

Research UPDATE

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Summary

This article highlights recent findings from a study examining the impact of postpartum exercise in women at risk for the future development of cardiovascular disease. The authors suggest that a 12-week, moderate-intensity exercise program is an effective intervention to reduce cardiovascular disease risk in women with a history of preeclampsia.

Physical Activity Following Pregnancy in Women at Risk for Cardiovascular Disease

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Background

Cardiovascular disease is the top killer of women in Canada, leading to \$22.2 billion/year in direct and indirect health care costs (Statistics Canada, 2012).

While there are many contributing factors, the American Heart Association has recently highlighted pregnancy complications as risk factors (*as strong as smoking*) for the future development of cardiovascular disease (Mosca et al., 2011).

Preeclampsia is particularly troubling as its fundamental origin has yet to be determined, it affects up to 8% of all pregnancies and its incidence has increased 25% over the last two decades (American College of Obstetricians and Gynecologists, 2013; Steegers, von Dadelszen, Duvekot, & Pijnenborg, 2010). Women who develop preeclampsia have, on average, a doubling in their risk for future hypertension, heart disease and stroke.

In diverse non-pregnant populations, exercise is a well-known adjunct intervention to decrease cardiovascular disease risk. It is estimated at least 40% of this risk reduction may be a direct influence of exercise on vascular health.

Following this logic, Scholten et al. (2014) recently examined the benefits of exercise training in reducing cardiovascular disease risk in previously preeclamptic women.

Methods

Forty-seven women (25 following preeclampsia, 22 following normal pregnancy) were enrolled 6 to 12 months following delivery. Traditional risk factors (fitness, anthropometrics, lipid profile, glucose, insulin, blood pressure) and non-traditional risk factors (heart rate variability, vascular endothelial function and arterial wall thickness) were assessed prior to and following a structured aerobic exercise program (12 weeks of cycling at 70-80% of maximal aerobic capacity, 2-3 times per week).

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Discussion and Findings

Prior to training, women with previous preeclampsia had elevated markers of cardiovascular risk. This included increased blood pressure, fasting insulin and triglyceride concentrations, as well as thicker arteries and decreased vascular endothelial function, compared to controls.

Following 12 weeks of training, both groups had significant improvements in cardiovascular disease risk factors. However, vascular endothelial health remained lower in previously preeclamptic women, and improvements in other risk factors only achieved a status similar to that of non-exercising controls.

These data are interesting from two perspectives.

- 1) This study confirms the benefits of exercise in reducing traditional and non-traditional markers of cardiovascular risk in a high-risk population of women, decades before development of overt cardiovascular disease.
- 2) Although this study is the first to demonstrate exercise as an important intervention to reduce cardiovascular disease risk following preeclampsia, the reported intervention was not sufficient to normalize risk compared to a group of healthy exercising controls.

Looking forward, the evaluation of earlier and/or more intense interventions are required. Large epidemiological studies suggest that exercise during pregnancy may prevent the development of preeclampsia. Limited evidence also indicates that aerobic exercise during pregnancy improves vascular endothelial function, reduces glucose and insulin concentrations and prevents excessive gestational weight gain. Thus, exercise during pregnancy may reduce long-term cardiovascular disease risk.

Conclusions

Physical activity may be an important early intervention to promote improved cardiovascular risk status in the postpartum period; however, intervening earlier may provide additional benefits.

Current Canadian clinical guidelines recommend moderate-intensity exercise 3 to 4 times per week for all pregnant women, without contraindications to exercise (Wolfe, L. A. & Mottola, M. F., 2013). A gradual return to exercise in the weeks following delivery should be encouraged, especially in women with a history of preeclampsia. 

Key Terms

Preeclampsia is diagnosed by new onset hypertension after 20 weeks gestation (systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg on two occasions separated by ≥ 4 hours) and proteinuria (≥ 0.3 g/day protein in a 24-hour urine collection or protein/creatinine ratio of ≥ 0.3 in a random urine sample) (American College of Obstetricians and Gynecologists, 2013).

Endothelial function is a clinically relevant measure inversely associated with future cardiovascular events (Thijssen et al., 2011). The vascular endothelium (the innermost lining of cells in a blood vessel) is an important regulator of blood vessel function and health.

Heart rate variability measures the fluctuation in the timing between heart beats. Low heart rate variability has been linked to poor cardiovascular health.

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References

- American College of Obstetricians and Gynecologists (2013). Hypertension in pregnancy. Executive Summary: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. *Obstetrics & Gynecology*, 122. doi:10.1097/01.AOG.0000437382.03963.88
- Mosca, L., Benjamin, E. J., Berra, K., Bezanson, J. L., Dolor, R. J., ... Wender, N. K. (2011). Effectiveness-based guidelines for the prevention of cardiovascular disease in women--2011 update: a guideline from the American Heart Association. *Journal of the American College of Cardiology*, 57. doi:10.1161/CIR.0b013e31820faaf8
- Scholten, R. R., Thijssen, D. J., Lotgering, F. K., Hopman, M. T., & Spaandermaan, M. E. (2014). Cardiovascular Effects of Aerobic Exercise Training in Formerly Preeclamptic Women and Healthy Parous Controls. *American Journal of Obstetrics and Gynecology*. doi:10.1016/j.ajog.2014.04.025
- Statistics Canada (2012). *Mortality, Summary List of Causes 2009* (Rep. No. 84F0209X). Ottawa, ON: Statistics Canada.
- Steegers, E. A., von Dadelszen, D. P., Duvekot, J. J., & Pijnenborg, R. (2010). Pre-eclampsia. *Lancet*, 376. doi:10.1016/S0140-6736(10)60279-6
- Thijssen, D. H., Black, M. A., Pyke, K. E., Padilla, J., Atkinson, G., ... Green, D. J. (2011). Assessment of flow-mediated dilation in humans: a methodological and physiological guideline. *American Journal of Physiology Heart and Circulatory Physiology*, 300. doi:10.1152/ajpheart.00471.2010
- Wolfe, L. A. & Mottola, M. F. (2013). PARmed-X for Pregnancy (2013). Canadian Society for Exercise Physiology. Retrieved from <http://www.csep.ca/cmfiles/publications/parq/parmed-xpreg.pdf>