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Physical Activity and Increased Lactation May Shift Cardiometabolic Risk Following Pregnancy*

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Cardiovascular disease (CVD) is the leading cause of death across all ages and presents differently in women and men. While increased prevalence of obesity and its associated cardiometabolic sequelae (dyslipidemia, impaired glucose, and hypertension) greatly contribute to CVD, there are remarkable sex-specific patterns of CVD presentation. Women have higher incidence of nonobstructive coronary artery disease, heart failure with preserved ejection fraction, and left ventricular hypertrophy, and men are more likely to develop obstructive coronary artery disease, heart failure with reduced ejection fraction, and atrial fibrillation.¹ These differences in CVD presentation may be driven by sex-specific cardiometabolic risk factors that influence onset and progression of CVD. Pregnancy complications and lactation duration are potential risk factors and mediators of CVD and understanding their role in modifying cardiometabolic health (CMH) is key in understanding their influence on CVD in women. Numerous global studies have sought to understand the effect of lactation on CMH and largely show that increased duration of lactation positively influences CMH in the long run. When adjusted for relevant confounders (age, body mass index (BMI), household income, educational level, marital status, smoking status, alcohol drinking, physical activity, age at menarche, menopause, parity, and use of oral contraceptives) lactation can benefit blood pressure (BP), serum glucose, and triglycerides. The CARDIA (Coronary Artery Risk Development in Young Adults) study cohort from which this present study derives its data has previously showed a graded inverse association

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between lactation duration and markers of atherosclerosis including carotid intima-media thickness and a lower incidence of metabolic syndrome and diabetes when adjusted for BMI, parity, and other confounders in a 20- to 30-year longitudinal follow-up study.²

Numerous studies have also proven the benefit of exercise in modifying cardiometabolic risk in men and women through improvements in BMI, low-density lipoprotein, BP, and glucose levels.³ Furthermore, sedentary behavior has emerged as a risk factor in adverse cardiovascular health outcomes. The combined potential benefit of lactation and physical activity in improving long-term CMH among pregnant women has not been examined previously. In this issue of *JACC: Advances*, Lane et al⁴ evaluate CMH in women 30 years postpartum using cross-categories of physical activity and lactation. Women with above median physical activity and lactation duration ≥ 3 months had the most favorable CMH variables compared to women with lower physical activity and lactation duration. However, after adjusting for BMI, only association for waist circumference remained, suggesting that CMH variables at 30 years postpartum were likely mediated by BMI. Furthermore, while stratified analyses suggested that more favorable cardiometabolic risk score was significantly associated with increased physical activity and lactation among Black women, no interaction was seen by race when incorporating an interaction term into the model. Race is therefore unlikely to be an effect modifier and results can be understood similarly for Black and White women.

This study should be interpreted in the context of certain findings.⁴ Notably, women with the greatest physical activity and lactation duration had more favorable CMH variables at baseline (lower systolic BP, BMI, waist circumferences, triglycerides, insulin, and Homeostatic Model Assessment for Insulin Resistance [HOMA-IR]). They were also more likely to have longer educational duration and a fewer proportion identified as Black. This suggests that the propensity for physical activity and lactation may be a result of biologic and social factors, and that all women may not have equal ability to engage in physical activity and breastfeeding. Additionally, prior research suggests that women who have an atherogenic serum profile, represented by elevated serum glucose, hs-CRP, low-density lipoprotein, and triglycerides during the first trimester of pregnancy have a higher incidence of gestational diabetes and hypertension.⁵ These women would also likely be at risk for worsened long-term CMH. In the present study, overall the majority of women at baseline did not have severe CMH derangements (the frequency of women with hypertension and obesity was overall modest).⁴ The potential benefits of physical activity and lactation in mitigating adverse cardiometabolic variables long term may be greater in women with more unfavorable profiles at baseline. Lastly, in the present study, limited information is available about adverse pregnancy outcomes, such as pre-eclampsia, which may be important confounders in the association of physical activity and lactation duration with CMH. Large observational studies demonstrate a 2 to 4 times increased risk of future CVD among women with hypertensive disorders of pregnancy, and traditional cardiometabolic risk factors only explain part of the excess CVD risk following pregnancy.^{6,7} Future studies evaluating postpartum lifestyle factors such as physical activity, diet, and lactation should incorporate adverse pregnancy outcomes as potential confounders should this information be available (Figure 1).

While heart disease mortality and morbidity have declined for the past 3 decades, recent data suggest a plateauing of improvement among younger aged women.⁸ Furthermore, cardiometabolic disorders such as obesity, chronic hypertension, and diabetes are rising among young women.⁹ It is imperative for clinicians, researchers, and policy makers to be aware of this concerning trend and to conduct evidence-based efforts to mitigate pre-existing cardiometabolic risk factors among reproductive-aged women and to implement strategies to reduce longer term worsening of CMH. It is possible that recommending measures such as increasing physical activity, lactation duration, and healthier diet may help reduce long-term CVD risk among women and improve CMH. Future interventional trials should be conducted to explore the potential benefit of these interventions.

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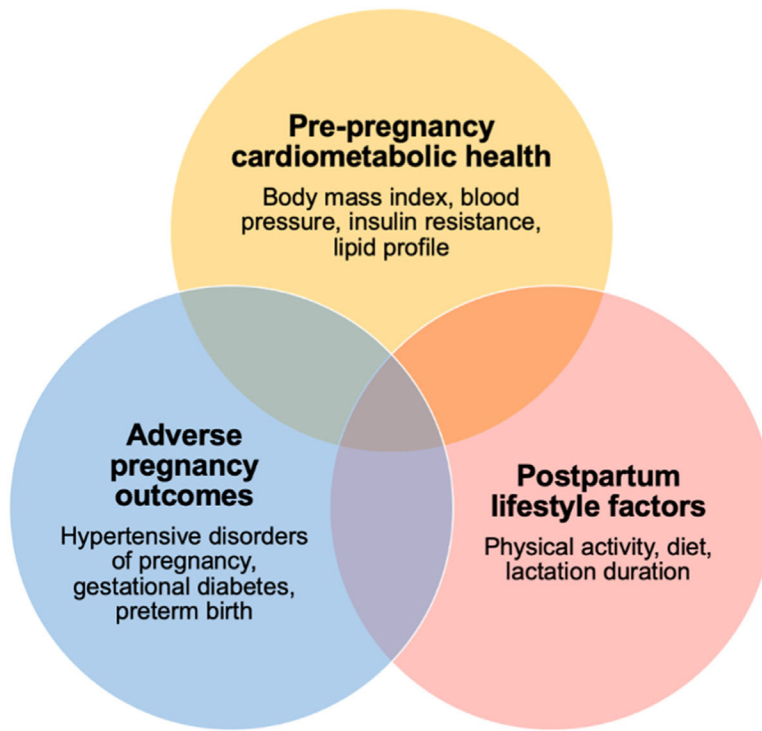


FIGURE 1.
Determinants of Long-Term Cardiometabolic Health Among Pregnant Women