

Racial/Ethnic Differences in Leisure-Time Physical Activity Levels Among Individuals With Diabetes

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Diabetes affects ~18.2 million people or 6.3% of the U.S. population and is associated with significant morbidity, mortality, and health care costs (1). Regular physical activity is beneficial for the prevention and management of diabetes and established benefits include improvement in blood glucose control, reduction of cardiovascular risk factors, weight loss, and improvement in well-being (2,3).

The purpose of this study was to use nationally representative data with detailed information on frequency, duration, and intensity of 23 leisure-time physical activities (LTPAs) to 1) determine racial/ethnic variations in LTPA levels among adults with diabetes and 2) assess the independent effects of activity limitations and comorbidity on racial/ethnic differences in LTPA levels in adults with diabetes. We hypothesized that blacks and Hispanics would have lower levels of moderate to vigorous LTPA compared with their white counterparts. We further hypothesized that racial/ethnic differences in activity limitations and comorbidity would explain racial/ethnic variations in LTPA among adults with diabetes.

RESEARCH DESIGN AND METHODS

Combined data from the sample adult core and the adult prevention module of 1998 National Health

Interview Survey (NHIS) (4) were analyzed. The NHIS is a nationally representative household survey of U.S. adults aged ≥ 18 years. The sample is selected by a complex sampling design involving stratification, clustering, and multistage sampling with a nonzero probability of selection for each person. Final weights allow estimates from the NHIS to be generalized to the adult civilian population of the U.S. (4,5).

LTPA was based on 23 leisure-time exercises, sports, or hobbies, including walking, gardening/yard work, stretching exercises, weight lifting, jogging/running, aerobics/aerobic dancing, riding a bicycle/exercise bike, stair climbing, swimming, playing tennis, playing golf, or bowling. Additional activities included playing baseball/softball, playing racquetball, downhill/cross country/water skiing, playing basketball, playing volleyball, playing soccer, and playing football. Interviewers were instructed to exclude individuals with observed disabling conditions that would make them uncomfortable with questions about hobbies and sports activities. For each activity, respondents were asked to specify frequency (number of times in the previous 2 weeks), duration (number of minutes), and intensity (effect on heart rate: no increase or small, moderate, or large increase). The frequency, duration, and intensity for each of the listed activities

were used by NHIS to compute activity levels for each individual in terms of kilocalories per kilogram of body weight per day and classified as sedentary ($0.0-1.4 \text{ kcal} \cdot \text{kg}^{-1} \cdot \text{day}^{-1}$), moderate activity ($1.5-2.9$), and vigorous activity (≥ 3.0).

Demographic and health status variables included age, race/ethnicity, income, education, marital status, employment, census region, metropolitan statistical area, perceived health status, and BMI. Activity limitation was defined as difficulty walking one-quarter of a mile (about three city blocks) or walking up 10 steps without resting. Comorbidity was derived from 14 self-reported chronic conditions including hypertension, ischemic heart disease, angina, myocardial infarction, other heart disease, emphysema, chronic bronchitis, end-stage renal disease, stroke, asthma, lower-back pain, and cancer. Number of comorbidities was summed and categorized into five groups (0, 1, 2, 3, and ≥ 4).

Statistical analysis was performed with STATA version 7.0 (6). Multiple logistic regression was used to determine the likelihood of moderate/vigorous LTPA by race/ethnicity, controlling for activity limitations, comorbidity, and other covariates. Covariates included age, sex, education, poverty category, employment, marital status, perceived health status, census region, metropolitan statistical area, and BMI. Because of significant interaction between sex and race/ethnicity, separate multiple logistic regression models were run for men and women. Variables were included in the models if they had significant *P* values (<0.25) in bivariate analyses or were considered clinically relevant based on previous literature.

RESULTS — In 1998, 32,440 individuals aged ≥ 18 years were interviewed, and the overall response rate was 74%. Of this number, 1,850 had diabetes and belonged to the three racial/ethnic groups examined in this study. Overall, only 25% engaged in moderate/vigorous LTPA daily. This varied from 16% in blacks to 23% in Hispanics to 27% in whites.

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Abbreviations: LTPA, leisure-time physical activity; NHIS, National Health Interview Survey.

A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

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Table 1—Adjusted odds of moderate/vigorous LTPA by race/ethnicity and sex

	All individuals	Men	Women
n	1,422	591	831
White (reference group)	1.00 (1.00)	1.00 (1.00)	1.00 (1.00)
Black	0.61 (0.40–0.96)*	0.70 (0.34–1.42)	0.52 (0.28–0.96)*
Hispanic	0.93 (0.59–1.48)	1.35 (0.74–2.46)	0.63 (0.31–1.27)

Data are OR (95% CI). Adjusted for age, sex (for all individuals only), education, poverty category, employment, marital status, perceived health status, census region, metropolitan statistical area, comorbidity, activity limitation, and BMI. Comorbid conditions: hypertension, ischemic heart disease, angina, myocardial infarction, other heart disease, emphysema, chronic bronchitis, end-stage renal disease, stroke, asthma, lower-back pain, and cancer. *Significant at $P < 0.05$.

Table 1 shows the adjusted odds of moderate/vigorous LTPA in all individuals with diabetes and stratified by sex. After controlling for activity limitations, comorbidity, and other covariates, blacks were less likely to engage in LTPA compared with whites (odds ratio [OR] 0.61, 95% CI 0.40–0.96), but Hispanics did not differ significantly from whites (0.93, 0.59–1.48). Among men with diabetes, there were no significant racial/ethnic differences in the odds of engaging in LTPA. In contrast, among women, blacks were less likely to engage in LTPA compared with whites (0.52, 0.28–0.96) and Hispanics did not differ significantly from whites (0.63, 0.31–1.27).

CONCLUSIONS—The major findings of this study are that levels of LTPA are generally low across all racial/ethnic groups with diabetes, that blacks are less physically active than whites, and low levels of physical activity in black women account for essentially all of the observed racial differences between whites and blacks. The findings of this study are consistent with those of prior studies (7,8). The unique contribution of this study is the availability of detailed information on 23 leisure-time exercises, sports, or physically active hobbies, which allows for in-depth information on frequency, duration, and intensity of physical activity. Absence of data on physical activity frequency, duration, and intensity has been a major limitation of previous nationally representative studies.

This study shows that racial/ethnic differences in LTPA levels in people with

diabetes are independent of activity limitations, comorbidity, sociodemographic, and health characteristics. In addition, these findings suggest that insufficient LTPA in black women was the major driving force for the observed racial/ethnic differences between whites and blacks with diabetes. It has been previously documented that black women, as a population subgroup, are more likely to be sedentary than white women (9,10) and that there is greater decline in physical activity during adolescence in black girls than in white girls (11). These findings are concerning and indicate a dire need to better understand cultural values about physical activity, especially in black women.

The two major limitations of this study are lack of data on physical activity from occupation, transportation, or housework and absence of data on environmental factors that are known to limit physical activity, including neighborhood safety, crowding, and access to exercise facilities.

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