

# ANXIETY AND DEPRESSION IN PREGNANCIES CONCEIVED WITH ASSISTED REPRODUCTIVE TECHNOLOGY: A SECONDARY ANALYSIS OF THE NULLIPAROUS PREGNANCY OUTCOMES STUDY

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**Background:** Anxiety and depression are now among the most common health conditions complicating pregnancy and untreated psychiatric illness during pregnancy is associated with several adverse outcomes. Patients undergoing infertility treatments, particularly in vitro fertilization (IVF), commonly experience depression and anxiety. However, few studies have examined the relationship between assisted reproductive technology (ART) conception and depression or anxiety during pregnancy or postpartum.

**Objective:** To investigate the association, if any, between conception through ART and depression or anxiety in pregnancy.

**Materials and Methods:** This is a secondary analysis of the prospective Nulliparous Pregnancy Outcomes Study: Monitoring Mothers-to-Be (nuMoM2b). A total of 10,037 nulliparous

individuals with singleton pregnancies from eight clinical centers in the United States were enrolled. Maternal depressive and anxiety symptoms were assessed by the Edinburgh Postnatal Depression Scale (EPDS) and the Perceived Stress Scale (PSS) at the first (visit 1) and third trimesters (visit 3) and the State Trait Anxiety Inventory (STAI) at the first trimester (visit 1) during designated study visits. Patients who conceived through ART (n=366) were compared to those who conceived naturally (n=8,922). Linear and logistic regression models were used, as appropriate, to control for potential confounders including age, body mass index (BMI), educational level, history of mental health condition, and treatment for anxiety or depression prior to pregnancy.

**Result(s):** The ART group patients were older ( $p<0.001$ ) and more likely to be White ( $p<0.001$ ) compared to their non-ART counterparts. There were no significant differences in BMI ( $p=0.769$ ). The ART group had significantly lower EPDS scores both at visit 1 ( $p=0.003$ ) and at visit 3 ( $p=0.005$ ) compared to the non-ART group. Similarly, patients who conceived with ART were less likely to experience significant depressive symptoms (EPDS  $\geq 10$ ) both at visit 1 ( $p<0.001$ ) and at visit 3 ( $p<0.001$ ). This remained true even when adjusting for potential confounders in visit 1 [OR (95% CI): 0.650 (0.428 – 0.987)], whilst no significant differences were found in visit 3 [0.664 (0.437 – 1.010)]. The ART group had significantly lower PSS scores both at visit 1 ( $p<0.001$ ) and at visit 3 ( $p<0.001$ ). Similarly, patients who conceived with ART were less likely to experience high perceived stress (PSS 27-40) both at visit 1 ( $p<0.001$ ) and at visit 3 ( $p<0.001$ ). No significant relationships were observed when controlling for potential confounders neither for visit 1 [0.493 (0.120 – 2.029)] or visit 3 [0.514 (0.124 – 2.121)].

There were no significant differences in the STAI questionnaire responses in unadjusted [beta coefficient (95% CI); p-value: -0.19 (-0.64 – 0.27); p=0.420] or adjusted [-0.05 (-0.52 – 0.43); p=0.854] analysis.

**Conclusion(s):** Patients who conceive with ART may experience lower depression symptoms during the first trimester of pregnancy compared to those with unassisted conception. However, the groups show similar depression symptoms in the third trimester, and their anxiety symptoms are comparable in both the first and third trimesters.