

## **Physical activity during pregnancy and infant's birth weight: results from the 3D Birth Cohort.**

Michèle Bisson, Jordie Croteau, Benjamin C Guinhouya, Emmanuel Bujold, François Audibert, William D Fraser, Isabelle Marc. *BMJ Open Sport & Exercise Medicine*, March 2017.

Pregnancy provides a great opportunity to make positive lifestyle changes ranging from improved diet, to reducing tobacco and alcohol use, to becoming less sedentary in motivated individuals. Pregnant women also often inquire about the safety of many aspects of their everyday lives, and physical activity is no exception to this. There is evidence of benefit for both mom and baby for moderate physical activity early in low-risk pregnancies, including psychological well-being, maternal weight management and cardiorespiratory health, and improved placental function, for example. The effects of different exercise intensities, at different time points in pregnancy, on fetal growth and birth weight (BW), both positive and negative, is less clear.

The aim of this study was to evaluate the association between maternal physical activity and infant BW, as well as whether there was a moderating effect on this by infant's sex, pre-pregnancy maternal body mass index (BMI), gestational diabetes, hypertensive disorders of pregnancy, or prematurity. This was assessed via a prospective cohort study involving 1913 women from the 3D Birth Cohort study in Quebec. Included participants favoured a more Caucasian, non-smoking, primiparous, lower pre-pregnancy BMI, with delivery at a later gestational age (GA) than those excluded from the study (due to study withdrawal, miscarriage or pregnancy termination, stillbirth, missing BW, and insufficient physical activity data). All were singleton pregnancies of a mother-father-child triad.

Energy expenditure was determined using a validated questionnaire (the Pregnancy Physical Activity Questionnaire) completed at each trimester (8 to 13, 20 to 24, and 32 to 34 weeks GA, respectively), with participants recording the type and duration of exercise for the preceding one month. This was converted to Metabolic Equivalent of Task (MET)\*hours/week, with 1 MET representing energy expended at rest. This was used to calculate total activity, sports and exercise activity (leisure time activities  $\geq 1.5$  METs), and vigorous intensity activity (leisure time activities  $\geq 6$  METs (e.g. jogging)). Pre-pregnancy weight was recalled by the participant during the first visit (i.e. at 8 to 13 weeks GA).

First trimester energy expended during sport and exercise activity was found to be negatively associated with BW. More specifically, for each 1 MET\*hours/week increase in sports and exercise in the first trimester, there was 2.5 g decrease in BW. This BW reduction did not have an associated increased risk of having a small for GA (SGA) infant. Compared to those women recording 0 MET\*hours/week, women completing the equivalent of approximately 3 hours/week of brisk walking (11.7 MET\*hours/week), which is slightly above current activity guidelines, there was a 29.72 g decrease in BW (95% CI -55/88 to -3.50). This association was attenuated, however, after adjusting for gestational weight gain and sport and exercise in the second and third trimesters (-2.17g per MET\*hours/week, 95% CI -4.60 to 0.251). There was also a 17% reduction in the risk of having a large for GA (LGA) infant, though this was not statistically significant (95% CI 0.67 to 1.02).

In women who subsequently developed pre-eclampsia, each 1 MET\*hours/week increase in vigorous activity in the first trimester was associated with a reduced BW of approximately 19.8g (equivalent to approximately 61.26 g reduction for about 30 mins/week of light jogging). This association persisted after adjusting for vigorous exercise in later trimesters. This result was not found in normotensive moms or those with gestational hypertension

None of the potential mediating factors (i.e. infant sex, pre-pregnancy BMI etc.) were found to have an impact on the association of physical activity and BW. Finally, second and third trimester physical activity did affect BW.

Overall, this study suggests that physical activity during the first trimester is more impactful on fetal growth than that performed later in pregnancy, and that its relationship with BW is an inverse one. Importantly, the reduction in BW observed was not associated with an increased risk of an SGA infant, and there was a trend towards reducing the incidence of an LGA infant. Interesting to note, these findings were independent of pre-pregnancy activity level. Further investigation into the clinical significance of these BW differences, as well as the relationship between (vigorous) exercise in the first trimester, pre-eclampsia and BW is certainly warranted. It will be important given the relatively high prevalence of physical activity in pregnant women, and will help physicians most appropriately counsel their patients to achieve the most optimal outcomes for both mom and baby.

Alison Bagg MD, CCFP  
PGY3, Sport and Exercise Medicine, University of Ottawa

Advisor Dr. Taryn Taylor BKin, MSc, MD, CCFP (SEM), Dip Sport & Exercise Medicine