

## Fetomaternal Outcome of IVF Pregnancies in Third Trimester

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### ABSTRACT

**Introduction :** In Vitro Fertilization has emerged as a promising treatment option for infertility. However, it also increases the obstetric complications and adverse pregnancy outcomes. This study was conducted to gather the data on the incidence of maternal and neonatal outcome among IVF pregnancies.

**Methodology :** A prospective analysis of 80 IVF conceived pregnant patients in third trimester was done attending the OPD and IPD at Department of Obstetrics & Gynaecology, JLN Medical College, Ajmer during March 2020 to February 2021. All the patients were evaluated and the incidence of maternal and fetal complications, mode of delivery, and fetomaternal outcome was seen.

**Results :** In our study, most of the patients were >30 years of age(65.25%). Maternal complications were seen in 35% of the patients and HDP was the most common complication (46.42%). The complications were most common among patients >30 years and between gestational age 33-37 weeks(53%). Multifetal pregnancy had more maternal complications as compared to singleton pregnancies. A higher incidence of LSCS was seen among IVF conceived patients, which was more common in multifetal pregnancy. NICU admissions were more common in multifetal pregnancies and 43.75% IVF conceived patients had preterm delivery.

**Conclusion :** Maternal age has influenced the IVF conceived pregnancy and resulted in complications like HDP and GDM which were more frequently observed. Incidence of NICU admissions, FGR and neonatal death were more common in babies of mothers with HDP and multifetal gestation. Hence it is essential to identify such cases and provide prior maternal care to mother and fetus.

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### I. Introduction :

In Vitro Fertilization (IVF) is one of the most common advanced methods of Assisted Reproductive Technology (ART).<sup>1,2</sup> This approach reveals new aspects in the reproductive technology and infertility.<sup>3</sup> 10-15% of couples are infertile and during the last few decades, Infertility is prevalent among one in every four couples in the developing countries, is a neglected reproductive health condition.<sup>4</sup> India alone accounts for 30 million couples of infertility out of total 48.5 million globally affected couples.<sup>5,6</sup>

Infertility is a worldwide issue with 50 to 80 million couples in the reproductive age (8-12% couples) and 34 million in the developing countries suffering from lifetime infertility according to WHO 2010 census<sup>1</sup>. In India, primary infertility ranges between 3.9 to 16.8%, prevalence varying in various states.<sup>7</sup>

Considering the marital rate in 2020, similar to the current rate, the number of infertile couples could increase from 220 million in 2015 to 244 million by 2020. Infertility in the reproductive age group is ranked 5th most serious global disability.<sup>7,8</sup>

In vitro fertilization (IVF) has been a ray of hope for infertile couples especially in the elderly women. With the birth of the first child from in vitro fertilization, a new era in the science of assisted reproduction techniques was begun. Thirty years later, IVF procedures have become accepted worldwide for conception when there are difficulties in conceiving naturally.<sup>9</sup> ART techniques have provided the possibility of reproduction through the new ways and have improved the prognosis in infertile couples.<sup>10,11</sup>

IVF involves the use of own oocyte, donor oocyte, or vitrified embryo.<sup>12,13</sup> However, these treatments have been reported to be associated with the risk of various maternal complications like pregnancy-induced hypertension (PIH), gestational diabetes mellitus (GDM), preeclampsia, antepartum hemorrhage, placental abnormalities (placenta previa, abruption placentae), multiple pregnancy, post partum haemorrhage, puerperal sepsis, perinatal morbidity and mortality and fetal complications like multi-fetal pregnancy, preterm birth, low birth weight, small for gestational age (SGA), congenital abnormalities, and early neonatal death.<sup>14,15</sup>, compared to naturally conceived pregnancies, has been reported among singletons and twins.

Although there are benefits and disadvantages of every technique, IVF has no exception and studies have evidenced that couples treated with IVF-ET have neonates with congenital abnormalities as similar to naturally born neonates by 2-3%<sup>16,17,18</sup> and neurological morbidity<sup>19</sup>. Hence, it is understood that IVF-ET/ICSI outcomes are poor as compared to spontaneous conception<sup>20</sup>. Therefore, this study was conducted to gather the data on the incidence of maternal and neonatal outcome of pregnancy resulting from IVF pregnancy in terms of preterm labor, PPRM, and placental abnormalities.

**Objective :** To study the maternal and fetal outcome of pregnancies conceived with IVF techniques in terms of preterm labor, PPRM, and placental abnormalities.

## II. Methodology

### Study Design

This prospective study was conducted and ethically approved by the institutional committee and consent was obtained from all the 3<sup>rd</sup> trimester women who took IVF treatment for conception during March 2020 to Feb 2021 at OPD, Department of Obstetrics and Gynaecology in Rajkiya Mahila Chikitsalaya, JLN Medical College, Ajmer.

### Inclusion criteria

All IVF conceived women attending OPD in 3<sup>rd</sup> trimester. All 80 women who conceived through IVF were evaluated in terms of several factors such as : Infertile couple's age, type of infertility, duration of infertility, cause of infertility, male factor (including azospermia, oligospermia and varicocele), female factor included (ovulation problems, tubal factor, endometriosis). A check list was prepared and on the basis of information from the file, reviews were completed. Patients with recorded file information and access were enrolled in the study. They were followed up and the incidence of maternal and fetal complications, mode of delivery and fetomaternal outcome was seen.

### Statistical Analysis

Data entered in the questionnaire was analyzed using SPSS software. To express quantitative descriptive variables, the mean and to test the qualitative data and prevalence, standard deviation was used.

## III. Results :

Out of the 80 patients, 27 (34.75%) were in the age group 20-30 years, 49 (61.25%) in age group of 31-40 years and 4 patients were aged above 40 years. The mean age was 34.5 years. When socio-economic status was considered, most of the patients belonged to the Middle class i.e., 52.5% followed by Upper class i.e., 37.5% and few patients (10%) belonged to the lower socio economic status group (Table 1).

Age in years	No of patients	Percentage
20-30	27	34.75%
31-40	49	61.25%
>40	4	5%
Total	80	100%
Socio-economic status	Frequency	Percent
Lower	8	10%
Middle	42	52.5%
Upper	30	37.5%
Total	80	100.0

**Table 1: Demographic information of patients**

### Clinical Information :

With respect to clinical information, most of the patients had Primary infertility (81.2%) and 18.8% patients had secondary infertility. Singleton pregnancy was seen in most of the patients i.e. 53.75 %, whereas 46.25% had multifetal pregnancy. In the early II<sup>nd</sup> trimester, 6 (7.5%) patients had cervical cerclage operation (Table 2).

Type of infertility	Frequency	Percent
Primary	65	81.2%
Secondary	15	18.8%
Total	80	100.0

H/O Macdonald Enclerlage	Frequency	Percent
No	74	92.5%
Yes	6	7.5%
Total	80	100.0

**Table 2: Clinical information of patients**

**Complications :**

In our study, it was observed that 35% of the patients had some type of maternal complication; out of which HDP was the commonest (46.42%). The maternal complications were more common in patients of secondary infertility, as compared to primary infertility patients. Out of the 65 patients of primary infertility, 32% patients had complications and among 15 patients of secondary infertility, 46% patients had complications. HDP was the mostly common complication seen among patients with primary and secondary infertility (Table 3).

Maternal complications	Infertility		Total
	Primary	Secondary	
No complication	44	8	52
Abruption	1	0	1
GDM	5	1	6
IHCP	1	0	1
Placenta Previa	0	1	1
PPROM	3	0	3
HDP	8	3	11
HDP& GDM	1	0	1
HDP& PPRM	0	1	1
PROM	2	1	3
Total	65	15	80

**Table 3 : Maternal Complications among IVF pregnancies**

**Association with age :**

With advancing maternal age, the complications like HDP and GDM were more frequently observed. Maternal complications (39.28%) were more commonly seen in patients aged >30 years. The study showed that HDP was 18% in age > 30 year patients while 11% in age < 30 years. GDM was observed in 7% patients with age < 30 years and 9% of patients > 30 years (Table 4).

Maternal complications	Age Range			Total
	21-30	31-40	>40	
No complication	17	34	1	52
Abruption	1	0	0	1
GDM	2	2	2	6
IHCP	0	1	0	1
Placenta Previa	0	0	1	1
PPROM	2	1	0	3
HDP	3	8	0	11
HDP& GDM	0	1	0	1
HDP& PPRM	0	1	0	1
PROM	2	1	0	3
Total	27	49	4	80

**Table 4: Maternal age and associated complications**

**Fetal outcome in IVF pregnancy :**

Among 80 patients in our study, out of them 43 patients had singleton pregnancy, 15 neonates had NICU admission in which 5 neonates had FGR and out of them, 2 neonates had early neonatal death. The incidence of NICU admission, FGR and neonatal death were more common in babies of mothers with HDP. (Table 5).

Maternal Complication	No of patients	NICU Admission	FGR	Early neonatal death
No complication	28	4	0	0
Abruptio	1	1	0	0
GDM	6	2	0	0
IHCP	0	0	0	0
Placenta Previa	0	0	0	0
PPROM	2	2	0	0
HDP	4	4	4	1
HDP& GDM	0	0	0	0
HDP & PPRM	1	1	1	1
PROM	1	1	0	0
TOTAL	43	15	5	2

**Table 5 : Fetal outcome in singleton pregnancies**

Among the 80 patients in our study, out of them 37 patients had multifetal pregnancy, 32 neonates had NICU admission in which 6 neonates had FGR. The incidence of NICU admissions and FGR was more common in babies of mothers with HDP (Table 6).

Maternal outcome	No of patients	NICU Admission 1stTwin	NICU Admission 2nd Twin	FGR	Early neonatal death
No complication	24	6	5	0	0
Abruptio	0	0	0	0	0
GDM	0	0	0	0	0
IHCP	1	1	1	0	0
Placenta Previa	1	1	1	0	0
PPROM	1	1	1	0	0
HDP	7	5	7	6	0
HDP & GDM	1	1	1	0	0
HDP& PPRM	0	0	0	0	0
PROM	2	0	1	0	0
TOTAL	37	15	17	6	0

**Table 6 : Fetal outcome in multifetal pregnancies**

**IV. Discussion :**

In the current study, fetal and maternal outcomes of 80 pregnant women who underwent IVF were evaluated.

**Age and study details**

Most of the patients (61.25%) belonged to the age group of 31-40 years, followed by 20-30 years. The mean age was 34.5 years. Most of them belonged to the Middle-income group i.e., 52.5% followed by Upper-Income group i.e., 37.5%. Few patients (10%) belonged to the lower income group in the current study. In the study of **Parvin Akbari et al. (2016)<sup>21</sup>**, the mean age was less compared to the current study. In the study of **Michael J Davies et al (2012)<sup>22</sup>**, 6163 women with assisted conception were evaluated, More patients belonged to the age group 30 to 34 years. 26.3% patients belonged to the low socio-economic status.

Variables	Current study	Parvin et al. <sup>21</sup>	Micheal J Davis et al <sup>22</sup>
Sample size	80	100	6163 with assisted conception
Study place	India	Iran	Australia
Type of study	Prospective, observational study at tertiary care center	Retrospective, descriptive study	Comparative study between women with assisted and spontaneous conception
Study period	2020-2021	2010-2015	Data collected from National Health and Medical Research Council -Australia-from 1986 to 2002
Age	More patients	Mean age was 30.5 years	More patients belonged to 30 to 34 years

	belonged to 31 to 40 yrs.		
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**Type of infertility and pregnancy**

Among 80 patients in this study, most of the patients (81.3%) had Primary infertility. Singleton pregnancy was seen among most of the patients i.e., 53.8% in the current study. 46.2% women had multifetal pregnancy. In the study of **Manish Banker et al. (2016)<sup>22</sup>**, out of 2112 embryonic transfers done, 286 pregnant women had multifetal pregnancies. In the study of **Parvin et al.<sup>21</sup>**, Premature Ovarian Failure accounted for 10% of infertility cases, PCOD for 8% cases of infertility. Hypo gonadotropic hypogonadism was the reason in 5% cases, tubal factors were the reason in 10% cases, endometriosis in 10% cases, and ovarian reasons constituted 23% for causing infertility. 63% were singleton pregnancies, 19% women had multifetal pregnancy in **Parvin’s study<sup>21</sup>**. Singleton pregnancies were more similar to the current study. Reasons or etiology of primary and secondary infertility were not evaluated in the current study. This is one of the limitations of the current study. 70% women had singleton pregnancies in the study of **Micheal et al<sup>22</sup>**.

**Maternal Complications :**

Out of the 80 patients in the study, 35% had maternal complications. 75 patients out of 100 patients included in the study of **Parvin et al<sup>21</sup>** had no complications. 5.9% had diabetes, 1.6% had hypertension, 4.2% had asthma, 12.9% has anemia among pregnant women with assisted conception in the study of **Micheal et al<sup>22</sup>**.

Maternal complication	No of patients in current study	No of patients in Parvin’s study.
<b>Abruption</b>	1	2
<b>GDM</b>	6	6
<b>IHCP</b>	1	
<b>Placenta Previa</b>	1	4
<b>PPROM</b>	3	-
<b>Preeclampsia</b>	11	2

**Neonatal Outcome :**

There is a significant difference in birth weight of babies born to women with singleton pregnancy compared to mothers who had delivered twin babies. The mean birth weight was 2.47 kgs in babies with mothers of singleton pregnancy. The mean birth weight of first twin was 2.17kgs and second twin was 2.12kgs in babies with mothers of multiple gestation in the current study. Overall, the mean birth weight was low in the current study. Abnormalities in birth weight, especially low birth weight, was linked to IVF. An increased risk of LBW was seen among babies of mothers conceived with the assistance of IVF.

Out of the 80 patients, late premature delivery was more common than early premature deliveries. There were 2 early neonatal deaths, 5 FGRs and 47 NICU admissions in the current study.

In the study of **Parvin et al<sup>21</sup>**, fetal anomalies were found in 2% babies and IUGR was seen in 2% babies born to mothers who underwent IVF.

Still births were seen in 42 babies, early neonatal deaths were seen in 12 babies and late neonatal deaths were seen in 3 babies, congenital anomalies were seen in 11 babies in the study of **Manish Banker et al<sup>23</sup>**. 8.3% Babies had congenital anomalies in the study of **Micheal et al.<sup>22</sup>**

The study of **Tracy shevell et al. (2005).<sup>24</sup>**, says that there was no association between ART and FGR, aneuploidy, or fetal anomalies.

**V. Conclusion :**

Maximum patients had pregnancies in 30-40 years of age which influences the pregnancy and affects the fetal growth. Singleton pregnancies were more common than multifetal. HDP was the most common complication seen among IVF conceived patients. Maternal age has influenced the pregnancy and resulted in complications like HDP and GDM which were more frequently observed. Incidence of NICU admission, FGR and neonatal death were more common in babies of mothers with HDP and in multifetal gestation. Hence, it is essential to identify such cases and provide prior maternal care to mother and fetus.

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