99	79.8
Education	Finished primary	75	60.5
	Secondary	33	26.6
	College	16	12.9
Residency	Urban	105	84.7
	Rural	19	15.3
Smoking	Smoker	6	4.8
	Non-smoker	118	95.2

Concerning obstetric and gynecological history, more than half of wives attending the center for infertility were married for 5-9 years (51.6%), three quarters of women had a primary type of infertility (75.8%), 46.8% of them have 1-4 years duration of infertility. While regarding parity, number of living child, abortion, and contraception methods; a higher percentage of these aspects were with no such history (79.8, 81.5, 86.3 & 97.6% respectively). The age at menarche was within 11-16 years while menstrual cycle was regular for high percentage of women (Table 2).

In Current study the distribution of husbands according to socio demographic characteristics, medical history and infertility related factors. A higher proportion of husbands were within 35-39 years age group (27.4%), about half of them were governmental employee (52%) and secondary school level of education (48.4%), most of them were smokers (62.1%), few with impotence (3.2%), premature ejaculation (3.2%), hydrocele & varicocele (14.5%), and other medical diseases, but about half of them with abnormal progressive motility of seminal fluid (52.5%) and pus cells in seminal fluid (54.8%) (Table 3).

The distribution of IUI response rate according to years of documentation, the highest rate of successful response was during 2007 (48.4%) and lowest during 2011 (7.1%), the highest successful rate was seen in wives in whom their age 30-39 years (66.2%), women with secondary infertility (46.7%), women with 1-4 years duration of infertility (32.8%), and in those women who undergone more than one IUI trial.(33 out of 73 represent the response rate of 45%(33 out of 73) for those <10 years duration of infertility which is significantly higher than those ≥10 years duration of infertility (P=0.0001) (Table 4).

Table 2: The distribution of wives according to their obstetric & gynecological history

		No	%
Duration of marriage(years)	1--4	9	7.3
	5--9	64	51.6
	10--14	31	25
	15--19	13	10.5
	=>20y	7	5.6
Type of infertility	Primary	94	75.8
	Secondary	30	24.2
Duration of infertility	<1year	8	6.5
	1--4	58	46.8
	5--9	40	32.3
	10--14	16	12.9
	=>15years	2	1.6
Parity	No	99	79.8
	1	6	4.8
	2	7	5.6
	3	8	6.5
	4&More	4	3.2
Living children	No	101	81.5
	1	9	7.3
	2	5	4
	3	8	6.5
	4&More	1	0.8
Abortion	No	107	86.3
	1	13	10.5
	2	2	1.6
	3	2	1.6
Contraception	No	121	97.6
	IUCD	2	1.6
	OCP	1	0.8
Menarche	11	21	16.9
	12	59	47.6
	13	31	25
	14	8	6.5
	15	2	1.6
	16	3	2.4
Regularity of cycle	Irregular	18	14.5
	Regular	106	85.5

Considering response rate (successful or failure) according to husband age, the highest successful rate seen in husband whom age lies between 40-44 years (45.0%) and also a higher significant successful rate seen in those with normal progressive sperm motility (37.3%), while no significant difference in successful and failure rate seen in husband with impotence or pre-ejaculation problem (Table 5).

DISCUSSION

The successful rate of IUI in the current study is equal to 27% with 4.8% pregnancy rate per cycle comparing to another study being 22.6% and 8% respectively.^[9] In another hospital, in Iran, pregnancy rate was 21.6% and 12.8% per cycle.^[10] Success rates, in general, are in the region of 5-30%.^[11, 12] The spontaneous abortion rate in this study was 4%, while the live birth rate was 4.8%. There were no cases of multiple pregnancies which

agree with study done in Al-Batool Hospital in Mosul city.^[13]

Table 3: The distribution of husband according to the socio-demographic characteristics, medical and related infertility factors.

For husband		No	%
Husband age (years)	<25	7	5.6
	25—29	24	19.4
	30—34	22	17.7
	35—39	34	27.4
	40—44	20	16.1
	45—49	9	7.3
	=>50years	8	6.5
Employment	Governmental employee	65	52.42
	Student	2	1.61
Education	Primary school	30	24.2
	Secondary school	60	48.4
Smoking	Smoker	77	62.1
	Non	47	37.9
Medical diseases	Diabetes	5	4
	Epilepsy	1	0.8
	Hepatitis	1	0.8
	Hypertension	3	2.4
	Negative	114	91.9
Impotence	Yes	4	3.2
	No	120	96.8
Premature ejaculation	Yes	4	3.2
	No	120	96.8
Testicular problems	Hydrocele	13	9.7
	Varicocele	6	4.8
	Normal	106	85.5
Semen fluid	Abnormal progressive motility (<50%)	65	52.5
	Normal =>50%)	59	47.5
Pus cells in semen	Pus cell	68	54.8
	Negative	56	45.2

In the present study The pregnancy rate in younger women (<35 years) was higher than in older women (>35 years), this result was similar to that reported by Stone et al.,^[14] and Firoozeh et al.,^[15] were the success rate appeared to be increased with decreased age groups. The age related decline in female fecundity (the potential for reproduction) has been suggested to be a result of reduced uterine receptivity, and/or decreased oocytes quality, this ability rapidly declined at 42 years of age,^[16] The majority of wives were non-smoker (95.2%); the lower prevalence of smoking among women may be due to underestimation because of family values, traditional and/or cultural norms, as smoking in girls is still less acceptable social habit in our society.^[17]

Smoking addiction did not have a significant influence on IUI outcome. Smoking has substantial adverse effects on fertility, a large meta-analysis comparing smoking women with non-smoking women found that

smoking women were significantly more likely to be infertile.^[18]

The impact of the duration of infertility on the success of IUI varied between studies; Mahnaz Ashrafi et al. concluded that the pregnancy rate in IUI increased with decreasing infertility duration less than 3 years,^[19] which was the same finding of Iberico et al.^[20] The duration of infertility is a prognostic factor for live birth among untreated sub-fertile couples and homologous IUI achieved the best results with infertility duration <3 years which goes in concordance with the current study.

The rate of pregnancy decreased with increasing age and increasing duration of infertility, a finding that is comparable to a study done in Iran,^[13] and other countries.^[9] Agarwell & Buyalos also found a decrease in pregnancy rate beyond 35 years of age [21],but disagree with other study have shown that the age of the couple and duration of infertility did not correlate with pregnancy rate in an IUI cycle Koli et al.^[22]

Maximum number of couples were from urban rather than rural, this is because the study sample was taken from central region of Baghdad (Infertility Center in Al-Yarmouk Hospital

Several studies have shown the increase of pregnancy rate after IUI when the number of motile sperm inseminated (NMSI) was between 0.8×10^6 to 20×10^6 .^[23] The pregnancy rate increase when the total number of motile sperm (normal progressive motility) is more than or equal to 50% of total sperm count reflecting the role of the number of motile sperms in influencing the chances of pregnancy as reported by other studies.^[24,25] The relation between pregnancy rate and the number of motility of sperm was in agreement with other studies who reported a relation between pregnancy rate and number of motility sperm.^[9,23] Tomilson et al.,^[26] found that progressive motility of sperm was one of the predictive variables of IUI success.

In the current study, higher pregnancy rate was observed in those with secondary infertility than primary infertility, a result that is in agreement with results reported by Edward et al.^[27] Better results from IUI procedure can be obtained with cases of secondary infertility, and those wives in whom there ages were younger than 35 years as reported by Corsan et al. that a pregnancy rate per cycle in women 40 years or older was less than half of that in women younger than 40 years but still able to become pregnant.^[28]

Table 4: The IUI response rate according to the date of IUI, type of infertility, age of wives, and number of IUI trials.

		IUI response				P value
		Successful		Failure		
		No	%	No	%	
Date of IuI(year of study)	2007	15	48	16	52	0.013*
	2008	4	25	12	75	
	2009	8	28	21	72	
	2010	5	25	15	75	
	2011	2	7.1	26	93	
Age (years)	15--19	2	33	4	67	0.883
	20--24	3	20	12	80	
	25—29	7	23	23	77	
	30--34	10	29	24	71	
	35--39	7	37	12	63	
	=>40	5	25	15	75	
Type of infertility	Primary	20	21	74	79	0.007*
	Secondary	14	47	16	53	
Duration of infertility	<1year	2	25	6	75	0.15
	1--4	19	33	39	67	
	5--9	12	30	28	70	
	=>10 years	1	5.6	17	94	
Number of IUI	1	8	16	43	84	0.045*
	2	21	37	36	63	
	3&more	5	31	11	69	
*Significant using Pearson Chi-square test at 0.05 level						

Table 5: The IUI response rate according to husband age and infertility managements in the studied sample.

		IUI response				P value
		Successful		Failure		
		No	%	No	%	
Husband age (years)	<25	2	28.6	5	71.4	0.578
	25--29	6	25	18	75	
	30--34	5	22.7	17	77.3	
	35--39	8	23.5	26	76.5	
	40--44	9	45	11	55	
	45--49	3	33.3	6	66.7	
	=>50years	1	12.5	7	87.5	
Impotence	Yes	1	25	3	75	0.912
	No	33	27.5	87	72.5	
Pre-ejaculation	Yes	2	50	2	50	0.303
	No	32	26.7	88	73.3	
Semen fluid	Abnormal progressive motility (<50%)	12	18.5	53	81.5	0.019*
	Normal =>50%)	22	37.3	37	62.7	
*Significant using Pearson Chi-square test at 0.05 level						

In conclusions; IUI is a suitable and good option for many couples prior to considering more complicated and expensive assisted reproductive techniques, Factors including age of mother (female age), number of treatment cycle, type of infertility (primary or secondary), duration of infertility, and progressive motility of sperm after preparation, can predict IUI success rate, Careful patient selection criteria combined with ovarian stimulation is the model for IUI success rate.

The study recommends the need for IUI department, not only in hospital but also in specialist primary health care center, to make easy to patient to under gone IUI trial when we are suffering from mild to moderate infertility causes. There is a necessary rule for hospital to overcome the difficulties that faced the infertility center in Al-Yarmouk hospital.

REFERENCES

- Practice Committee of American Society For Reproductive Medicine. Definition of infertility and recurrent pregnancy loss. *Fertility & Sterility*, 2008; 89: 1603.
- Bentov Y, Esfandiari N, Burstein E & Casper RF. The use of mitochondrial nutrients to improve the outcome of infertility treatment in older patients. *Fertility & Sterility*, 2010; 93(1): 272-75.
- Bourgeois FJ, Gehrig PA & Veljovich DS. Infertility in Obstetrics and Gynecology Recall, 2nd ed., Awolters Klumar Company in USA, 2005, Chapter 35. PP: 405-25
- Alabama B. Aging and infertility in women. *Fertility & Sterility*, 2006; 86(5suppl 1): S248-52.
- Oehninger S. Place of intracytoplasmic sperm injection in management of male infertility. *Lancet*, 2001; 357: 2068-69.
- Ombelet W, Deblaere K, Bosmans E, et al. Semen quality and intrauterine insemination. *Reproductive Bio Medicine Online*, 2003; 7(4): 485-92
- Snick H. Is the benefit of IUI really evidence-based? *Hum Reprod*, 2002; 17(11): 300-03.
- Fetahovic F, Popivoda Z, Radonjic D, Kljaic D & Raicevic S: Efficiency of intrauterine insemination as a method of treating marital infertility. *The Internet J of Gynecology & Obstetrics*, 2010; 13 (2): DOI: 10.5580/2e8.
- Wang B, Hu Y, Sun H, Zhang N & Xu Z. Investigation of correlative factors affecting successful intrauterine insemination. *Zhonghua Nan Ke Xue*, 2004; 10(7): 526-29. (Abstract).
- Iberico G, Vioque J, Ariza N, Lozano JM, Roca M, et al. Analysis of factors influencing pregnancy rates in homologous intrauterine insemination. *Fertility & Sterility*, 2004; 81(5): 1308-13.
- Jurema MW, Vieira AD, Bankowski B, Petrella C, Zhao Y, Wallach E, et al. Effect of ejaculatory abstinence period on the pregnancy rate after intrauterine insemination. *Fertility & Sterility*, 2005; 84(3): 678-81.
- Stephani M, Lu co, Chioma agbo, Barry Behr, et al. The evaluation of pre- and post-processing semen analysis parameters at the time of intrauterine in semination. *European Journal of obstetrics and Gynecology and Reproductive Biology*. 2014; 179: 159-162.
- Mohammed LB, Intrauterine Insemination Treatment. In: *Sub Fertility: Analysis of Factors Affecting Outcome*. Duhok Med J, 2010; 4 (1): 16-27.
- Stone BA, Vargyas JM, Ringler GE, Stein AL & Marrs RP. Determinants of the outcome of intrauterine insemination: Analysis of outcome of 9963 consecutive cycles. *Am J Obstet & Gynaecol*, 1999; 180(6 Pt 1): 1522-34.
- Firoozeh Ghaffari, Shahideh Jehanian S, Mohammed Reza A, Poopk Eftekhari Y, Zahra Zolfaghri. Evaluation the effective factors in pregnancy after IUI. *Int J Fertil and Steril*. 2015; v. 9 (3); Oct - Dec (pub med).
- Duran EH, Morshedi M, Taylor S & Oehninger S. Sperm DNA quality predicts intrauterine insemination outcome: A prospective cohort study. *Hum Reprod*, 2002; 17(12): 3122-28.
- Alghabban SI. Prevalence of smoking among students in university of Karbala. *Karbala J of Medicine*, 2009; 2(8-9): 645-60.
- Augood C, Duckitt K & Templeton AA. Smoking and female infertility: a systemic review and meta- analysis. *Hum Reprod*, 1998; 13: 1532-39.
- Mah naz Ashr, M Rashid, A Ghasemi, et al. The rate of infertility Etiology in success rate of intrauterine in semination cycles. *International Journal of fertility and sterility*. 2013 Jul. sep; 7 (2) 100-107.
- Zhao Y, Vlahos N, Wyncott D, Petrella C, Garcia J, et al. Impact of semen characteristics on the success of intrauterine insemination. *J Assist Reprod Genet*, 2004; 21(5): 143-48.
- Agarwell SK & Buyalos RP. Clomiphene citrate with intrauterine insemination: is it effective therapy in women above the age of 35 years? *Fertility & Sterility*, 1996; 65: 759-63.
- Pramila Koli, Anil M, N R Ramya, Kamal Patil, M K Swamy. Intrauterine Insemination. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 2013; Vol.2, No.3.
- Kamath Ms, Bhare P, Aleyamma T, Nair R, Chandy A, Mangalaraj Am, et al. predictive factors for pregnancy after intrauterine in semination. *J Hum Reprod Sci*. 2010; 3 (3): 129-134.
- Campana A, Sakkas D, Stalberg A, Bianchi PG, Comte I, Pache T & Walker D. Intrauterine insemination: Evaluation of the results according to the women's age, sperm quality, total sperm count per insemination and life table analysis. *Hum Reprod*, 1996; 11: 732-36.
- Brasch JG, Rawlins R, Tarchala S & Radwanska E. The relationship between total motile sperm count and the success of intrauterine insemination. *Fertility & Sterility*, 1994; 62: 150-54
- Tomlinson MJ, Amissah-Arthur JB, Thompson KA, Kasraie JL & Bentick B. Prognostic indicators for intrauterine insemination (IUI): statistical model for IUI success. *Hum Reprod*, 1996; 11(9): 1892-96
- Plosker SM, Jacobson W & Amato P. Predicting and optimizing success in an IUI programmer. *Hum Reprod*, 1994; 9(11): 2014-21
- Corsan G, Tria A, Trout S & Kemmann E. Ovulation induction combined with intrauterine insemination in women of 40 years of age and older: is it worthwhile? *Hum Reprod*, 1996; 11: 1109-12.