

Title: Influence of Aerobic Training Dose During Pregnancy on Infant Heart Function

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The leading cause of death globally is cardiovascular disease, however exercise during pregnancy may offer cardioprotection. Maternal exercise is safe and beneficial for pregnant women and their children. Previous research demonstrated lower fetal heart rate (HR) associated with self-reported maternal exercise duration during pregnancy. Effects of supervised exercise during pregnancy has not been assessed in infants. This study will determine if heart function of one-month old infants improves with supervised maternal aerobic exercise, and if a dose-response exists with these outcomes. We hypothesize that one-month infants of aerobic exercisers during pregnancy will have increased heart function compared to same age infants of controls, with greater differences seen with increased exercise. Pregnant participants were randomized into either aerobic exercise or non-exercise control group. Aerobic exercisers completed moderate intensity exercise tri-weekly, for 50 minutes, from 16 weeks gestation until delivery; controls received no intervention. At one-month postpartum, blinded echocardiographic recordings were performed on all infants. A blinded pediatric cardiologist analyzed recordings and infant activity state (active, quiet). Training data was grouped into exercisers, active, or control based on maternal exercise attendance and compliance. SPSS data analysis included regression analyses, ANOVA, and post-hoc Tukey tests, with an alpha level set a priori at $p < 0.05$. Findings show significantly different one-month infant HR between groups ($p = .02$), with the lowest infant HR in those exposed to maternal aerobic exercise. Increased number of aerobic trainings during pregnancy is associated with lower one-month infant HR ($p = .047$). Infants of aerobic exercisers trend towards increased cardiac output, stroke

volume, ejection fraction, and cardiac index compared to other groups. Findings suggest aerobic exercise during pregnancy at recommended levels benefits infant heart function, this finding is dose-related. This study is important in encouraging women to exercise during pregnancy at recommended levels, and that any level of exercise will benefit infant heart outcomes.

One of the main reasons why I wanted to work with Dr. May's study at East Carolina University is because I was able to work with pregnant women and babies every day, first hand seeing the people our research is benefitting. I strongly believe that God wants us to take care of ourselves and respect his creations. I also believe that exercise is key in this, promoting health and longevity. Working with a study that encourages maternal and infant health through exercise has been very rewarding for me and aligns with my values of wanting to help others as a future physician. The study is designed to educate, guide, and support women throughout their pregnancies. The study's measurements give women the opportunity to receive regular blood pressure and heart rate checks, bloodwork, fetal ultrasounds, as well as EKGs and ultrasounds of their infant's heart. The communication of my results is also important to me as a Christian because I want to inform as many women as possible about the health benefits of exercise not only for them, but for their children. My research is impactful within the culture at large because it was not too long ago that exercise during pregnancy was discouraged by physicians, but most people now know that this recommendation is incorrect. However, not as many people know that maternal exercise during pregnancy also benefits the child's heart, as this is a much more recent discovery. I want to use my research to continue growing and spreading this database. Research has shown that women are more likely to make positive changes while they are pregnant, so this is a great intervention point. I think it is a duty, as both a Christian and a researcher, to share beneficial findings to others.