

BLOOD PRESSURE RESPONSES OF SEDENTARY AFRICAN AMERICAN WOMEN DURING CYCLE AND TREADMILL EXERCISE

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Objective: To examine blood pressure (BP) in sedentary African American women during two exercise intensities on a cycle and treadmill at fixed heart rate (HR) values.

Methods: Blood pressure (BP) and heart rate (HR) were assessed in 44 women (age 33.1 ± 8.2 years) during cycling and treadmill walking at 40% and 60% heart rate reserve (HRR). Systolic blood pressure (SBP) and diastolic blood pressure (DBP) reactivity differences were evaluated with separate 2 (mode: cycle, treadmill) \times 2 (intensity: 40%, 60% HRR) repeated measures analyses of covariance. Separate multiple regression analyses for the cycle and treadmill were performed to examine potential contributors to higher SBP reactivity at 60% HRR.

Results: After adjusting for baseline SBP, body mass index (BMI), and age, mean SBP reactivity was higher during cycling compared to treadmill at both levels of intensity ($P \leq .05$). The DBP reactivity revealed a main effect for mode ($P \leq .05$) only with cycle DBP reactivity higher than treadmill for both intensities. Cycling significantly predicted SBP at 60% HRR ($P \leq .001$), accounting for 66% of the variance in SBP reactivity. However, in both regression models, baseline SBP was inversely related to SBP reactivity ($P \leq .01$).

Conclusions: At fixed HR values, after adjusting for baseline BP, BMI, and age, BP reactivity is mode dependent and greater for cycling than treadmill exercise at both low and moderate exercise intensity. Baseline SBP is inversely related to the magnitude of SBP reactivity after controlling for the effects of BMI and age. (*Ethn Dis.* 2007;17:59–64)

Key Words: African American Women, Blood Pressure, Exercise

INTRODUCTION

Hypertension in African Americans has an early age of onset and is associated with greater cardiovascular disease (CVD) mortality.¹ Recent data indicate that African American women have the highest reported prevalence of hypertension in the United States.²

Although blood pressure (BP) responses to stressors such as exercise have been used as physiologic markers to predict future hypertension, data are inconsistent. For example, in epidemiologic research, while Manolio et al³ failed to find an association between exercise BP response and the risk of future hypertension, Matthews et al⁴ and Miyai et al⁵ found that both systolic BP (SBP) and diastolic BP (DBP) reactivity were predictive. Similarly, in experimental studies, higher responses in subjects with a positive family history have been shown for SBP and DBP,⁶ but in some experimental studies, no between-group BP differences were found.⁷

The notion that exercise BP responses are mode dependent may explain some of the inconsistencies in the exercise BP literature. For example, Kelly et al⁸ reported significantly higher SBP during cycling compared to treadmill exercise when Caucasian subjects exercised at a moderate intensity at the same heart rate (HR) on each mode. The SBP mode difference was greater for those with two or more cardiovascular disease (CVD) primary risk factors, which indicated a potentially greater sensitivity for cycle exercise in detecting elevated BP in hypertension-prone individuals. However, since the authors employed only a single intensity, the results preclude examination of a potential mode by intensity interaction.

The purpose of this study was to evaluate the BP responses of African American women at two exercise intensities on two different modes of exercise.

Although African Americans display augmented BP reactivity to various stressors,^{9,10} little research has been conducted on a potential mode dependency exercise BP response in African Americans. Moreover, because women may show greater BP reactivity than men,¹¹ research with African American women may be particularly informative. Therefore, the purpose of this study was to evaluate the BP responses of African American women at two exercise intensities on two different modes of exercise. Two questions were asked. First, at fixed HR values for a given intensity, do the BP responses of African American women depend on the mode (cycle vs treadmill) and intensity (low vs moderate) of exercise? Second, what is the relationship between baseline SBP and the magnitude of SBP reactivity for cycle and treadmill exercise in this population?

METHODS

Subjects

Forty-four African American women volunteered to participate. The number of subjects recruited was based on a power estimate of .80 to detect a potential exercise mode by intensity SBP interaction.¹² Criteria for participation included nonsmoking, 20 to 45 years of age, physically inactive as

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