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Original Research Paper

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"STUDY ON" BIRTH, PRETERM BIRTH AND LOW BIRTH WEIGHT IN INFANTS BORN FROM INVITRO FERTILIZATION

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ABSTRACT

BACKGROUND: In-vitro fertilisation (IVF) is now widely used for the treatment for infertility, and validated age-stratified national success rates and outcomes are published annually. To facilitate patient counselling, clinical decision-making, and access to health care provision, prediction models for live birth after IVF have been constructed. However, these studies have been limited by their sample size, development before the introduction of intracytoplasmic sperm injection (ICSI), or lack of validation in external populations. In our study, we included 58 subjects who were undergoing IVF for infertility. **The objectives of the study** include, to study the incidence of term birth and preterm birth among the infants delivered by IVF (In vitro fertilisation) and to study the incidence of low birth weight among the infants born by IVF. **Results and Discussion:** It is evident from our study, that the incidence of the single live birth infants born to IVF mothers was 67.2% as compared to twins which was 32.8%. The incidence of the single liver birth infants born to IVF mothers was 67.2% as compared to twins which was 32.8%. that the incidence of term birth (34-36 weeks) was 60.3% as compared to preterm birth. The incidence of preterm birth was 82% as compared to term birth which was 12%. The incidence of low birth weight infants was 65.5% as compared to normal birth weight which was 34.5%.

KEYWORDS : Infertility, Invitro Fertilisation, Live Birth Infants, Incidence, Preterm Birth

BACKGROUND:

In-vitro fertilisation (IVF) is now widely used for the treatment for infertility, and validated age-stratified national success rates and outcomes are published annually.[1-3] To facilitate patient counselling, clinical decision-making, and access to health care provision, prediction models for live birth after IVF have been constructed.[4] However, these studies have been limited by their sample size, development before the introduction of intracytoplasmic sperm injection (ICSI), or lack of validation in external populations.[5-9] Established multivariable prediction models may therefore not be applicable to contemporary couples seeking treatment. Consequently, clinicians and regulatory bodies have not adopted prediction models and predominantly quote age related success rates.[1-3] Given the known complications with multiple gestations and prematurity, the focus has moved to defining the most appropriate IVF outcome variable as a singleton term live birth.[10-12] Low birth weight and macrosomia are also known to be associated with immediate and long-term risk to offspring heath and IVF singletons are at increased risk of these complications.[14-15] It is now recognised that factors leading to infertility may be responsible for adverse perinatal outcome rather than the process itself however, which parental characteristics of infertile couples contribute to adverse perinatal outcomes in IVF singletons and can thereby be targeted for intervention remain unknown.[16-19]

OBJECTIVES OF THE STUDY:

The objectives of the study include,

1. To study the incidence of term birth and preterm birth among the infants delivered by IVF (In vitro fertilisation)
2. To study the incidence of low birth weight among the infants born by IVF

MATERIALS AND METHODS:

We included a total of 58 subjects in our study, who underwent in vitro fertilization aged between 20-50 years. We studied the incidence of term birth, preterm birth among and incidence of low birth weight among the infants delivered by IVF (In vitro fertilisation). This study was conducted at Sharda Narayan Hospital, Mau near Varanasi from June 2016 to June 2019.All treatment cycles and outcomes registered on the database between June 2016 and June 2019 were used in our study. Treatment cycles that were for storage or donation of gametes, were not IVF, or were frozen embryo transfers were excluded.

Although there is a move to greater use of frozen embryo cycles we excluded these from our analyses to be consistent with previous publications, including that by Templeton et al. [7] in which the established model was developed. Furthermore, during the time studied very few elective single embryo transfers were performed (0.05% of all cycles). Information was obtained for recipient age groups and age groups of women having autologous IVF, type of infertility (female primary or secondary infertility), cause of infertility (tubal disease, ovulatory disorder, male factor, unexplained, endometriosis), previous live births, day of embryo transfer (<day 5 or ≥day 5), number of embryos transferred, initial multiple pregnancy with spontaneous reduction resulting in singleton live birth (vanishing twin), gestational length at delivery and birth weight. Information was also obtained for oocyte donor age groups (<20, 21–25, 26–30, and 31–35 years). Perinatal outcomes of PTB, early PTB, LBW and very LBW were compared between fresh oocyte donation and autologous fresh IVF cycles. A live birth is defined as a birth event in which at least one baby is born alive. Preterm birth is defined as live birth before 37 weeks gestation and early PTB is live birth before 32 weeks. Low birth weight is birth weight less than 2500 g and very LBW is birth weight less than 1500 g.

RESULTS AND DISCUSSION:

We included a total of 58 subjects in our study, who underwent invitro fertilization aged between 20-50 years.

Table 1: Distribution of the study subjects based on their age

Mothers age	Frequency	Percent
20-25	7	12.1

26-30	20	34.5
31-35	19	32.8
36-40	9	15.5
41-45	2	3.4
46-50	1	1.7
Total	58	100.0

It is evident from the table 1, that majority of the study subjects belong to the age group of 26-30 (34.5%) years.

Table 2: Distribution of study subjects based on single/twin birth

Birth	Frequency	Percent
Single	39	67.2
Twin	19	32.8
Total	58	100.0

It is evident from the table 2, that the incidence of the single liver birth infants born to IVF mothers was 67.2% as compared to twins which was 32.8%.

Table 3: Distribution of study subjects based on term birth

Term Birth	Frequency	Percent
34-36 weeks	35	60.3
32-34 weeks	10	17.2
28-32 weeks	4	6.9
<28 weeks	2	3.4
>36 weeks	7	12.1
Total	58	100.0

It is evident from the table 3, that the incidence of term birth (34-36 weeks) was 60.3% as compared to preterm birth.

Table 4: Association between age of the mother and term birth

	34-36 weeks	32-34 weeks	28-32 weeks	<28 weeks	>36 weeks	total	P value
20-25	5	1	0	0	1	7	0.79
26-30	11	2	3	0	4	20	
31-35	12	4	1	1	1	19	
36-40	5	3	0	1	0	9	
41-45	1	0	0	0	1	2	
46-50	1	0	0	0	0	1	
Total	35	10	4	2	7	58	

Table 5: Association Between The Age Of The Mother And Single /twin Birth

	Single	Twin	Total	p value
20-25	4	3	7	0.889
26-30	15	5	20	
31-35	12	7	19	
36-40	6	3	9	
41-45	1	1	2	
46-50	1	0	1	
Total	39	19	58	

Table 6: Incidence of low birth weight and normal birth weight

	Frequency	P value
<2.5 kg	38	0.009
>/=2.5kg	20	
Total	58	

Table 7: Incidence of low birth weight among Single and Twins birth

	Single	Twin	Total	P value
<2.5 kg	14	24	38	.000
>/=2.5kg	19	1	20	
Total	33	25	58	

Pregnancies following assisted reproductive treatments (ART) are associated with a significantly higher risk of adverse obstetric outcomes such as preterm birth (PTB) and low birthweight (LBW) compared with spontaneous pregnancies (Schieve *et al.*, 2007; McDonald *et al.*, 2009, 2010). The possible reason for adverse obstetric outcomes following ART has been attributed to the underlying infertility itself and embryo specific epigenetic modifications due to the IVF techniques (Pinborg *et al.*, 2013). Studies have also reported higher rates of PTB and LBW among women of advanced maternal age (Ludford *et al.*, 2012; Phadungkiatwattana *et al.*, 2014) and this is thought to be the result of vascular ageing and vascular endothelial dysfunction (Pell *et al.*, 2004; Bonamy *et al.*, 2011; Hastie *et al.*, 2011).

Vascular endothelial dysfunction associated with advanced female age is in turn attributed to sex steroid depletion, which is a consequence of ovarian ageing (Herrington *et al.*, 2001; Vita and Keaney, 2001). It is therefore a matter of interest whether women with poor response to ovarian stimulation, which is a manifestation of early ovarian ageing, are at increased risk of these adverse obstetric outcomes following IVF treatment. There have been few studies addressing the association between response to ovarian stimulation and obstetric outcomes following IVF treatment. In our study, we included 58 subjects who were undergoing IVF for infertility. It is evident from our study, that the incidence of the single liver birth infants born to IVF mothers was 67.2% as compared to twins which was 32.8%. The incidence of the single liver birth infants born to IVF mothers was 67.2% as compared to twins which was 32.8%. that the incidence of term birth (34-36 weeks) was 60.3% as compared to preterm birth. The incidence of preterm birth was 82% as compared to term birth which was 12%. The incidence of low birth weight infants was 65.5% as compared to normal birth weight which was 34.5%.

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