Project Details	
Project Code	MRC22PHSEx Andrews
Title	Development of guidelines and resources to encourage and support exercise in pregnant women with type 1 diabetes.
Research Theme	Population Health Sciences
Summary	Regular exercise reduces complications in pregnant women with type 1 diabetes (T1D), but many women do not do enough exercise to get this benefit. This project will measure exercise levels and barriers to exercise in pregnant women with T1D and determine what insulin dose adjustments and carbohydrate intake is needed to exercise safely. Using this knowledge national guidelines to support pregnant women with T1D to increase their exercise levels will be developed.
Description	Regular exercise during pregnancy improves cardiovascular function, decreases the risk of gestational hypertension, limits weight gain, and improves mood. Pregnancy with type 1 diabetes (T1D), which accounts for 5% of pregnancies, increases the risk of preterm delivery, preeclampsia, macrosomia, intrauterine death and congenital malformations. Regular exercise is therefore likely to have an even greater effect on improving the health of pregnant women with T1D. Based on these benefits it is recommended all pregnant women aim for at least 150 minutes of moderate activity and two muscle strengthening sessions each week. However, physical activity both amongst pregnant women, and amongst those with T1D is disproportionately low. There is currently no evidence-based guidance to support physical activity (PA) for pregnant women with T1D, as key questions remain unanswered. No studies have looked at habitual activity levels, or barriers to activity in pregnant women with T1D. In addition, it is not known how exercise affects glucose control in pregnant women with T1D, and whether advice on insulin dosage adjustment and carbohydrate intake for exercise that is used for non-pregnant women with T1D is effective in pregnant women with T1D. This interdisciplinary project will establish this evidence and then work in partnership with Moving Medicine, a collaborative that develops material to support and encourage activity, and the Association of British Clinical Diabetologists (ABCD) to produce national guidance to enable healthcare workers to encourage and support pregnant women with T1D to increase their activity levels. This project will have 5 distinct parts. 1. Literature review: Dietetic, diabetes management, physiological, activity, barriers and other relevant data on T1D, pregnancy and exercise/ activity will be identified by database searches, searching on grey literature (e.g. conference proceedings) and contact with known worldwide experts in the field. 2. Experimental study: What happens to glucose levels when pregnant women with T1D exercise and are current guidelines for changing insulin dosages and carbohydrate replacement for exercise effective in pregnant women with T1D?12 pregnant women with T1D will attend our Exeter Lab. Blood glucose measured every 5 minutes for 2 hours in 4 initial conditions; fasted sitting, fasted doing 40 minutes of moderate continuous exercise (MTE), post-meal sitting and during 40 minutes of post-meal MTE. In two subsequent conditions they will 1) alter their premeal dose of insulin by the recommended amount and then do 40 minutes of MTE exercise 30 minutes after eating and 2) conduct 40

	minutes of MTE exercise 30 minutes after eating the recommended amount of carbohydrate. 3. Observational study: How active are pregnant women with T1D, and how is activity related to glucose? Sixty pregnant women with T1D and sixty matched controlled pregnant women will be recruited from 5 pregnancy clinics in the Southwest. PA will be measured using accelerometers for 2 weeks during the 1st, 2nd and 3rd third trimester. Women with T1D will also complete exercise, food, insulin and sleep diaries, and data from their continuous glucose monitors will be downloaded for these periods. 4. Qualitative study. What information/resources would support women with T1D during pregnancy, and what resources would be valued by the HCPs who will provide it? Semi-structured interviews will be carried out with pregnant women with T1D and HCPs (dietitians, diabetes nurses, midwives, obstetricians and diabetologists) to explore the barriers and facilitators to participating in PA and strategies to support PA. 5. Producing national guidelines: A working group will be established of research team members and representatives from Moving Medicine and the ABCD to agree on guidelines for on how to help healthcare workers to encourage and support pregnant women with T1D to increase their activity levels.
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