Vascular Reactivity Index is not associated with risk factors for poor cardiovascular health

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Background: Cardiovascular disease is a leading cause of maternal morbidity and mortality. Risk factors for poor cardiovascular health begin accumulating in childhood. Early identification and intervention for subclinical cardiovascular disease during adolescence could prevent future cardiovascular morbidities and mortality, especially those worsened during pregnancy. However, there are currently few resources available to measure subclinical cardiovascular disease in adolescence. The Vascular Reactivity Index (VRI) is a non-invasive measure of endothelial function which may identify asymptomatic girls at risk for future cardiovascular complications.

Significance of the Problem: VRI correlates well with more invasive measures of cardiovascular health in adults, but it is not known whether VRI could identify subclinical cardiovascular disease in adolescents. This study will address this gap in knowledge by investigating the relationship between VRI and risk factors for poor cardiovascular health in adolescent girls, including inadequate nutrition, high stress levels, lack of exercise, and obesity.

Hypothesis: We hypothesize that VRI will be positively correlated with resiliency to stressful events and exercise level in adolescent girls. Additionally, we hypothesize that VRI will be negatively correlated with dietary fat and body mass index (BMI).

Experimental Design: The Endothelix VENDYS® was used to measure VRI and blood pressure in 12–18-year-old girls (N=46). A VRI above 1.6 represents good endothelial function and below 1.4 represents poor endothelial function. Participants completed three 24-hour dietary recalls (ASA24), and average fat (total, saturated, polyunsaturated, and cholesterol) intake was calculated (N=29). The Brief Resilience Scale was used to measure emotional resiliency (N=44) and the Godin-Leisure Time Exercise Questionnaire to measure physical activity (N=43). BMI was calculated from self-reported height and weight (N=35). Spearman correlations were utilized to assess the relationship between VRI and cardiovascular risk factors.

Results: Median VRI was 1.85 (IQR 1.60-2.14), which represents good endothelial function. There were no significant correlations between VRI and exercise level (p=0.98) or emotional resiliency (p=0.66). Additionally, VRI was not correlated with dietary intake of total fats (p=0.68), cholesterol (p=0.32), saturated fat (p=0.53), or polyunsaturated fat (p=0.87). Similarly, there was no significant correlation between VRI and BMI (p=0.89). However, BMI was positively correlated with systolic (rs=0.47, p=0.006) and diastolic (rs=0.36, p=0.04) blood pressure.

Conclusions: There was no significant correlation between VRI and cardiovascular risk factors for adolescent girls, which suggests that VRI may not be a helpful tool to assess subclinical cardiovascular health in this population. Future studies should assess whether biological markers of cardiovascular health, such as blood cholesterol levels, are correlated with VRI in adolescents.