**LEICESTER LIFESTYLE AND HEALTH RESEARCH GROUP**

**The role of exercise in the management of gestational diabetes mellitus**

|  |  |
| --- | --- |
| **First Supervisor** | **Dr Jamie O’Driscoll** |
| **School/Department** | Diabetes Research Centre |
| **Email**  | **jod16@leicester.ac.uk** |

|  |  |
| --- | --- |
| **Second Supervisor** | **Professor Claire Meek** |
| **School/Department** | Diabetes Research Centre |
| **Email**  | **cm881@leicester.ac.uk** |

|  |  |
| --- | --- |
| **Additional Supervisor** | Tom Yates, DRC, **ty20@leicester.ac.uk** |

**Section 2 – *Project Information***

|  |  |
| --- | --- |
| **Project Title** | **The role of exercise in the management of gestational diabetes mellitus** |
| **Project Summary**  |
| *Aim:* This research program aims to investigate the impact of exercise on the management and outcomes of gestational diabetes, focusing on metabolic, physiological, and psychological aspects for both the mother and the fetus.*Background* Gestational diabetes mellitus (GDM) affects approximately 5-10% of pregnancies and is associated with increased maternal and fetal complications, including macrosomia, preeclampsia, and an elevated long-term risk of developing type 2 diabetes. Exercise is a promising intervention for managing GDM by improving insulin sensitivity, regulating blood glucose levels, reducing maternal weight gain, and enhancing psychological well-being. Both aerobic and dynamic resistance training have demonstrated benefits in managing GDM, although the optimal exercise prescription remains unclear. A novel intervention in this context is the use of isometric exercise training, which involves static muscle contractions without joint movement. Isometric exercise training has been shown to improve insulin sensitivity, reduce blood glucose levels, lower blood pressure, and improve psychological wellbeing, which are important adaptations for pregnant women managing GDM. Given the low-impact nature of isometric exercises, they offer a promising and accessible (home based) additional exercise option for pregnant women with GDM, especially for those who may find completing the recommended weekly dosage of traditional aerobic or dynamic resistance training challenging. Furthermore, isometric exercise training may help contribute to the mitigation of long-term metabolic risks for both mothers and offspring, including reducing the likelihood of postpartum type 2 diabetes. *Methods:* This prospective randomised controlled trial will be embedded within the MRC funded DODGE trial and include three arms; 1) control (standard care) group, 2) traditional exercise intervention (aerobic and dynamic resistance training) group, 3) traditional exercise intervention plus isometric exercise training group. In total, this PhD research project will aim to recruit 75 women from diverse backgrounds, who are 12-16 weeks’ pregnant with high risk of gestational diabetes. Following baseline assessment, the women will be randomly divided into group 1, 2 or 3 as detailed above. The women will return for follow-up data collection at 20, 24-28 and 36 weeks of pregnancy and at 6-months after the baby is born.The primary outcome of the DODGE trial is the mother’s fasting glucose at 24-28 weeks on a standard test for gestational diabetes. Key secondary outcomes of focus for this PhD project will be blood pressure (resting and ambulatory) and indices of cardiac structure and function. *Expected outcomes and impact:* This PhD program aims to provide a comprehensive understanding of the role of exercise in managing gestational diabetes and its broader implications for both maternal and child health, potentially shaping future clinical guidelines for prenatal care. |
| **References** |
| Dipla et al. (2021). Exercise as a therapeutic intervention in gestational diabetes mellitus. *Endocrines, 2,* 65-78.Edwards et al. (2023). Exercise training and resting blood pressure: a large-scale pairwise and network meta-analysis of randomised controlled trials. *British Journal of Sports Medicine, 57,* 1317-1326.Meek et al. (2016). Random plasma glucose in early pregnancy is a better predictor of gestational diabetes diagnosis than maternal obesity. *Diabetologia, 59,* 445-452.Meek et al. (2015). Diagnosis of gestational diabetes mellitus: falling through the net. *Diabetologia, 58,* 2003-2012. Ming et al. (2018). The effect of exercise during pregnancy on gestational diabetes mellitus in normal-weight women: a systematic review and meta-analysis. *BMC Pregnancy Childbirth, 12,* 440.Saravanan et al. (2020). Gestational diabetes: opportunities for improving maternal and child health. *Lancet Diabetes & Endocrinology, 8,* 793-800.Simmons et al. (2023). Treatment of Gestational Diabetes Mellitus Diagnosed Early in Pregnancy. *New England Journal of Medicine, 388,* 2132-2144*.*Xie et al. (2022). Effects of resistance exercise on blood glucose level and pregnancy outcome in patients with gestational diabetes mellitus: a randomized controlled trial. *BMJ Open Diabetes Research & Care, 10,* e002622. |