

OBSTETRIC AND NEONATAL OUTCOMES IN ART-CONCEIVED VS. SPONTANEOUS PREGNANCIES: A YEARLONG COHORT STUDY FROM A HIGH-VOLUME MATERNITY CENTER

Sistema Socio Sanitario



Regione Lombardia

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Background

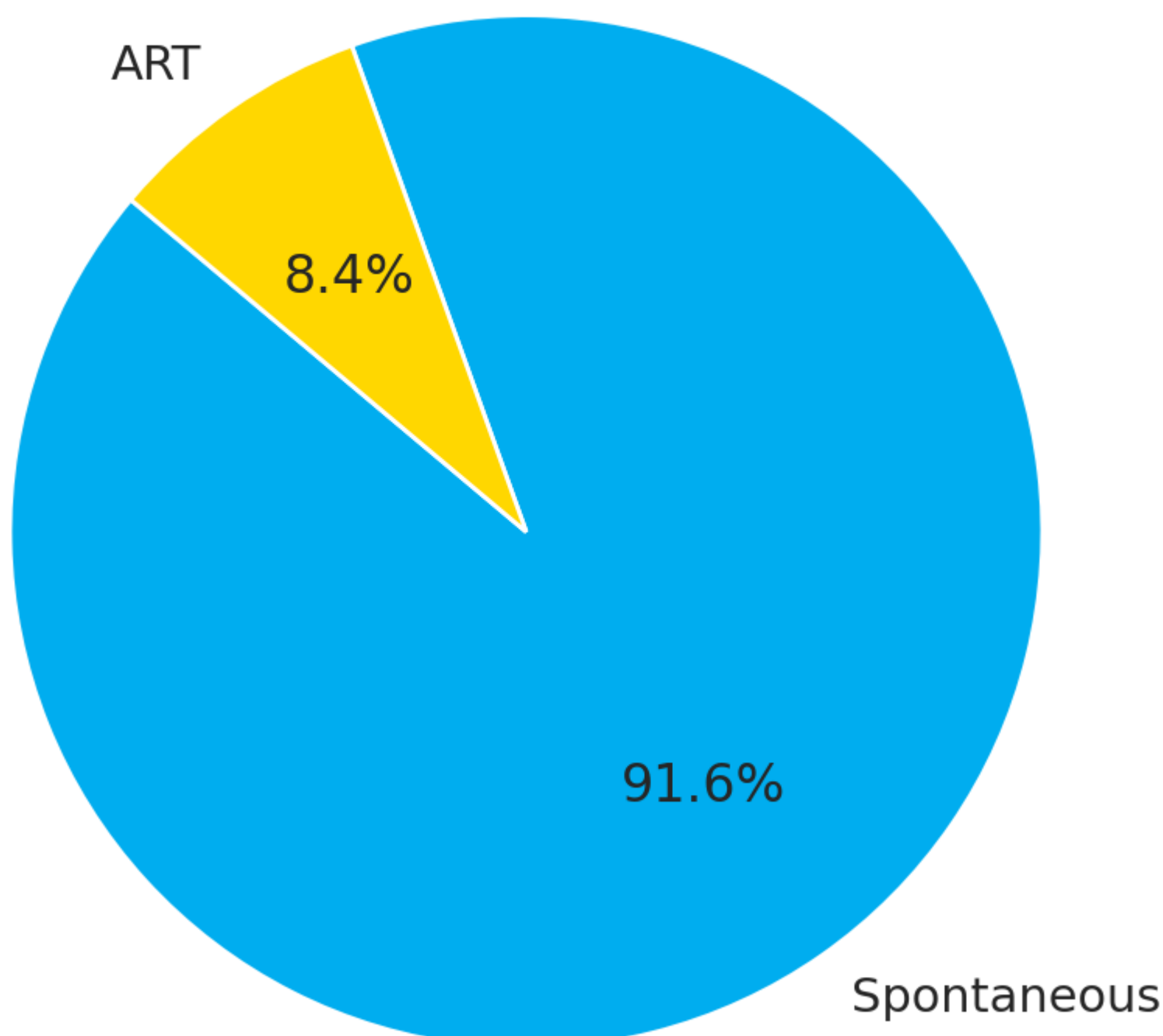
- Assisted reproductive technologies (ART), including in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI), have led to a marked increase in pregnancies among individuals with infertility, often in association with advanced maternal age and comorbidities. While ART has revolutionized reproductive medicine, it is well established that ART-conceived pregnancies carry a higher risk of maternal and perinatal complications throughout gestation and at the time of delivery.
- Despite these concerns, few studies have systematically evaluated real-world delivery outcomes of ART pregnancies in high-volume, tertiary maternity centers. Understanding the specific intrapartum risks associated with ART is essential to ensure appropriate management strategies, optimize resource allocation, and improve maternal and neonatal outcomes.
- This study aims to present the 2024 experience of a level III maternity hospital in Milan, comparing key maternal and neonatal outcomes at delivery between ART-conceived and spontaneously conceived pregnancies, with particular attention to labor management, obstetric interventions, and postpartum complications.

Objectives

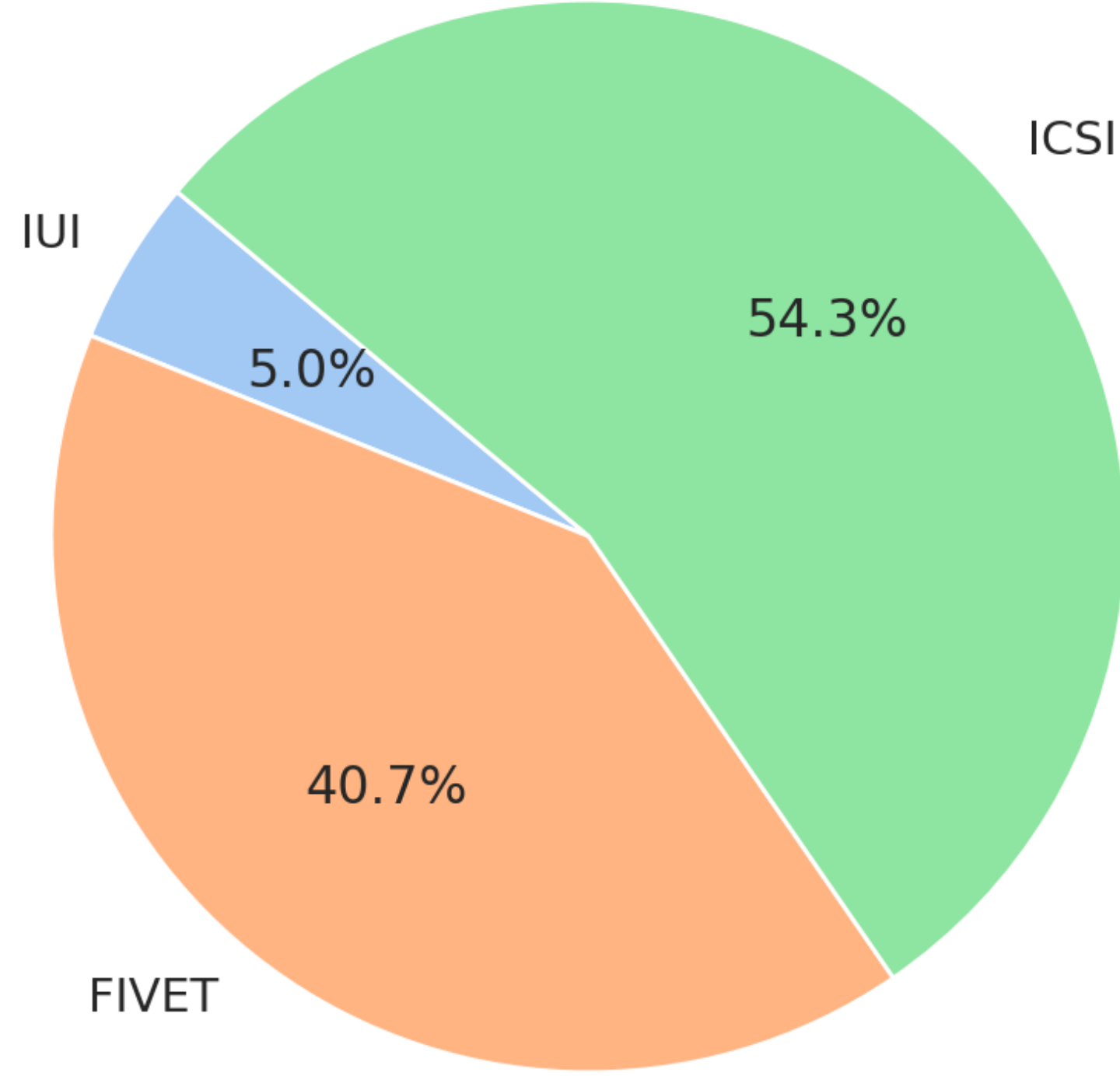
- The primary objective of this study was to compare maternal and perinatal outcomes at the time of delivery between pregnancies conceived through assisted reproductive technologies (ART) and those conceived spontaneously, within a large 2024 cohort from a tertiary-level maternity center.
- We aimed to analyze differences in key intrapartum variables—including mode of delivery, induction of labor, need for operative procedures, estimated blood loss, postpartum hemorrhage, and blood transfusion rates—to assess the real-world impact of ART on labor and immediate postpartum care.
- Secondary objectives included the evaluation of neonatal well-being at birth through Apgar scores and arterial cord blood pH, with the goal of identifying potential areas for clinical optimization and tailored care pathways for ART pregnancies.
- For the above reasons, a retrospective cohort study was conducted on all deliveries at Buzzi Hospital (Milan) in 2024. Among 3,332 deliveries and 3,414 neonates, 280 pregnancies (8.4%) resulted from ART and 3,052 (91.6%) were spontaneous. Data were analyzed using χ^2 and t-tests where appropriate.



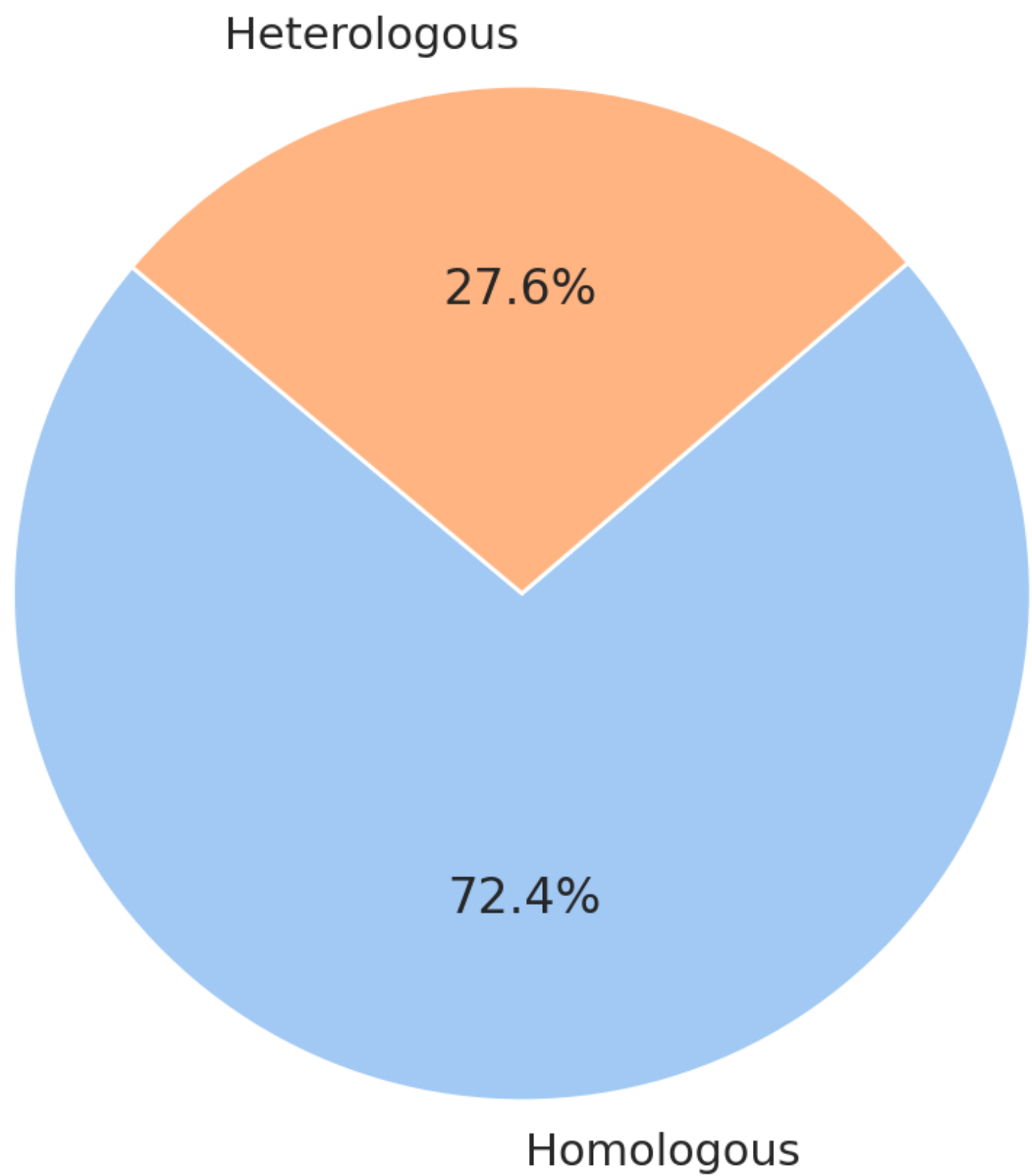
Pregnancy Origin Distribution



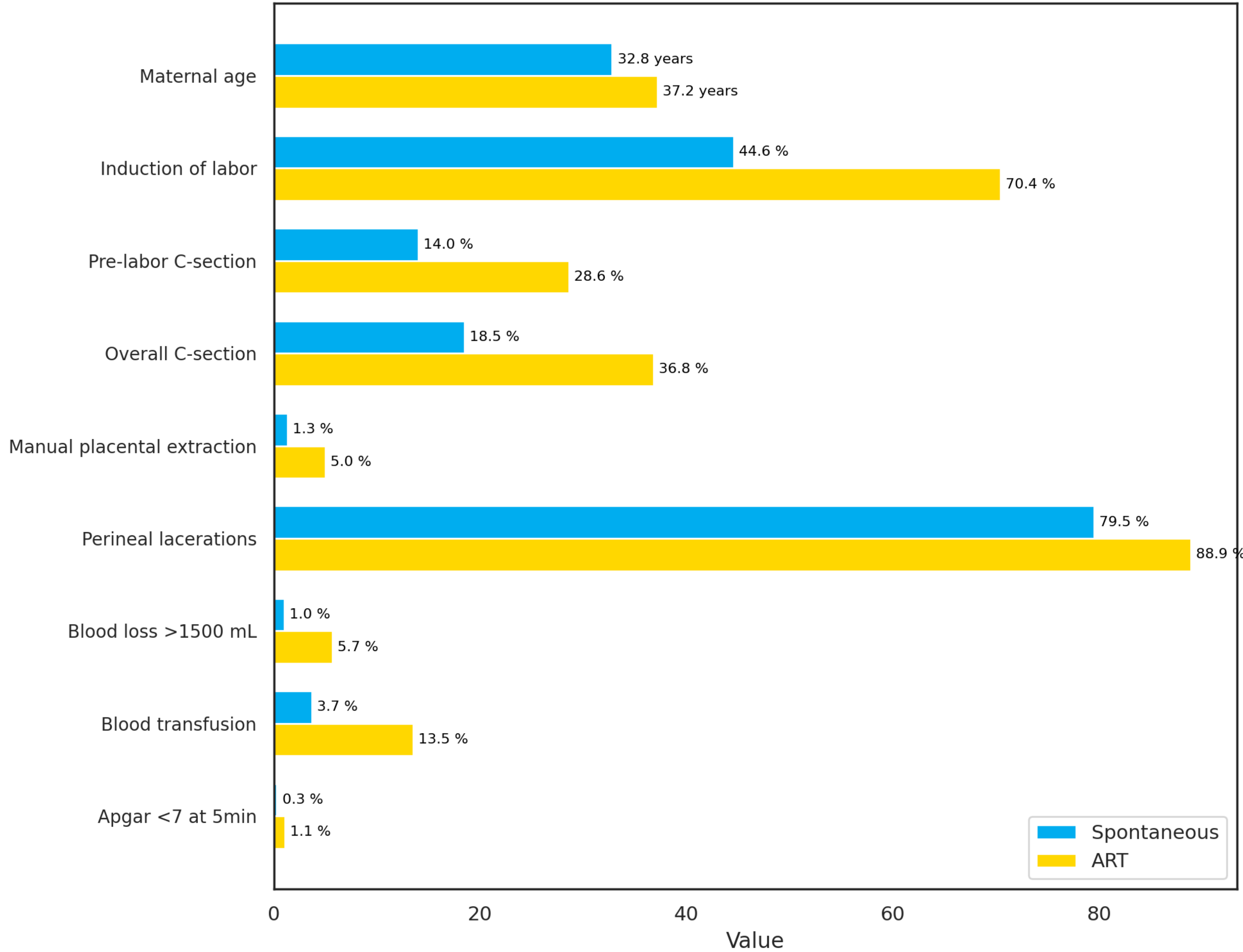
ART Technique Distribution



Type of ART: Homologous vs Heterologous



Delivery Outcomes: ART vs Spontaneous Pregnancies



Results

The maternal age in the ART group was significantly higher (mean 37.2 ± 4.1 vs. 32.8 ± 3.9 years; $p<0.001$), with no significant differences in pre-pregnancy BMI or parity. A substantially more interventional profile emerged for ART pregnancies. Induction of labor was performed in 70.4% of ART pregnancies compared to 44.6% in the spontaneous group ($p<0.001$), and pre-labor cesarean section was twice as frequent in ART (28.6% vs. 14.0%; $p<0.001$), suggesting a more medicalized approach to delivery. The overall cesarean section rate in ART was 36.8%, significantly higher than the 18.5% in spontaneous pregnancies ($p<0.001$). This reflects both elective indications and increased obstetric complications in ART management. Similar rates of instrumental delivery were observed (9.9% vs 7%). Manual placental extraction was required more frequently in ART deliveries (5% vs. 1.3%; $p<0.001$), potentially indicating a higher prevalence of abnormal placental adherence. Perineal lacerations were more common in ART pregnancies (88.9.1% vs. 79.5%; $p=0.001$), likely correlated also with increased maternal age. From a hemodynamic and hemorrhagic standpoint, estimated blood loss was significantly higher in the ART group (median 400 mL vs. 300 mL; $p<0.001$), and postpartum hemorrhage >1500 mL was notably more frequent (5.7% vs. 1.0%; $p<0.001$). Consistently, blood transfusion rates were markedly elevated in ART deliveries (13.5% vs. 3.7%; $p<0.001$), emphasizing a true increased risk of significant peripartum bleeding. Neonatal outcomes, while overall favorable, showed subtle differences: Apgar scores <7 at 5 minutes were more frequent in ART neonates (1.1% vs. 0.3%; $p=0.037$). However, no cases of arterial pH <7.00 were recorded in the ART group.

Conclusions

- Our findings highlight the necessity of dedicated care pathways for ART pregnancies, particularly in tertiary centers where the volume and complexity of cases are high. This includes pre-labor planning, multidisciplinary decision-making, and tailored risk assessment that extends beyond conception history and incorporates dynamic labor management strategies.
- In light of the increasing prevalence of ART conceptions, these results support the integration of ART-specific protocols within delivery wards, not only to optimize clinical outcomes, but also to improve resource allocation and staff readiness. Further multicentric studies are warranted to validate these trends and to guide evidence-based recommendations for managing ART pregnancies during labor and delivery.