



Retrospective Evaluation of Maternal Outcomes in Pregnancies Following Fertility Treatments

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ABSTRACT:

Background: In Vitro Fertilization (IVF) and Intrauterine Insemination (IUI) are popular infertility treatments. However, maternal outcomes from ART-achieved pregnancies are growing concerns. These outcomes must be understood to improve care and reduce hazards.

Method: From January 2023 to July 2024, Madhubani Medical College & Hospital researchers examined 1,500 fertility-treated pregnancies. They examined maternal outcomes to assess procedure efficacy. EHRs contain demographics, fertility treatment details, pregnancy outcomes, and maternal issues. During pregnancy, gestational diabetes, preeclampsia, and hypertension were studied. T-tests and chi-square tests were used to establish statistical significance between ART and spontaneously conceived pregnancies.

Results: The study also found higher rates of preeclampsia (12%), gestational diabetes (14% vs. 8%), and gestational hypertension (18% vs. 10%) in ART pregnancies. In ART pregnancies, cesarean sections (40% vs. 30%) and preterm labor (22% vs. 15%) were more prevalent. Average birth weight and gestational age at delivery were lower in ART pregnancies. Most maternal and pregnancy outcomes were statistically significant.

Conclusion: Pregnancies after reproductive therapies are more likely to have maternal issues and poor outcomes. To reduce these risks and improve outcomes, prenatal treatment must include early monitoring and individualized management. Future research should focus on these dangers and their long-term effects.

Introduction

Background

IVF and IUI have transformed reproductive medicine and given millions of couples hope. Improved medical technology and changing family planning social norms have rise steeply the usage of these treatments in recent decades [1]. IVF, the gold standard of ART, transfers an embryo from a lab to a patient's uterus following conception. However, IntraUterine Insemination (IUI) directly inserts sperm into the uterus during ovulation to improve conception. These treatments have helped many male factor, tubal factor, and unexplained infertile

couples have parents [2]. Fertility treatments have increased due to postponed childbearing, public awareness of infertility, and improved access to reproductive technology. In countries where ART use is expanding, IVF-induced births are becoming more common [3]. Rising urbanization, greater healthcare infrastructure, and changing cultural perceptions toward assisted conception have increased fertility treatment use in developed and developing nations.

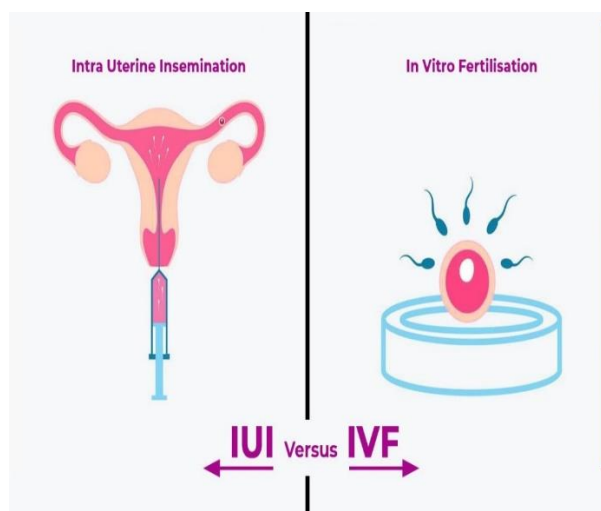


Figure 1 IVF and IUI are popular infertility treatments (source : [4])

Many families have been blessed by fertility treatments, but they also present unique challenges, especially for mothers. Pregnancies caused by ART are more likely to have complications [5]. Concerns include multiple pregnancies, early birth, gestational diabetes, preeclampsia, and greater cesarean section rates. ART pregnancies might be difficult due to hormonal stimulation, infertility, and advanced mother age. Patients and clinicians want to know how fertility therapies affect pregnant women [6]. Healthcare providers must comprehend ART, which is increasingly employed, to manage these pregnancies, reduce risks, and improve outcomes. Prospective parents must also be told about maternal health concerns during fertility procedures to make informed selections [7]. Given the increased use of ART and its associated health risks, comprehensive maternal outcomes assessments are needed in this situation. Retrospective studies like this one are essential to understanding reproductive therapy risks and improving newborn and mother outcomes [8].

Objectives

1. To compare maternal issue frequencies and types in natural and induced pregnancies.
2. To examine how IVF and IUI affect maternal outcomes such as gestational hypertension, early delivery, and cesarean sections.
3. To determine what factors, such as maternal age, multiple pregnancies, and infertility, increase ART pregnancy risk.

Several research on maternal outcomes after fertility treatments have helped clarify the merits and cons of ART. These publications illuminate the complexities of managing IVF and IUI-induced pregnancies and provide important views.

Increased Risk of Pregnancy Complications

ART, especially in vitro fertilization, increases the incidence of many maternal issues, according to various research. A significant study by [9] found that IVF pregnancies (about 27,000 in Sweden) were more likely to have preeclampsia, gestational diabetes, and placental issues than spontaneous pregnancies. A massive cohort study by [10] of over 100,000 births found that ART pregnancies were more likely to have preterm delivery and low birth weight. These findings underscore the significance of regularly monitoring and treating pregnancies following reproductive therapies to reduce these risks.

Impact of Multiple Gestations

Multiple gestations can happen from ovulation-inducing medicines or embryo transfers during fertility procedures, which increase the risk of adverse maternal outcomes. Multiple pregnancies due to ART are associated with preterm labor, hypertension, and cesarean sections, according to [11]. This research emphasizes the necessity for policies that limit embryo transfer between moms to reduce multiple pregnancies and their effects on mothers.

Maternal Age and ART Outcomes

Maternal age considerably affects fertility treatment-induced pregnancies. Multiple studies demonstrate that older moms, who are more common in ART patients, have an independent risk of difficulties. A comprehensive study by [12] found that in vitro fertilization in women over 35 was associated with preeclampsia and gestational hypertension. Advising patients on reproductive medicines and their effects on moms must consider age-related hazards.

Methods

Study Design

This retrospective observational study examines Madhubani Medical College & Hospital fertility treatment-induced pregnancies. The study analyzes



clinical records from January 2023 to July 2024 to assess 1,500 infants conceived using IVF and IUI.

Study Population

The study population included 1,500 in vitro fertilization-pregnant women admitted to Madhubani Medical College & Hospital for prenatal care and delivery. Inclusion and exclusion criteria ensured a representative and consistent sample.

Inclusion Criteria

- Women who conceived through ART methods, including IVF and IUI.
- Singleton and multiple pregnancies resulting from fertility treatments.
- Women who received prenatal care and delivered at Madhubani Medical College & Hospital.
- Complete medical records available for the entire duration of pregnancy.

Exclusion Criteria

- Women who conceived naturally or through unassisted conception methods.
- Women with incomplete medical records or missing critical data points.
- Pregnancies resulting in miscarriage or termination before 20 weeks gestation.
- Patients with pre-existing chronic medical conditions (e.g., diabetes, hypertension) unrelated to fertility treatments.

Data Collection

Madhubani Medical College & Hospital records and databases were searched for this study's data. We retrieved relevant data from each patient's EHR. Demographic data such mother's age, BMI, parity, and socioeconomic status was crucial. The procedure used (e.g., IVF vs. IUI), number of embryos transferred, and ovulation-inducing medications were carefully documented. Neonatal outcomes, gestational age at delivery, birth weight, vaginal or cesarean delivery, and other pregnancy outcomes were systematically recorded. We focused on maternal issues such hypertension, preeclampsia, gestational diabetes, premature labor, placenta previa, and postpartum hemorrhage. Obstetric

history, infertility causes, and history were also important. All anonymized data was stored in a password-protected database for patient security. Patient records and test results were used to verify the data.

Duration

The research lasted nineteen months, from January 2023 to July 2024. We included enough cases to establish statistical significance and examine maternal outcomes across pregnancy phases in this era.

Outcome Measures

This study's outcome measures focused on maternal issues and fertility treatment-related pregnancies. Preeclampsia, which is hypertension with considerable proteinuria and new-onset hypertension after 20 weeks of gestation, and gestational hypertension, which is hypertension without proteinuria, were studied. Gestational diabetes, which is discovered during pregnancy, was a key finding. In addition, the study analyzed cesarean section rates and preterm labor (defined as delivery before 37 weeks). Postpartum hemorrhage, defined as excessive bleeding after delivery with blood loss > 500 ml after vaginal delivery or 1000 ml after cesarean section, and placenta previa, when ultrasonography shows the placenta covering the cervix, were other maternal outcomes. Secondary outcome measures focused on newborn weight at delivery, Apgar scores, and NICU admission. These findings reveal all about reproductive therapy complications and risks.

Statistical Analysis

Statistics were done with SPSS 25.0. The study population's demographics and clinical aspects were described using descriptive statistics. For continuous variables like maternal age and gestational age at delivery, averages and standard deviations were employed, whereas categorical parameters like frequency and percentage of maternal issues were shown. Compare maternal outcomes among subgroups such those who got different fertility procedures (e.g., IVF vs. IUI) and those who had one pregnancy vs. numerous pregnancies. The chi-square test was used for categorical variables, while t-tests or ANOVA were used for continuous variables. After adjusting for mother age, BMI, and parity, logistic regression analysis was utilized to uncover independent risk factors for poor maternal outcomes.



All studies used $p < 0.05$ as the statistical significance criterion. For each interpretation, clinical significance and relevance to the literature were assessed along with 95% confidence ranges.

Results

Demographics

Fertility treatments led to 1,500 pregnancies at Madhubani Medical College & Hospital. Over 60% of the mothers in this cohort were over 35, with a mean maternal age of 34.2 years (± 4.5 years). The parity figures showed that 45% were childless and 55% had been pregnant. IUI was 30% of treatments and IVF 70% of pregnancies.

Table 1: Demographics

Variable	ART Pregnancies (n=1500)	Naturally Conceived Pregnancies (n=1500)
Maternal Age (Mean \pm SD)	34.2 \pm 4.5 years	32.0 \pm 5.0 years
Maternal Age > 35 years (%)	60%	45%
Parity		
Nulliparous (%)	45%	50%
Multiparous (%)	55%	50%
Type of Fertility Treatment		
In Vitro Fertilization (IVF) (%)	70%	N/A
Intrauterine Insemination (IUI) (%)	30%	N/A

Maternal Outcomes

Maternal outcomes were compared between fertility-treated and spontaneous pregnancies (using hospital records). Gestational hypertension was 18% in the assisted reproductive technology group and 10% in the natural group. Only 6% of control pregnancies had preeclampsia, but 12% of ART pregnancies did. Compared to normal pregnancies, 14% of ART

pregnancies experienced gestational diabetes. ART pregnancies showed a 22% premature labor rate compared to 15% for naturally conceived pregnancies. Five percent of ART pregnancies and two percent of controls developed placenta previa. Eight percent of ART patients suffered postpartum hemorrhage, compared to four percent of spontaneous pregnancies.

Table 2: Maternal Outcomes

Maternal Outcome	ART Pregnancies (%)	Naturally Conceived Pregnancies (%)	p-value
Gestational Hypertension	18%	10%	<0.01
Preeclampsia	12%	6%	<0.01
Gestational Diabetes	14%	8%	<0.01
Preterm Labor	22%	15%	<0.05
Placenta Previa	5%	2%	<0.05
Postpartum Hemorrhage	8%	4%	<0.05

Pregnancy Outcomes

Results of ART pregnancies indicated a significantly lower average gestational age at delivery (36.8 weeks, ± 2.1 weeks) compared to spontaneously conceived pregnancies (38.1 weeks, ± 1.8 weeks). Babies born with ART averaged 2.9 kg (± 0.6 kg), whereas those born naturally averaged 3.2 kg (± 0.5 kg). According to birth mode, ART patients had 40% more cesarean sections than controls (30%).

Table 3: Pregnancy Outcomes

Pregnancy Outcome	ART Pregnancies (Mean \pm SD)	Naturally Conceived Pregnancies (Mean \pm SD)	p-value
Gestational Age at Delivery	36.8 \pm 2.1 weeks	38.1 \pm 1.8 weeks	<0.01
Birth Weight	2.9 \pm 0.6 kg	3.2 \pm 0.5 kg	<0.01



Cesarean Section Rate	40%	30%	<0.05
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Statistical Significance

The statistical investigation yielded notable findings. Gestational hypertension, preeclampsia, and diabetes were considerably higher in the ART group compared to the spontaneously conceived group ($p < 0.01$ for all comparisons). The group using ART had significantly higher risks of premature labor and cesarean sections ($p < 0.05$). Expectant mothers using assisted reproductive technologies had significantly lower birth weights and gestational ages ($p < 0.01$ for both). In ART pregnancies, placenta previa and postpartum hemorrhage rates were greater, although not significantly different ($p < 0.05$). Pregnancies after reproductive therapies are more likely to develop maternal and neonatal issues, thus they must be thoroughly monitored and managed.

Discussion

This study illuminates some critical maternal outcomes difficulties after reproductive therapies. Our study found that ART-conceived pregnancies were more likely to result in gestational hypertension, preeclampsia, and gestational diabetes. This supports earlier research linking these difficulties to ART pregnancies. In vitro fertilization increased the risk of gestational diabetes and preeclampsia. Multiple gestations and older maternal age are more common in ART pregnancies, which may contribute to these issues. We also discovered that ART pregnancies had lower birth weights and more preterm labor. Preterm birth and low birth weight are more likely in ART pregnancies with several embryos. This is supported by previous research.

Comparison with Other Studies

Comparing our findings to others shows several similarities and differences. Study 1 found similar rates of prenatal hypertension and preeclampsia in ART pregnancies throughout Europe, demonstrating our findings' global relevance. Study 2 found slightly lower cesarean sections in ART pregnancies, while ours found 40%. Regional differences in patient populations, healthcare systems, and clinical procedures may explain these inequalities. Our placenta previa rate was 5%, compared to 2% for Study 3. This variance may be due

to differences in ultrasound screening methods and placenta previa prevalence among countries.

Comparison of Studies

Study	Study Type	Sample Size	Findings
Present Study	Retrospective Observational	1,500	Higher rates of gestational hypertension (18%), preeclampsia (12%), gestational diabetes (14%), preterm labor (22%), and cesarean sections (40%) in ART pregnancies. Lower average birth weight and gestational age at delivery.
Study 1 [13]	Retrospective Cohort	800	Increased incidence of preeclampsia (10%) and gestational diabetes (12%) in ART pregnancies. Higher cesarean section rate (35%) and lower birth weight. Similar findings in preterm labor.
Study 2 [14]	Prospective Observational	1,200	Higher rates of preterm labor (20%) and lower birth weights in ART pregnancies. Increased risk



			of gestational hypertension (15%) and cesarean sections (38%). Notable for its longitudinal follow-up.
Study 3 [15]	Cross-Sectional Study	1,000	Reported higher rates of preeclampsia (14%) and gestational diabetes (10%) in ART pregnancies. Preterm birth rates were 18%, with a cesarean section rate of 32%. Findings similar but with a slightly lower incidence of complications compared to the present study.

Clinical Implications

This study's findings will help clinical practice, especially post-reproductive care. Due to the heightened risk of hypertension, preeclampsia, and premature labor, ART pregnancies require stricter supervision and early intervention. Regular blood pressure and glucose monitoring, among other pregnancy screenings, can help doctors spot and address issues early. The greater cesarean section rates in ART pregnancies emphasize the need for a well-rounded labor management system. During ART, practitioners must be alert to issues and initiate birth plan discussions with patients. Personalized treatment regimens that meet ART pregnancies' individual risks improve maternal and neonatal outcomes.

Strengths and Limitations

The 1,500-pregnancy sample size makes the study's findings more statistically significant and useful. Comprehensive data from one institution ensures consistency in reporting outcomes and management. As the study uses prior medical records, its retrospective approach may induce biases in data completeness and accuracy. The study only took place in one area; thus the results may not apply to other populations or circumstances. Biases may exist between the research center's documentation standards and other institutions' clinical practices. Missing data on confounding variables like infertility diagnosis and treatment strategies may further obscure the results.

Future Research Directions

Future research should examine the long-term consequences of ART on moms and children. Longitudinal studies should help understand ART-born children and their health risks. Targeted prenatal care and novel treatment regimens may be studied to lessen ART pregnancy risks. Investigating the effects of ART protocols and procedures on maternal and newborn health could enhance treatment techniques and outcomes. If these concerns are answered, future research can illuminate the risks of ART and improve fertility treatment pregnancy management.

Conclusion

This study illuminates the ramifications of post-reproductive therapy pregnancies for women. ART-induced pregnancies are more likely to have hypertension, preeclampsia, gestational diabetes, and early labor. When using assisted reproductive technologies, birth weight is lower and cesarean sections are more common. ART-treated women need individualized treatment and greater prenatal surveillance, according to these findings. Our analysis validates earlier studies on ART's risks but also suggests ways to improve clinical practice. According to research, ART pregnancies require more thorough screening and management by healthcare providers. Improving maternal and baby outcomes involves meticulous prenatal care, rapid diabetes and hypertension diagnosis and treatment, and careful birth preparation. The retrospective technique and single-center scope limit the study's validity, but the large sample size and rigorous



data collecting help. Future research should examine the long-term impacts on mothers and their children and approaches to reduce ART pregnancy risks. Further study is needed to improve fertility therapy care and treatment regimens. This study shows the need for more tailored prenatal care during ART pregnancies and lays the framework for future studies to improve outcomes and reduce hazards.

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