

Design placentation: Elaborating the mechanism of peri-implantation sexual intercourse and oxidative stress

Abubakar Ibrahim¹, Martina Irwan Khoo², Engku Husna Engku Ismail¹, Nik Hazlina Nik Hussain¹, Anani Aila Mat Zin³, Liza Noordin⁴, Sarimah Abdullah⁵, Zaleha Abdullah Mahdy⁶, Nik Ahmad Zuky Nik Lah¹

¹Department of Obstetrics and Gynaecology, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia, ²Department of Chemical Pathology, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia, ³Department of Pathology, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia, ⁴Department of Physiology, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia, ⁵Biostatistics and Research Methodology Unit, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia, ⁶Department of Obstetrics and Gynaecology, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia

ABSTRACT

Introduction: The peri-implantation phase plays a critical role in successful placental development. Disruptions during this phase have been linked to adverse outcomes such as preeclampsia, fetal growth restriction (FGR), and placenta previa. Although sexual intercourse during this period is traditionally thought to support conception, its impact on oxidative stress and placental morphology remains unclear. **Objectives:** To investigate the effects of sexual abstinence during the peri-implantation period on placental development, oxidative stress markers, placental positioning, and maternal-fetal outcomes. **Materials and Methods:** A randomised controlled trial was conducted with 33 pregnant participants, divided into abstinence (n=9) and non-abstinence (n=24) groups. Placental tissue was evaluated for histomorphological features using H&E and CD31 immunohistochemistry. Oxidative stress markers (MDA, SOD, CAT, T-AOC) were assessed using ELISA. Placental location was evaluated via ultrasonography, and maternal-fetal outcomes were recorded. **Results:** The abstinence group demonstrated better placental histomorphology with lower inflammation (33.3% vs. 70.8%), absence of MPFD (0% vs. 33.3%), and preserved membrane integrity (100% vs. 25%, p<0.0001). Angiogenesis was enhanced in the abstinence group (15.3 ± 3.1 vs. 8.9 ± 2.7 vessels/HPF, p=0.0136). Oxidative stress markers showed reduced stress and elevated antioxidant capacity: lower MDA (6.54 ± 2.37 vs. 16.65 ± 4.98 µmol/L, p=0.0006), higher SOD (52.16 ± 15.29 vs. 24.40 ± 6.30 U/mg, p=0.0038), CAT (106.7 ± 23.24 vs. 57.33 ± 11.63 U/mg, p=0.0026), and T-AOC (137.5 ± 60.93 vs. 60.93 ± 22.35 µmol/L, p=0.0034). No low-lying placenta was observed in the abstinence group versus 20.8% in the non-abstinence group. **Conclusion:** Peri-implantation sexual abstinence is associated with improved placental development, reduced oxidative stress, enhanced angiogenesis, and reduced risk of abnormal placental positioning. These findings suggest a potential role for sexual behaviour modification during early conception in improving pregnancy outcomes.