EXERCISE PARTICIPATION BEFORE AND DURING PREGNANCY AMONG LOW-INCOME, URBAN, BLACK WOMEN: THE BALTIMORE PRETERM BIRTH STUDY

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National data demonstrate that Black women have poorer health status, and greater risk of death from chronic diseases, than their White counterparts. Exercise can help prevent chronic disease, and adult Black women are less likely to engage in exercise than White women. However, few data are available about exercise among pregnant Black women. Pregnant Black women were enrolled in this study at hospital-based prenatal clinics in Baltimore, Maryland. Exercise before and during pregnancy were assessed at the first prenatal visit, along with exposure to stressors, depression, John Henryism Active Coping, and behavioral factors such as smoking. Among the 922 women in the sample, approximately three quarters reported engaging in exercise before pregnancy, and two thirds exercised during pregnancy. Most women engaged in non-strenuous exercise during pregnancy (56%) and exercised for ≥20 minutes at least three times per week (80%). Exercise participation was significantly associated with higher levels of John Henryism Active Coping and lower levels of depression but was not significantly associated with behavioral factors or exposure to stressors. Prior research, based on older women, may have underestimated exercise participation by young Black women. These results suggest that Black women may decrease exercise participation after pregnancy and as they age. Encouraging Black women to continue to exercise as they age may have promising implications for the prevention of chronic diseases. (*Ethn Dis*. 2006;16:909–913)

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INTRODUCTION

National data for the United States consistently demonstrate the diminished health status of Black women compared to White women.[1–2] Black women have greater risk of dying from heart disease, cancer, stroke, diabetes, and complications of pregnancy than their White counterparts. These long-standing disparities exist within virtually all age groups of women, including women of reproductive age.

Exercise has been demonstrated to confer health benefits, and conversely, physical inactivity is associated with diminished health and increased risk for chronic diseases.[3–5] Prior research consistently suggests that adult Black women are less likely to engage in exercise than their White counterparts.[4,6,7] One strategy to reduce the excess risk of illness and death from chronic diseases among Black women may be to develop an improved understanding of exercise patterns and adherence among this group of women to ultimately enhance exercise participation. Exercise among younger adults may be of special importance because of the potential to prevent the onset of diabetes, obesity, hypertension, and other chronic conditions. Women of reproductive age are of particular interest because most women are in regular contact with the healthcare system while they are pregnant, which creates an opportunity to intervene on exercise patterns.

Despite the importance of exercise among young adult women, few data are available about exercise participation among pregnant, low-income, Black women. In the research reported in this paper, we focused upon describing the exercise patterns of a cohort of low-income, pregnant, Black women before and during pregnancy. A particular interest was developing a description of the associations between various psychosocial and behavioral factors with exercise during pregnancy.

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METHODS

Pregnant Black women were recruited into this study at five hospital-based prenatal clinics located in Baltimore. Enrollment in the study took place from 1993 to 1995. All women presenting for their first prenatal visit were eligible for this project if they were ≥18 years of age and self-identified their race as Black. A trained research assistant enrolled eligible women in the study at the time of their first prenatal visit. The research assistant obtained informed consent and asked the women to complete the study questionnaire. The questionnaire contained items to assess demographic information (eg, maternal marital status, educational level, and age), psychosocial factors (eg, exposure to psychosocial stressors, depressive symptoms, and active, effortful coping), and degree of participation in exercise before and during pregnancy. Fewer than 5% of eligible

women declined to participate in the research.

Exercise participation was assessed separately before pregnancy and during pregnancy. For both time intervals, women were asked about their participation in exercise for "fun and fitness," in order to distinguish exercise from daily activities.[8] Women were asked about their participation in strenuous (exercise which made them "breathe hard and sweat even when the weather is not hot") and non-strenuous activities (exercise that did not make them "breathe hard and sweat, even when the weather is not hot"), and examples were provided for each. Examples of strenuous exercise were running and biking. For non-strenuous exercise, the examples used were walking and gardening. Women were also asked if they participated in the activities for ≥20 minutes, three times per week. Women who participated in exercise before pregnancy were asked how long they had exercised before pregnancy (less than three months, three to six months, six months to one year, more than one year). For both time periods, a summary variable was created that categorized women as non-exercisers; those that participated only in strenuous activities; those that participated only in non-strenuous activities; and those that participated in both strenuous and non-strenuous activities.

The 41-item Prenatal Social Environment Inventory (PSEI) was used to assess exposure to stressors.[9] The PSEI was developed specifically for use among pregnant women and focuses primarily on exposure to chronic stressful life conditions (eg, chronic financial, housing, or marital problems). However, major stressful events, which often necessitate long-term adjustment, were also included, such as divorce or death of a close family member. The PSEI was developed based on extensive interviews with pregnant women, who identified salient stressful events and conditions. Then, using a separate sample of pregnant women, the instrument was tested for temporal stability, internal consistency, and construct validity, as described elsewhere.[9] It performed well in these evaluations and was used in a large prospective study of exposure to stressors and low birth weight.[10] Scores on the PSEI are computed by assigning one point for each affirmative response to each stressor item, and scores are dichotomized into high and low with a median split.

Maternal depressive symptoms were assessed by using the Center for Epidemiologic Studies Depression Scale (CES-D).[11] The CES-D was developed by the National Institute of Mental Health to facilitate the assessment of levels of depressive symptoms in community-based samples.[11] It contains 20 items and can be self-administered. The items assess various symptoms of depression, including feeling sad, feeling blue, feeling lonely, sleep and appetite disturbance, and crying spells. The instrument has been extensively tested for reliability and validity and is widely used in epidemiologic research.[12–14] Scores on the CES-D can range from 0 to 60, and a customary cut-point score of ≥16 is used to indicate "elevated" levels of depressive symptoms. However, using the CES-D for pregnant women presents special problems, since certain symptoms of pregnancy, such as fatigue and appetite changes, are also characteristic of depression. As a result, CES-D scores of pregnant women might be inflated somewhat, and the cut-point score might be too low. To address this problem, we raised the usual cut-point score. Instead of using 16 to define the "high" group, we used the upper 10% of scores.[15] The upper 10% of scores identifies women with a large number and frequency of symptoms.

The John Henryism Active Coping Scale (JHAC 12) was used to measure propensity to cope actively with environmental stressors.[16] This 12-item questionnaire was developed to assess active, effortful attempts to cope with environmental stressors. Scores on the John Henryism questionnaire can range from 12 to 60, and low and high groups are defined as those below and above the median. Higher scores on the JHAC 12 indicate that the respondent is predisposed to cope actively with psychosocial stressors in the environment and also believes that these stressors can be controlled through a combination of hard work and determination.[16] Sample items to assess John Henryism Active Coping are, "I've always felt that I could make of my life pretty much what I wanted to make of it," and "It's not always easy, but I manage to find a way to do the things I really need to get done." The John Henryism questionnaire has been shown to have good reliability and validity for Black women.[17] A median split was used to create groups of high and low John Henryism active coping style.

Data on maternal health behaviors (eg, alcohol use, smoking) during pregnancy were obtained from prenatal and delivery records. Drug use was assessed by using both self-reports and urine testing. Women who were identified as drug users with either method were classified as positive for drug use. Underreporting by pregnant women of undesirable behaviors such as substance use is always a concern; however, the prevalence of use of alcohol, drugs, and cigarettes in this sample was comparable to reports from other studies.[18–19]

Of the 1,163 women initially enrolled in the study, 241 (20.7%) had to be excluded from the analysis sample, leaving a final sample size of 922. Reasons for exclusion after enrollment included, as shown in Table 1: patient was lost to follow-up (60), patient's medical record could not be located (25), patient moved out of state (17), patient had a therapeutic abortion (29), or patient had a stillbirth or miscarriage (60).

The analysis of data focused upon the use of univariate and bivariate descriptive statistics. Bivariate associations were evaluated for statistical

Table 1. Exclusions from the enrolled sample: Baltimore Preterm Birth Study, 1993–1995

Reason for exclusion	Number
Lost to follow up	60
No records located	25
Moved out of the state	17
Miscellaneous, medical	7
Psychiatric patient	3
Twins	14
Therapeutic abortion	29
Not pregnant	14
Miscellaneous, other	12
Stillbirths, miscarriages	60
TOTAL	241
	(20.7% of total enrolled)

significance by using the chi-square statistic.

RESULTS

As previously described, after exclusions, 922 Black women made up the final sample for analysis. Of these women, 72.3% had completed at least a high school education; 75.6% were ≥20 years of age; 36.4% were employed outside of the home; 86% were Medicaid recipients; and 27.5% of the women were either married or living with a man who was like a husband to them (Table 2). As shown in Table 2, 23.1% of the women in the sample smoked cigarettes, 16.0% used illicit drugs, and 7.9% used alcohol. Of the 147 drug users, 100 used cocaine.

Scores on the JHAC 12 ranged from 29 to 60, with a median of 53. Scores on the PSEI stressor assessment ranged from 0 to 33, with a median of 9. Finally, scores on the CES-D ranged from 0 to 57, with a median of 16.

As shown in Table 3, only approximately one quarter of the women (n=234) did not engage in exercise before pregnancy. Approximately 44% of the women (n=402) reported participating only in non-strenuous exercise before pregnancy, while 8.1% (n=74) reported participating only in strenuous exercise during this period. In addition,

Table 2. Demographic and behavioral characteristics of the sample: Baltimore Preterm Birth Study, 1993–1995

Maternal Characteristics	*n*	(%)
Age (years)		
18–19	225	24.4
≥20	697	75.6
Education		
Less than high school	255	27.7
High school or more	664	72.3
Employment		
Unemployed	576	63.6
Employed	330	36.4
Insurance		
None	101	11.0
Medical assistance	792	85.9
Private insurance	29	3.1
Marital status		
Single	665	72.5
Married	252	27.5
Drug use		
Yes	147	16.0
No	771	84.0
Alcohol use		
Yes	73	7.9
No	848	92.1
Smoker		
Yes	213	23.1
No	709	76.9

22.5% (n=207) of women engaged in both strenuous and non-strenuous exercise before pregnancy.

Approximately one third of the women in the sample did not participate in exercise during the pregnancy (n=330). An additional 56% of the women reported engaging in non-strenuous exercise only during pregnancy (n=516), and 2.1% (n=19) engaged only in strenuous exercise. Six percent (n=55) of the women reported participating in both strenuous and non-strenuous exercise during the current pregnancy (Table 3).

Among women who engaged in any form of exercise during pregnancy, 76.8% reported that they participated in exercise for ≥20 minutes, at least three times per week. Before pregnancy, 82% of women engaged in exercise for ≥20 minutes three times per week.

Exercise participation before pregnancy was significantly associated with exercise during pregnancy (P<.001). Among the 234 women who did not exercise before pregnancy, two thirds continued to be non-exercisers, while approximately one third reported starting to exercise during the pregnancy. Among the 683 women who reported that they participated in exercise before pregnancy, ≈75% continued to do so, and the remaining 25% stopped exercising during the pregnancy.

Among those who engaged in only non-strenuous exercise before pregnancy, >70% continued to participate only in non-strenuous exercise. Of the 74 women who engaged in only strenuous exercise before pregnancy, >50% continued to participate in exercise, but only 8.1% continued to engage only in strenuous exercise. Of those women who engaged in both strenuous and non-strenuous exercise before pregnancy, >80% continued to exercise during pregnancy.

John Henryism was significantly associated with exercise during pregnancy. Proportionately more women with

Table 3. Exercise participation before and during pregnancy: Baltimore Preterm Birth Study, 1993–1995

	Before Pregnancy		During Pregnancy	
Maternal Exercise Participation	*n*	(%)	*n*	(%)
None	234	25.5	330	35.9
Non-strenuous only	402	43.8	516	56.1
Strenuous only	74	8.1	19	2.1
Both	207	22.5	55	6.0

higher levels of John Henryism (ie, greater propensity to cope actively with environmental stressors) (69.8%) engaged in exercise during pregnancy than those with lower levels of John Henryism (59.4%) ($P=.003$). Maternal depressive symptoms were also significantly associated with exercise participation during pregnancy. Proportionately more women with lower levels of depressive symptoms engaged in exercise during pregnancy (65.9%) than those with higher levels of depressive symptoms (51.8%) ($P=.011$). Exposure to stressors and behavioral factors (drug use, cigarette smoking, or alcohol use) were not associated with exercise participation before or during pregnancy.

DISCUSSION

This is one of only a few studies that have examined exercise patterns before and during pregnancy among low-income, pregnant, urban, Black women. The proportions of women who engaged in exercise before pregnancy (≈75%) and during pregnancy (≈65%) were somewhat greater than we expected. Prior research has reported that 40%–60% of women exercise during pregnancy.[20–22] Studies of women who are not pregnant have suggested that approximately half of all women engage in some form of exercise.[7] Three quarters of the women in our study engaged in regular exercise before pregnancy, and most who exercised before pregnancy continued to do so during pregnancy. This finding has promising implications for the prevention of chronic diseases in this group of women. Examining changes in exercise participation from younger (ie, reproductive age) to older women may be useful. Many prior studies of exercise among women, which have reported lower levels of participation in exercise than those observed among our sample, have been focused on middle-aged and older women. Our findings raise the possibility that exercise participation decreases with age among women. Another study has indicated that exercise participation declines with age among Black women.[23] The possibility that exercise participation declines with age among this group is a cause for concern, since chronic disease rates are high among Black women as they age, and regular exercise could help to ameliorate some of these conditions (eg, diabetes, hypertension) and their sequelae.

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The method of assessment of exercise that we employed for this study was likely not responsible for the high levels of exercise participation reported by the women in the sample. We specifically queried about exercise for "fun and fitness," so the reporting of exercise participation was not likely to be influenced by job-related physical exertion or other activities of daily living.

Exercise during pregnancy was associated with exercise before pregnancy, which was as we expected. Those women who reported that they engaged in exercise before pregnancy were very likely to continue to exercise during pregnancy. Only 25% of those women who reported exercising before pregnancy did not participate in exercise during pregnancy. Also, approximately one third of the women who did not exercise before pregnancy began to exercise during pregnancy. The most notable change in exercise patterns from before pregnancy to during pregnancy was that most of the women who engaged in strenuous exercise before pregnancy did not continue to do so. Most participated in non-strenuous exercise during pregnancy. We might speculate that this may have occurred because of their doctors' instructions or to their own perceptions about safety of strenuous exercise during pregnancy.

The finding that maternal depressive symptoms were associated with exercise participation was not surprising. The association between exercise and depression is well established.[24–25] We cannot ascertain from our data if exercise is protective against depressive symptoms or if women with higher levels of depressive symptoms are less likely to engage in exercise than those with lower levels of depressive symptoms. High levels of depressive symptoms among pregnant women appear to increase risk for preterm birth outcomes.[15] Thus, the association of exercise participation with depressive symptoms may create a potential pathway for intervention to reduce preterm outcomes.

High scores on the JHAC 12 were positively associated with engaging in exercise during pregnancy ($P<.003$). This result is consistent with findings reported by Bild et al on Black and White women in the CARDIA study, in which higher scores on the JHAC 12 were an independent predictor of regular participation in physical activity.[23] Several empiric studies by James et al indicate that high John Henryism scores are positively associated with self-rated health, life satisfaction, and other indicators of positive mental health and well-being.[17,26] The relationship between high John Henryism and physical activity is likely a reciprocal one; that is, each contributes to sustaining the other.

In conclusion, our data demonstrate that most women in this sample of low income, urban, pregnant, Black women engage in exercise both before and during pregnancy and that selected maternal psychosocial factors are associated with exercise participation. Efforts directed toward helping pregnant women maintain exercise participation in the months and years following

pregnancy may yield preventive health benefits from regular exercise participation as women age.

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