63

Effects of exercise training during pregnancy on late pregnancy and postpartum cardiorespiratory fitness in overweight and obese women: A randomised controlled trial

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Introduction: Pregnant women who are overweight/obese have increased risk of excess gestational weight gain and postpartum weight retention. Along with low cardiorespiratory fitness, these risk factors are associated with subsequent development of diabetes risk. We examined if exercise training during pregnancy would prevent a decline in peak oxygen uptake (VO_2 peak) in women with a pre-pregnancy BMI ≥ 28 kg/m^2.

Methods: We included a sub-sample of 53 sedentary women (age: 31 ± 4 yr, BMI: 34.8 ± 4.3 kg/m^2) from a larger randomised controlled trial. The training group ($n = 28$) was offered three weekly sessions (35 min moderate-intensity endurance and 25 min strength training) from gestational week 12–18 to delivery. The control group ($n = 25$) received usual care only. Participants underwent testing for VO_2peak in gestational week 12–18 (baseline), in gestational week 34–37 (late pregnancy) and 3 months postpartum.

Results: Weight gain from baseline to late pregnancy was 8.7 ± 3.1 kg, with no change between baseline and postpartum, and no between-group difference. Relative VO_2 peak (mL/min/kg) decreased in both groups from baseline to late pregnancy (exercise: -3.7 ± 2.4, control: -4.8 ± 4.1, $p < 0.001$, between-group difference, $p = 0.34$), whereas absolute VO_2peak decreased only in the control group. Nineteen women were not physically able to undertake a VO_2peak test in late pregnancy. From baseline to postpartum, relative VO_2peak (mL/kg/min) increased by 13% (from 25.0 ± 4.1 to 27.7 ± 3.9, $p = 0.002$) in the exercise group and by 4% (from 25.7 ± 4.2 to 26.6 ± 4.4, $p = 0.07$) in the control group (between-group difference, $p = 0.05$). Absolute VO_2peak increased only in the exercise group ($+0.2 \pm 0.4$ L/min) from baseline to postpartum (between-group difference, $p = 0.04$).

Conclusion: Overweight/obese women who received a supervised training program during pregnancy maintained their absolute VO_2 peak from early to late pregnancy and had a higher increase in postpartum VO_2 peak compared to women who received usual care. Supervised exercise training should be included as part of maternity care.

64

Comparing two exercise training doses on body composition in adults with overweight/obesity and type 2 diabetes: a randomised controlled trial

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Introduction: Type 2 diabetes (T2D) and overweight/obesity frequently occur concomitantly, further increasing an individual's risk of developing complications such as cardiovascular disease. High-intensity interval training (HIIT) has been suggested as a viable alternative to moderate intensity continuous training (MICT) to improve exercise participation in adults with T2D. However, the effects of HIIT on body composition in T2D are not well known. We aimed to compare the effects of low-volume combined aerobic and resistance HIIT (C-HIIT) with combined aerobic and resistance MICT (C-MICT) on body composition in adults with T2D following 8-weeks of supervised training and 10-months of home-based training.

Methods: 50 individuals (age 60.0 ± 8.5y, BMI 34.1 ± 7.3 kg/m^2, 60% male) diagnosed with T2D (mean HbA$_{1c}$ 7.7 ± 1.3%) were randomly allocated to 8-weeks of either supervised C-HIIT (1x4 min high intensity aerobic @ 85–95% HRpeak plus resistance training, 3 times/week), supervised C-MICT (52.5 min @ 55–65% HRpeak, 2 times/week; 22.5 min @ 55–65% HRpeak plus resistance training, 2 times/week) or control (usual care). Participants then completed 10-months of home-based training (same protocol), with once monthly supervised sessions. Body composition was assessed using dual energy x-ray absorptiometry and waist and hip circumference at baseline, 8-weeks and 12-months.

Results: There were no significant interaction or time effects. There were no significant differences in any body composition variables between C-HIIT and C-MICT at any time point. C-HIIT significantly decreased fat mass ($p = .03$) and increased lean mass ($p = .003$) compared to control after 8 weeks. C-MICT significantly increased lean mass ($p = .036$) compared to control after 8 weeks.

Conclusion: There were no differences between C-HIIT and C-MICT for changes in body composition in adults with T2D following 8-weeks of supervised exercise training and 10-months of home-based training. Both C-HIIT and C-MICT improved body composition compared to control. Therefore, C-HIIT is a time efficient alternative to C-MICT to improve body composition in T2D.

65

Early infant feeding and body mass index trajectory in the first five years of life

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Background/objectives: Early nutrition plays an important role in the development of later obesity, but it is unclear how early infant feeding impacts body mass index (BMI) trajectory. The aim of this study was to examine the influences of breastfeeding duration and timing of solid introduction on BMI z-score (BMIz) trajectory in from age 9 months to 5 years.