

## A RETROSPECTIVE STUDY OF OBSTETRICAL OUTCOME IN ART AND SPONTANEOUS PREGNANCIES.

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### Abstract:

#### Background:

Infertility tends to be one of the emerging health concern with today's world .It is a common condition affecting approx 8-9% of reproductive age group. Infertility diagnosis is divided into etiologies of ovulatory dysfunction, tubal endometriosis, and uterine, unexplained and male factors. Certain type of infertility such as severe male factors and complete tubal obstruction will require ART. **Objective:**To study obstetrical outcome in pregnancy conceived with assisted reproductive techniques . **Materials and Methods:**A Retrospective study was done and data was collected of patients, who have conceived through assisted reproductive techniques admitted and delivered at tertiary care hospital from January 2017 to June 2017.**Results:** They were anaemia 25(24.27%) and 17(16.19%) in ART and spontaneous conception respectively (p- value<0.147), hypothyroid 40(38.83%) and 14(13.33%) in ART and spontaneous conception respectively (p- value<0.0001, highly significant), chronic hypertension 27(26.21%) and 4(3.81%) in ART and spontaneous conception respectively (p- value<0.0001, highly significant), DM Type-2 10(9.71%) and 0(0.00%) in ART and spontaneous conception respectively (p-value<0.280, not significant). Study also showed that various obstetrical complications common in ART group. They were preterm birth, PIH, Polyhydramnios, Placenta previa, APH, Oligohydromnios, PPRM, GDM, Multiple pregnancies.**Conclusion:** There was a significant association between obstetrical complications with age. Maternal pre-existing disease like anaemia, chronic hypertension, hypothyroidism and diabetes mellitus should be treated before conception, to improve maternal and perinatal outcome.

**Keywords:** Assisted reproductive technology, Spontaneous Conception, Pregnancy.

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### Introduction:

Infertility is the inability of sexually active, non-contraception practicing couple to achieve pregnancy in one year (WHO-ICMART). It is a common condition affecting approx 8-9% of reproductive age group. Despite a stable prevalence of infertility in the population the demand for infertility services has increased substantially over past decade (1). Infertility diagnosis is divided into etiologies of ovulatory dysfunction, tubal endometriosis, and uterine, unexplained and male factors. Certain type of infertility such as severe male factors and complete tubal obstruction will require ART.

Assisted reproductive technology (ART) has increasingly grown in the last few years. India has one of the highest growths in the ART centres and the number of ART cycles performed every year. ART includes in vitro fertilization (IVF) with or without intracytoplasmic sperm injection (ICSI), fresh and frozen/ thawed embryo transfer, IVF with donor oocytes and intra uterine insemination (IUI) either with ovarian stimulation or IUI in unstimulated cycles.

In recent years, an increasingly large proportion of deliveries following ART have been multiple pregnancies (2). ART associated with increased likelihood of GDM, chronic hypertension and diabetes mellitus leading to further more complication like polyhydromnios, PIH, APH, oligohydromnios, PPRM, pre eclampsia , etc. As mother having ART treatment is mostly from higher age group, chronic hypertension and diabetes mellitus may be pre-existing to leading to further exaggeration during pregnancy.

Even study have suggested an increased risk of Diabetes Mellitus, accidental haemorrhage, preeclampsia, gestational hypertension, placenta previa, and gestational diabetes in ART pregnancies(3).

In addition, even in singleton pregnancies, ART may be associated with an increased risk of adverse perinatal outcomes, including increased risk of labour induction and LSCS. A small but significant increase in congenital structural anomalies and chromosomal abnormalities has also been observed in singleton ART in studies including pregnancy termination (4).

**OBJECTIVE:**

To study obstetrical outcome in pregnancy conceived with assisted reproductive techniques in patients who had delivered at tertiary care hospital from January 2017 to June 2017.

**Material and Methods:**

**Source of data:**

The maternal records of patients, who had conceived after assisted reproductive techniques, and delivered at tertiary care hospital in New Delhi from January 2017 to June 2017 were obtained from medical record department.

**Method and Collection of Data:**

A Retrospective study was done and data was collected of patients, who have conceived through assisted reproductive techniques admitted and delivered. The maternal condition noted as per records.

**Study Area:** Department of obst & Gynae.

**Study Design:** Retrospective study.

**Study Duration:** January 2017 to June 2017.

**Sample Size:** All cases from January 2017 to June 2017.

**Inclusion Criteria:**

Pregnant women delivered at conceived after ART and IUI.

**Exclusion Criteria:**

1. Pregnant women delivered without ART and IUI
2. Conceived with ovulation induction.

**Methodology:**

Records of the patient conceived through ART were taken and maternal outcome were noted for statistical analysis and results were obtained.

**Statistical Ananalysis:**

Categorical variables were presented in number and percentage and continuous variable were presented as mean±SD and median. Normality of data was tested by Kolmogorov-Simrnov test. If the normality was rejected then non parametric test was used.

Statistical test was applied as follows:

1. Quantitative variables were compared using unpaired t-test/Mann-Whitney Test (when the data sets were not normally distributed) between the two groups.
2. Quantitative variables were correlated using Chi-Square test/Fishers exact test.

A p value of <0.05 was considered statistically significant.

**Results:**

**Table 1: Distribution of age amongst Spontaneous Conception and ART Pregnancy.**

	Group		Total	p value
	ART (n=103)	SPONTANEOUS CONCEPTION ( n=105)		
Age 1) <30	47 (45.63%)	80(76.19%)	127(61.06%)	<.0001
2)31-40	43(41.75%)	25(23.81%)	68(32.69%)	
3)>40	13(12.62%)	0(0.00%)	13(6.25%)	
<b>TOTAL</b>	103(100.00%)	105(100.00%)	208(100.00%)	

**Table 1:** shows that total number of women belonging to age group less than 30 amongst ART and spontaneously conceived group of women is 47 (45.63%) and 80 (76.19%) respectively. Number of women belonging to age group 31-40 amongst ART and spontaneously conceived group of women is 43(41.75%) and 25(23.81%) respectively. Number of women belonging to age group more than 40 amongst ART and spontaneously conceived group of women is 13(12.62%) and 0(0.00%)respectively. (P value<.0001, highly significant).

**Table 2: Distribution of women according to Medical Complications.**

	Group		Total	P value
	ART n=103	Spontaneous conception n=105		
<b>Anaemia</b>	25(24.27%)	17(16.19%)	42(20.19%)	0.147
<b>Hypothyroid</b>	40(38.83%)	14(13.33%)	54(25.96%)	<.0001
<b>Chronic hypertension</b>	27(26.21%)	4(3.81%)	31(14.90%)	<.0001
<b>DM Type-2</b>	10(9.71%)	0(0.00%)	16(7.69%)	<0.280
<b>Total</b>	103 (100.00%)	105(100.00%)	208(100.00%)	

**Table 2:** shows that various high risk factors were present in pregnant women studied in our study. They were anaemia 25(24.27%) and 17(16.19%) in ART and spontaneous conception respectively (p-value<0.147), hypothyroid 40(38.83%) and 14(13.33%) in ART and spontaneous conception respectively (p- value<0.0001, highly significant), chronic hypertension 27(26.21%) and 4(3.81%) in ART and spontaneous conception respectively (p- value<0.0001, highly significant), DM Type-2 10(9.71%) and 0(0.00%) in ART and spontaneous conception respectively (p- value<0.280, not significant).

**Table 3: Distribution of women according to Obstetrical Complications.**

	Group		Total	P value
	ART (n=103)	Spont. conception (n=105)		
<b>Preterm</b>	41(39.81%)	2(1.90%)	43(20.67%)	<.0001
<b>PIH (PIH+Super imposed Hypertension)</b>	54(52.43%)	17(16.19%)	71(34.13%)	<.0001
<b>Polyhydramnios</b>	7(6.80%)	0(0.00%)	7(3.37%)	0.007
<b>Placenta Previa</b>	5(4.85%)	2(1.90%)	7(3.37%)	0.277
<b>Antepartum haemorrhage</b>	6(5.83%)	1(0.95%)	7(3.37%)	0.064
<b>Oligohydromnios</b>	45(43.69%)	13(12.38%)	58(27.88%)	<.0001
<b>PPROM</b>	27(26.21%)	5(4.76%)	32(15.38%)	<.0001
<b>GDM</b>	25(24.27%)	6(5.71%)	21(10.09%)	0.005
<b>Multiple pregnancy</b>	61(59.22%)	4(3.81%)	65(31.25%)	<.0001

**Table 3:** shows that various obstetrical complications common in ART group. They were preterm birth, PIH, Polyhydramnios, Placenta previa, APH, Oligohydromnios, PPROM, GDM, Multiple pregnancies.

**Table 4: Distribution of women according to Mode of Delivery.**

	Group		Total	P value
	ART (n=103)	Spontaneous conception (n=105)		
<b>Instrumental delivery</b>	0(0.00%)	3(2.86%)	3(1.44%)	0.246
<b>Vaginal delivery</b>	31(30.10%)	44(41.90%)	75(36.06%)	0.076
<b>LSCS</b>	72(69.90%)	62(59.05%)	134(64.42%)	0.102
<b>Total</b>	103(100.00%)	105(100.00%)	208(100.00%)	

**Table 4:** shows that among 103 women who underwent ART conception and were admitted at our hospital there was no instrumental delivery, 31(30.10%) delivered vaginally and 72(69.90%) had caesarean section and amongst 105 women who had spontaneous conception have 3(2.86%) instrumental deliveries, 44(41.90%) vaginal deliveries, 62(59.05%) women had caesarean section.

**Table 5: Distribution of women according to Intrapartum and Postpartum Complications.**

	Group		Total	P value
	ART (n=103)	Spontaneous conception (n=105)		
<b>PPH</b>	8(7.77%)	2(1.90%)	10(4.81%)	0.057
<b>Obstetrical Hysterectomy</b>	3(2.91%)	0(0.00%)	3(1.44%)	0.120
<b>Total</b>	103(100.00%)	105(100.00%)	208(100.00%)	

**Table 5:** shows that among 103 women who underwent ART conception and were admitted at our hospital there were 8(7.77%) cases having PPH and 3(2.91%) had obstetrical hysterectomy and amongst 105 women who had spontaneous conception 2(1.90%) had PPH and there was no obstetrical hysterectomy.

### Discussion:

In our study the mean age of ART group were 32.87 years and that of spontaneous group 28.15 years, so the mean age group of ART group were more, also it was observed that as the age increases there is increasing number of obstetrical complications in pregnancy conceived after assisted reproductive technique. In group >40 year we have 84.61% of preterm labour, 84.61% were PIH, 30.76% had accidental haemorrhage, 30.76% were having oligohydromnios, 30.76% had PPH, 24.27% were having gestational diabetes and 15.38% had to undergo obstetrical hysterectomies. So maternal age is one of the risk factor for poor maternal outcome, also other studies says that maternal age is the single most important prognostic factor for ART success (5). Studies that have investigated retrospective data concerning female age and the outcome of ART show that the chance of pregnancy declines with age and the incidence of pregnancy loss increases (9). The live delivery rate per fresh cycle was 26.8% among women aged 30-34 year and less than 1% in women aged 44 or older (10). Some studies also report that women over the age of 40 can have a greater than 5% chance of success in ART but no pregnancies are reported for women aged 46 or more who are using their own oocytes (8, 9). Some studies have found a negative relationship between paternal age and ART success (6, 7) a recent review concluded that there is currently insufficient evidence to demonstrate a negative effect of paternal age on ART outcomes (11). Women who conceive with ART after the age of 40 have a greater risk of gestational diabetes, PIH, instrumental deliveries and caesarean section in younger women (5).

In our study it was observed that the ART group has anaemia (24.27%), hypothyroid (38.83%), chronic hypertension (26.21%), Diabetes Mellitus (9.71%), these complications were very high as compared to spontaneous group. As studied by R Viviane et al in 2008 Maternal complications presented by 90.9% in ART group, iron deficiency anaemia, diabetes mellitus, hypertension, premature deliveries, uterine atony and haemorrhage, caesarean deliveries. The results show that diabetes mellitus and iron deficiency anaemia were observed in 12.2% of the cases.

In our study it was observed that obstetrical complications were 39.81% of preterm labour in ART group and 1.90% in control group; again there was fourfold increase in rate of placenta previa in ART group, fivefold increase rate of ante partum haemorrhage, threefold increase rate of oligohydromnios, six fold increase rate of PPRM, fourfold increase rate of gestational diabetes and almost twenty fold increase rate of multiple pregnancies noted in ART group compared to spontaneous pregnancies respectively. So there was a vast increase in obstetrical complication observed in ART group with a poor maternal outcome compared to spontaneous group. Study conducted by Desari P et al in 2009 there is increase incident of obstetrical complication in ART pregnancies especially preterm labour, APH, multiple pregnancies GDM and PPRM, similar to our study. Also reviewed guidelines by genetics committee, the reproductive endocrinology, infertility committee, Cochrane library and Medline concluded pregnancies achieved by IVF with or without ICSI are at higher risk for obstetrical complications than spontaneous pregnancies, and close surveillance during pregnancy should be considered. It remains unclear if these increased risks are attributable to the underlying infertility, characteristics of the infertile couples or use of ART. Also women undergoing ART should be informed about the increased rate of obstetrical intervention such as induced labour and elective caesarean delivery. Our findings corroborate those of the recent meta- analysis, demonstrating a significant increase in hypertensive disorder, placental abnormalities and the incidence of caesarean delivery.

This association between ART and PIH and preeclampsia has also been noted by other authors, including Wang et al (13) in 2002 and Maman et al (14) in 1998. Our study also shows an increased incidence of abnormal placentation with IVF use, including a 2.4-fold increased risk of placental abruption and a 6.0-fold increased risk of placenta previa noted in IVF pregnancies compared with controls. This has also been substantiated by other authors, including Verlaenen et al (15) in 1995 and Li et al (16) in 1996. Also our study shows increase rate of peripartum hysterectomy and PPH more in ART group than in spontaneous pregnancy ( P value = 0.120). As studied by Nardelli, A.A. et al in 2014. In comparison to spontaneous conception, IVF/ICSI appears to be associated with an increased risk of various obstetrical complications occurring during pregnancy and delivery, in our study we have obstetrical complications noted almost more than triple in ART group than in spontaneous conception.

In our study it was observed that there were no instrumental delivery compared to 2.86% in spontaneous group , which reveals the fact that obstetrician assuming ART as a precious pregnancy don't prefer instrumental deliveries also vaginal deliveries were 30.10% in ART group and 41.90% in spontaneous group and caesarean rate were 69.90% in ART group and 59.05% in spontaneous group revealing the truth that, may be because of so many obstetrical complications in ART conceived pregnancies, caesarean rate are more than vaginal deliveries. Comparing with study by Howell S in 2008 in Queensland, caesarean section deliveries are more common in pregnancies resulting from ART than in those that are the product of natural conception. This appears to be only partly due to the increased incidence of complicated pregnancies associated with ART: higher CS rates were observed in ART-conceived pregnancies among this cohort of nulliparous women with a full term, singleton birth, with vertex presentation where the risk of pregnancy complications is arguably low. There are trends indicating that CS rates in ART pregnancies are increasing in the public sector, although they appear to have established in the private sector. Sullivan EA et al concluded from his study in 2010, rates of caesarean section appear to be disproportionately high in term singleton births after ART. Vaginal birth should be supported and the indications for caesarean section evidence based, Crude rate of caesarean section was 50.1% versus 28.9% for all other births (12).

Post-partum haemorrhage in ART group is 7.71% compared to 1.90% in spontaneous conception, also rate of obstetrical hysterectomy were 2.91% in ART group which is 0% in spontaneous pregnancies, which again proves ART conception as a high risk, leading to a poor maternal outcome, a recent study by Francois et al in 2015 has shown that multiple pregnancies had a six fold increased risk of emergency peripartum hysterectomy compared to singleton pregnancies. Within this group, higher order multiple pregnancies (triplet and beyond) had an almost 24-fold increased risk of hysterectomy. It seems logical to conclude that the increase in multiple pregnancy rates associated with ART provides a further contribution to the rising peripartum hysterectomy rates.

## Conclusion:

To conclude it was observed that women in ART group had higher age group and BMI. There was a significant association between obstetrical complications with age. Obesity can be addressed in pre-conception period. Maternal pre-existing disease like anaemia, chronic hypertension, hypothyroidism

and diabetes mellitus should be treated before conception, to improve maternal and perinatal outcome.

Main obstetrical complications were multiple pregnancies (in more than half women), PIH, oligohydromnios and pre maturity (>40%). On one hand, more than one embryo transfer can give us good pregnancy rate, single embryo transfer provide better maternal and perinatal outcome. While addressing the advanced infertility treatment (ART procedure), the ultimate goal should be a good healthy carry home rate.

It was observed that more caesarean section rate, more because of apprehension from doctor and patient side, other than of course increased medical and obstetrical complications. There was increased incidence of peripartum complications like PPH and obstetrical hysterectomy.

To conclude significantly increased antenatal, obstetrical and neonatal complications may be attributable to increased maternal age, multiple pregnancies, pre-existing medical diseases and morbidities related to sub fertility itself rather than ART pregnancies per se.

**Limitations:** The study was conducted for a duration of 6 months to evaluate obstetrical outcome in ART, since the number of study subjects was small, so it is possible that the results may not be extremely precise.

**Conflict of interest:** The authors declare no conflict of interest.

## References:

- [1.] Boivin J, Bunting L, Collins J A, Nygren KG. International estimates of infertility prevalence and treatment seeking: potential need and demand for infertility medical care. *Hum Reprod* 2000;15:1023-27.
- [2.] Health Canada. Assisted Human Reproductive Agency of Canada. Available at: Accessed November 30, 2005.
- [3.] Wen, J et al. Birth defects in children conceived by in vitro fertilization and intracytoplasmic sperm injection: a meta-analysis. *Fertil Steril* 97,1331-1337(2012).
- [4.] Lambert R D. Safety issues in assisted reproductive technology: aetiology of health problems in singleton ART babies. *Hum Reprod* 2003;18:1987-91
- [5.] Maheshwari A, Porter M, Bhattacharya S. Women's awareness and perceptions of delay in childbearing. *Fertility and Sterility* 90.2008;1036-42.
- [6.] Wiener-Megnazi Z, Auslander R, Dirnfield M. Advanced paternal age and reproductive outcome. *Asian Journal of Andrology* 14,2012;69-76.
- [7.] Hourvitz A, Machtinger R, Manan E, Baum M, Dor J and Levron J. (2009). Assisted Reproduction in women over 40 years of age: How old is too old?. *RBM Online*.
- [8.] Dain L, Auslander M and Dirnfield M. The effect of paternal age on assisted reproduction outcome. *Fertility and Sterility* 95.2011; 1-8.
- [9.] Dildy GA, Jackson GM, Fowers GK, Oshiro BT, Varner MW, Clark SL. Very advanced maternal age: pregnancy after age 45. *Am J Obstet Gynecol*.1996;175:668-74.
- [10.] Dulitzki M, Soriano D, Schiff E, Chetrit A, Mashiach S, Seidman DS. Effect of very advanced maternal age on pregnancy outcome and rate of caesarean delivery. *Obstet Gynecol*.1998;9
- [11.] Canterino JC, Ananth CV, Smulian J, Harrigan JT, Vintzileos AM. Maternal age and risk of fetal death in singleton gestations: USA, 1995-2000. *J Matern Fetal Neonatal Med*.2004;15(3):1
- [12.] Sullivan EA, Chapman MG, Wang YA, Adamson GD. Population based study of caesarean section after invitro fertilization in Australia. *Birth* 2010;37;184-91.
- [13.] Wang JX, Knottnerus AM, Schuit G, Norman RJ, Chan A, Dekker GA. Surgically obtained sperm and risk of gestational hypertension and pre-eclampsia. *Lancet* 2002;359;673-4.
- [14.] Maman E, Lunenfeld E, Levy A, Vardi H, Potashnik G. Obstetric outcome of singleton pregnancies conceived via invitro fertilization and ovulation induction compared with those
- [15.] Verlaenen H, Cammu H, Derde MP, Amy JJ. Singleton pregnancies after invitro fertilization: Expectations and outcome. *Obstet Gynecol* 1995;86:906-10
- [16.] Li X, Zhuang G, Li D. The obstetric outcome of in vitro fertilization and embryo transfer pregnancy. *Fertil Steril* 1996;31:483-5