
Self-Reported Physical Activity Among Blacks

Estimates from National Surveys

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Background: National surveillance data provide population-level estimates of physical activity participation, but generally do not include detailed subgroup analyses, which could provide a better understanding of physical activity among subgroups. This paper presents a descriptive analysis of self-reported regular physical activity among black adults using data from the 2003 Behavioral Risk Factor Surveillance System ($n=19,189$), the 2004 National Health Interview Survey ($n=4263$), and the 1999–2004 National Health and Nutrition Examination Survey ($n=3407$).

Methods: Analyses were conducted between January and March 2006. Datasets were analyzed separately to estimate the proportion of black adults meeting national physical activity recommendations overall and stratified by gender and other demographic subgroups.

Results: The proportion of black adults reporting regular PA ranged from 24% to 36%. Regular physical activity was highest among men; younger age groups; highest education and income groups; those who were employed and married; overweight, but not obese, men; and normal-weight women. This pattern was consistent across surveys.

Conclusions: The observed physical activity patterns were consistent with national trends. The data suggest that older black adults and those with low education and income levels are at greatest risk for inactive lifestyles and may require additional attention in efforts to increase physical activity in black adults. The variability across datasets reinforces the need for objective measures in national surveys.

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Introduction

Participation in regular physical activity is associated with reduced risk of developing, as well as improving, symptoms of chronic disease.¹ Despite the known benefits of PA, most adults in the United States do not obtain adequate physical activity, and this amount is lower among racial/ethnic minorities compared to non-Hispanic whites.² For example, data from the National Physical Activity and Weight Loss Survey found higher rates of self-reported leisure-time inactivity among non-Hispanic black men and women compared to white men and women.³ Data from

the 2002 National Health Interview Survey (NHIS) found higher rates of inactivity among non-Hispanic blacks with arthritis compared to whites with arthritis.⁴ Data from the Behavioral Risk Factor Surveillance System (BRFSS; 1994–2004) showed higher prevalence of inactivity among non-Hispanic black men and women compared to non-Hispanic white men and women.⁵

Three national surveillance systems—BRFSS, NHIS, and the National Health and Nutrition Examination Survey (NHANES)—provide population-level estimates of self-reported physical activity participation. Although there are known limitations with using self-reported data, these surveys provide the only source of national-level information about type, frequency, intensity, duration of physical activity, as well as achievement of national objectives. Each survey uses different questions to assess physical activity, and estimates derived from each survey are likely to differ. In addition to providing estimates of physical activity levels for the general population, national data can also be used to examine these levels by population subgroups. Most subgroup analyses are stratified by one (e.g., race/ethnicity, age, gender) or two (e.g., by age within gender categories) levels. Estimates of activity levels stratified at more than two levels (e.g., by age within gender categories for a

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specific race/ethnic group) are often limited by small sample sizes, thus restricting the ability to thoroughly understand patterns within specific groups. However, detailed analyses at this level could provide a better understanding of participation patterns within population subgroups and, perhaps, more insight to help target public health efforts to increase physical activity levels.

It is believed that no published papers have combined data from three national surveys or used detailed subgroup analyses to describe regular physical activity participation among black adults. Because none of the surveys is considered the “gold standard” measure, compiling and evaluating data from all three surveys can provide a more comprehensive picture of activity levels and trends than evaluating data from a single source. This paper presents a comprehensive descriptive analysis of participation in regular physical activity at levels known to confer health benefits among black adults using the most recent available data from BRFSS (2003), NHIS (2004), and NHANES (1999–2004). These analyses are descriptive; no a priori hypotheses about differences among the national surveys or regular physical activity prevalence among black adults were developed.

Methods

Each survey is briefly described below and in more detail in Table 1. Surveys are approved by the Centers for Disease Control and Prevention Institutional Review Board and the Office of Management and Budget annually.

Behavioral Risk Factor Surveillance System Survey

The BRFSS provides annual state-based information on health practices and risk behaviors associated with health outcomes, including chronic and infectious diseases and preventable injuries, among adults (≥ 18 years).⁶ The 2003 BRFSS included six questions on moderate- and vigorous-intensity physical activity. Moderate-intensity physical activity was described as activities that “cause small increases in breathing or heart rate” and included examples such as “brisk walking, bicycling, vacuuming, gardening, or anything else that causes small increases in breathing or heart rate.” Participants who reported participating in moderate-intensity activity for at least 10 minutes at a time during a usual week also reported frequency (days/week) and duration (total time/day) for moderate-intensity activity. Vigorous-intensity physical activity was described as activities that “cause large increases in breathing or heart rate” and included examples such as “running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate.” Participants who reported participating in vigorous-intensity activity for at least 10 minutes at a time during a usual week were then asked about frequency and duration. Data were available for 19,189 black adults.

The National Health Interview Survey

The NHIS provides annual statistics about the health of Americans using a multipurpose health survey, conducted via

Table 1. Summary of national physical activity surveillance data sources^a

Survey	Mode of data collection	Target population	Total sample size	Black respondents	Frequency of data collection	Types of physical activity assessed
Behavioral Risk Factor Surveillance System (BRFSS)	Telephone interview	Adults (aged ≥ 18 year) in U.S. states, territories, and DC	264,684 respondents in 2003	20,684 (19,189 with available physical activity data)	Ongoing, annual	Leisure-time Household Transportation
National Health Interview Survey (NHIS)	In-person interview	Adults and children in U.S. states and DC	~31,326 adult respondents in 2004	4374 (4263 with available physical activity data)	Ongoing, annual	Leisure-time
National Health and Nutrition Examination Survey (NHANES)	Personal interview and examination	Children and adults in the U.S. states and DC	~17,061 adult respondents in 1999–2004	3408 (3407 with available physical activity data)	Ongoing, annual	Leisure-time

^aCenters for Disease Control and Prevention. An explanation of U.S. physical activity surveys (CDC, 2004).

personal household interviews by trained U.S. Census interviewers. The NHIS has a major emphasis on national-level estimates to track progress toward *Healthy People 2010* objectives.⁷⁻⁹ In 2004, NHIS included six questions to assess light/moderate and vigorous-intensity physical activity during leisure time. Participants were asked to report the frequency (i.e., times/day, week, month, year) and duration (i.e., minutes or hours/day) of participation in “light or moderate activities for at least 10 minutes that cause only light sweating or a slight to moderate increase in breathing or heart rate.” A similar set of questions was used to assess participation in “vigorous activities for at least 10 minutes that cause heavy sweating or large increases in breathing or heart rate.” Data were available for 4263 black adults.

The National Health and Nutrition Examination Survey

The NHANES focused on health and nutrition status, and included medical and dental examinations (MEC), physiologic measurements, laboratory tests, and a detailed household interview conducted by trained interviewers using a computerized system.¹⁰ Height and weight were measured during the MEC. Participants were also asked to identify moderate- and vigorous-intensity physical activity in which they had participated over the 30 days prior to assessment from a list of 47 activities. Moderate-intensity physical activity was defined as activities that caused only light sweating or a slight to moderate increase in breathing or heart rate. Vigorous-intensity physical activity was defined as activities that caused heavy sweating or large increases in breathing or heart rate. Intensity was assigned based on the Compendium of Physical Activities.¹¹ Frequency (times/day, week, month) and duration per session (minutes or hours/day) was reported for each activity. Participants also could report information for up to three additional unlisted moderate- or vigorous-intensity activities performed during leisure time. The frequency and duration of participation in activities within each intensity-level category was summed to create estimates for daily physical activity. Data were available for 3407 black adults.

Definition of Regular Physical Activity

Respondents for all three datasets were classified as obtaining or not obtaining “regular” PA. For the BRFSS and NHIS datasets, regular physical activity was defined as reporting participation in moderate- or light/moderate-intensity physical activity for ≥ 30 minutes on ≥ 5 days/week or vigorous-intensity physical activity for ≥ 20 minutes on ≥ 3 days/week. Regular physical activity was defined in the NHANES dataset as reporting participation in moderate-intensity physical activity for >600 total minutes over >20 of the past 30 days or vigorous-intensity physical activity for >240 minutes on >12 of the past 30 days.

Data Analysis

All statistics were calculated using SUDAAN (version 9.0) and weighted to account for the complex sample selection of the respective surveys. Descriptive data for study participants were assessed using self-reported data. Body mass index (BMI, kg/m^2) was calculated from self-reported data on weight and height for BRFSS and NHIS and from actual measures of height and weight taken during the medical examination

for NHANES. BMI was categorized as normal-weight ($<25.0 \text{ kg}/\text{m}^2$), overweight ($25.0\text{--}29.9 \text{ kg}/\text{m}^2$), or obese ($\geq 30 \text{ kg}/\text{m}^2$).¹² Regular physical activity participation was stratified by gender and selected participant characteristics, and percentage and 95% confidence interval (CI) are presented.

Results

Table 2 presents an overview of participant characteristics from all three surveys as well as prevalence and 95% CIs for self-reported regular physical activity among black adults from all three surveys. A higher proportion of men compared to women reported obtaining regular physical activity overall and among subgroups for each dataset. Self-reported regular physical activity was also highest among men and women in the youngest age group for each dataset. Although education categories were defined differently across surveys, men and women in the highest education category for each survey had the highest proportion of individuals who reported regular physical activity. Income categories also varied across surveys, but all three surveys showed that the highest proportion of men and women reporting regular activity was in the highest income category. Only BRFSS and NHIS included information about employment status, and participation in regular physical activity was highest among those who were employed. A higher proportion of married men reported regular physical activity in the BRFSS and NHIS datasets, and a higher proportion of unmarried men reported regular physical activity in the NHANES dataset, although the differences between married and unmarried men were small across all three datasets. The pattern among women was identical, with a higher proportion of married women in BRFSS and NHIS and unmarried women in NHANES reporting regular physical activity. When data were stratified by weight status, the highest prevalence of self-reported regular physical activity was observed among overweight ($25.0\text{--}29.9 \text{ kg}/\text{m}^2$), but not obese ($\geq 30 \text{ kg}/\text{m}^2$), men in all three datasets. Among women, self-reported regular PA was highest in the normal-weight ($<25.0 \text{ kg}/\text{m}^2$) subgroup in all three datasets. BRFSS was the only survey to report regional data and showed that men in the Midwest and women in the West reported the highest participation in regular activities.

Discussion

These findings are consistent with other published papers^{13,14} that report regular physical activity among black adults. Data from the 1999–2000 NHIS showed 30% of black men reported engaging in regular physical activity.¹³ BRFSS data from 2001–2002 in 21 Racial and Ethnic Approaches to Community Health (REACH) 2010 communities showed that the prevalence of meeting

Table 2. Prevalence of regular physical activity^a among blacks by selected demographic characteristics

	Demographics N (% of total)			Men Prevalence % (95% CI)			Women Prevalence % (95% CI)		
	BRFSS ^b	NHIS ^c	NHANES ^d	BRFSS ^b N=6353	NHIS ^c N=1674	NHANES ^d N=1612	BRFSS ^b N=12,836	NHIS ^c N=2589	NHANES ^d N=1795
Overall	19,189	4,263	3,407	41.8 (39.7, 43.9)	28.3 (25.8, 31.0)	29.8 (27.5, 32.1)	32.2 (30.7, 33.7)	19.8 (18.0, 21.8)	22.0 (19.6, 24.7)
Age^e									
18–24	1,848 (9.7)	472 (11.1)	803 (23.6)	61.1 (54.6, 67.3)	41.5 (32.8, 50.7)	44.3 (39.4, 49.4)	42.5 (38.2, 47.0)	20.2 (15.9, 25.2)	28.1 (22.0, 35.17)
25–34	3,648 (19.2)	862 (20.2)	509 (14.9)	49.9 (45.3, 54.5)	35.4 (29.4, 42.0)	32.2 (28.3, 36.3)	38.5 (35.4, 41.7)	19.5 (16.0, 23.5)	26.6 (23.2, 30.3)
35–44	4,207 (22.1)	941 (22.1)	571 (16.8)	44.8 (40.3, 49.3)	30.2 (25.5, 35.4)	21.4 (18.5, 24.7)	35.8 (32.7, 39.0)	24.0 (20.2, 28.2)	16.2 (13.4, 19.5)
45–64	6,630 (34.9)	1,347 (31.6)	908 (26.7)	33.9 (30.7, 37.2)	21.1 (17.8, 24.8)	—	28.8 (26.4, 31.3)	18.0 (15.5, 20.8)	—
65+	2,666 (14.0)	641 (15.0)	616 (18.1)	28.3 (22.6, 34.8)	—	—	18.9 (14.7, 24.0)	—	—
Education^f									
< High school	3,291 (17.2)	931 (22.1)	1,377 (40.6)	34.3 (29.4, 39.5)	13.6 (9.6, 18.9)	24.4 (21.4, 27.6)	24.2 (20.8, 28.1)	11.0 (8.6, 14.1)	12.1 (9.1, 15.9)
High school graduate	6,610 (34.6)	1,288 (30.6)	798 (23.5)	37.0 (33.8, 40.4)	23.6 (19.5, 28.3)	25.6 (20.9, 30.8)	28.7 (26.1, 31.5)	17.6 (14.7, 21.0)	20.3 (16.3, 24.9)
Some college	5,084 (26.6)	1,305 (31.0)	—	44.2 (40.5, 48.1)	34.1 (29.6, 38.9)	—	34.4 (31.8, 37.0)	23.6 (19.9, 27.8)	—
College graduate	4,146 (21.7)	683 (16.2)	—	53.9 (48.5, 59.1)	38.5 (32.2, 45.2)	—	40.0 (36.9, 43.1)	28.2 (22.9, 34.2)	—
> High school	—	—	1,218 (35.9)	—	—	37.4 (32.9, 42.2)	—	—	31.4 (26.3, 37.1)
Income^g									
<\$10,000	2,034 (10.6)	—	—	32.6 (25.7, 40.3)	—	—	26.5 (22.4, 31.0)	—	—
\$10,000–\$20,000	3,722 (19.4)	—	—	34.1 (29.9, 38.6)	—	—	27.6 (24.6, 30.9)	—	—
\$20,000–\$35,000	5,068 (26.4)	—	—	40.3 (36.7, 44.0)	—	—	31.9 (28.9, 35.1)	—	—
\$35,000–\$50,000	2,630 (13.7)	—	—	41.2 (36.3, 46.4)	—	—	36.6 (33.0, 40.5)	—	—
>\$50,000	3,390 (17.7)	—	—	53.4 (47.6, 59.2)	—	—	40.0 (35.7, 44.4)	—	—
< \$20,000	—	1,484 (34.8)	959 (28.1)	—	20.6 (16.4, 25.4)	26.8 (23.5, 30.5)	—	14.5 (12.2, 17.3)	17.0 (13.0, 22.0)
≥ \$20,000	—	2,383 (55.9)	2,012 (59.1)	—	30.9 (27.7, 34.4)	31.3 (28.2, 34.5)	—	23.4 (20.7, 26.2)	25.5 (21.9, 29.3)
Employment status									
Employed	11,396 (59.5)	2,476 (58.3)	—	44.8 (41.4, 48.3)	30.6 (27.2, 34.3)	—	34.5 (32.0, 37.1)	22.3 (19.3, 25.5)	—
Not employed	7,748 (40.5)	1,771 (41.7)	—	35.3 (31.7, 39.2)	25.2 (21.1, 29.9)	—	30.8 (28.4, 33.3)	17.5 (15.0, 20.3)	—
Marital status									
Married/living with	6,949 (36.3)	1,402 (33.1)	1,004 (30.5)	42.6 (39.4, 45.8)	28.0 (23.8, 32.5)	28.3 (23.2, 34.0)	34.3 (31.5, 37.3)	20.2 (17.5, 23.2)	22.2 (17.9, 27.3)
Not married	12,172 (63.7)	2,834 (66.9)	2,291 (69.5)	41.1 (38.3, 43.9)	27.9 (24.6, 31.5)	28.9 (25.4, 32.7)	31.1 (29.3, 32.8)	19.8 (17.8, 22.1)	21.6 (18.8, 24.7)
Body mass index (BMI)									
< 25.0 kg/m ²	5,295 (29.0)	1,240 (30.7)	1,017 (32.7)	40.3 (36.7, 44.1)	24.5 (20.4, 29.2)	27.0 (23.1, 31.4)	36.7 (33.7, 39.8)	21.1 (17.7, 24.8)	25.1 (20.6, 30.3)
25.0–29.9 kg/m ²	6,384 (35.0)	1,438 (35.6)	925 (29.8)	45.3 (42.2, 48.4)	32.9 (28.6, 37.5)	28.7 (24.1, 33.7)	32.5 (30.1, 35.1)	19.6 (16.8, 22.6)	24.6 (20.2, 29.6)
≥ 30.0 kg/m ²	6,557 (36.0)	1,362 (33.7)	1,164 (37.5)	40.0 (35.5, 44.6)	26.3 (21.3, 31.9)	31.9 (26.5, 37.9)	28.7 (26.2, 31.3)	18.6 (15.7, 21.8)	18.9 (15.5, 23.0)
Region of U.S.									
Northeast	2,343 (13.0)	—	—	43.2 (38.2, 48.4)	—	—	34.8 (31.2, 38.6)	—	—
Midwest	2,862 (15.8)	—	—	43.5 (39.0, 48.0)	—	—	34.5 (31.5, 37.6)	—	—
South	12,013 (66.5)	—	—	41.0 (38.7, 43.4)	—	—	29.3 (27.8, 30.9)	—	—
West	853 (4.7)	—	—	39.6 (29.9, 50.2)	—	—	38.6 (31.1, 46.7)	—	—

^a“Regular” physical activity for BRFSS data is defined as participating in moderate-intensity activity for >30 minutes on >5 days or vigorous-intensity activity for >20 minutes on >3 days. “Regular” physical activity for NHIS is defined as participating in moderate-intensity activity for >30 minutes on >5 days or vigorous-intensity activity for >20 minutes on >3 days. “Regular” physical activity for NHANES is defined as participating over the past 30 days in moderate-intensity activity for >600 total minutes over >20 days or vigorous-intensity activity for >240 minutes on >12 days.

^bSource data: Behavioral Risk Factor Surveillance System (BRFSS), 2003.

^cSource data: National Health Interview Survey (NHIS), 2004.

^dSource data: National Health and Nutrition Examination Survey (NHANES), 1999–2004.

^eFor NHIS data, age categories, 45–65 and 65+ were collapsed to 45+ due to too few observations to allow for additional stratification. For NHANES data, age categories were 18–29, 30–44, and 45+ due to too few observations to allow for additional stratification.

^fCollege graduate included people with vocational and associate’s degrees. For NHANES data, educational categories collapsed due to too few observations to allow for additional stratification.

^gFor NHIS and NHANES data, income categories were collapsed due to too few observations to allow for additional stratification.

the recommendation for regular PA was 36% in black men (range 27%–43%) and 26% in black women (range 21%–32%).¹⁴ This study is the first to use data from three national surveys to describe participation in regular physical activity among black adults.

In earlier national surveys, physical activity patterns were wide-ranging and stratification by specific demographic characteristics was limited to one or two levels (e.g., age by gender), which limited the ability to understand fully patterns within a specific population. This study is unique because data were stratified among black adults by seven levels (gender, age, education, income, employment status, BMI, and region of the country). The patterns observed in the analyses (e.g., higher prevalence of regular physical activity among men, younger age groups, more educated, and those with higher income levels) is also consistent with previous research. A higher prevalence was shown among normal-weight compared to overweight and obese women. In men, however, the highest prevalence of participation was reported in overweight men. This finding was not expected. BMI was self-reported in two of the three surveys and may not have been reported accurately among study participants, which could have influenced the relationship between BMI and self-reported physical activity. A recent paper reported racial/ethnic variations in self-reported versus measured BMI using data from the third NHANES survey and showed variability in the validity of self-reported BMI across racial/ethnic groups, particularly among men.¹⁵

There are several limitations in using information from multiple national sources to estimate PA patterns. Although the patterns observed across surveys were similar, the prevalence estimates differed. With the variety of activities assessed in national surveys, differences in results can be attributed to types of questions, data collection procedures, and methods of sample selection.

The NHANES questions inquired about participation in specific moderate- and vigorous-intensity leisure-time physical activities in the past 30 days during an in-person interview. NHIS questions asked about light-, moderate-, and vigorous-intensity leisure-time physical activities using open-ended questions during a household interview. BRFSS questions asked about moderate- and vigorous-intensity lifestyle activities in a usual week via telephone interview, thus potentially excluding people who did not have telephone service. The proportion of black adults, particularly women, who reported participating in regular physical activity was highest when the BRFSS PA data were used, which assessed lifestyle activities in a usual week during a telephone interview. In contrast, the proportion of blacks who reported participation in regular physical activity was lowest using estimates from

surveys that only assessed leisure-time physical activity and used face-to-face interviews (NHIS and NHANES).

Until recently, surveillance systems focused exclusively on leisure-time physical activity and may have excluded many of the activities in which certain subgroups of the population participate. For example, people who work and maintain a household might participate in household and occupational physical activity, but might have (or might perceive themselves to have) little or no time for leisure-time activities.^{16–18} Surveys that rely solely on estimates of leisure-time activities to describe physical activity patterns might provide inaccurate estimates. Similarly, people with physically demanding occupations might participate in moderate- or vigorous-intensity physical activity during work hours and might prefer less-intense or sedentary activities during nonwork periods.¹⁶ Although it has been shown that including activities other than leisure-time activities (e.g., household and occupational activities) increases the proportion of people who meet national recommendations,^{19–21} data are insufficient to determine whether these activities improved health. Until sufficient data are available, however, it may be useful to include separate questions representing various domains (i.e., leisure-time, household, occupational) that are similar across national surveys to provide comparable data on different types of physical activity.

In addition, all three surveillance systems relied on self-reported measures of physical activity, which might be subject to inaccuracies due to over- or underestimation of those levels. Because of the variability among the self-report measures, more objective assessments are recommended. However, no objective measures are available currently in nationally representative samples. NHANES began using accelerometers in a subset of a national sample to capture objective data on physical activity levels in 2004, but these data are not yet available to the public. Additional use of objective measures in national samples could improve the reliability of estimates. Despite these limitations, the patterns described in this paper were consistent across surveys. This study is the first comprehensive perspective on physical activity among black adults. This approach is novel and may help us to understand better the trends among population subgroups and to promote effectively physical activity in subgroups at risk for physical inactivity and sedentary lifestyles.

Conclusion

National estimates of physical activity levels are critical in establishing trends. The most physically active subgroups may provide insights for specific strategies to promote physical activity in the general population. The least physically active subgroups may be the most important groups to target for interventions. Preva-

lence rates combined with research on correlates can provide guidance in developing effective interventions. This study is unique because data from three national surveys are presented stratified by seven levels for black adults; however, the inferences that can be drawn from this study are limited because of the use of self-reported data. Future studies comparing prevalence rates among national surveys can provide, with convincing credibility, physical activity patterns and trends, particularly increasing and decreasing rates, by examining subgroups of the population. In addition, it is commendable that at least one national survey, NHANES, has moved to the use of objective monitors to capture participation patterns. Objective measures in additional national samples would provide more reliable estimates of physical activity patterns and trends.

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References

1. U.S. Department of Health and Human Services (USDHHS). Physical activity and health: a report of the Surgeon General. Hyattsville MD: USDHHS, Centers of Disease Control and Prevention (CDC), 1996.
2. Jones DA, Ainsworth BE, Croft JB, Macera CA, Lloyd EE, Yusuf HR. Moderate leisure-time physical activity: who is meeting the public health recommendations? A national cross-sectional study. *Arch Fam Med* 1998;7:285-9.
3. Marshall SJ, Jones DA, Ainsworth BE, Reis JP, Levy SS, Macera CA. Race/ethnicity, social class, and leisure-time physical inactivity. *Med Sci Sports Exerc* 2007;39:44-51.
4. Shih M, Hootman JM, Kruger J, Helmick CG. Physical activity in men and women with arthritis National Health Interview Survey, 2002. *Am J Prev Med* 2006;30:385-93.
5. Trends in leisure-time physical inactivity by age, sex, and race/ethnicity—United States, 1994–2004. *MMWR Morb Mortal Wkly Rep* 2005;54:991-4.
6. CDC. Behavioral Risk Factor Surveillance System user's guide. Atlanta GA: USDHHS, 1998.
7. CDC, USDHHS. NHIS Survey description. Hyattsville MD: Division of Health Interview Statistics, National Center for Health Statistics, 2003.
8. USDHHS Office of Disease Prevention and Health Promotion. Data 2010 . . . the Healthy People 2010 Database. 2003. Available online at: <http://wonder.cdc.gov/data2010/od22.htm>.
9. USDHHS. Healthy People 2010. Washington DC: U.S. GPO, 2000.
10. CDC, National Center for Health Statistics (NCHS). National health and nutrition examination survey questionnaire. Hyattsville MD: USDHHS, CDC, 2005. Available online at: http://www.cdc.gov/nchs/about/major/nhanes/nhanes99_00.htm.
11. Ainsworth BE, Haskell WL, Whitt MC, et al. Compendium of physical activities: an update of activity codes and MET intensities. *Med Sci Sports Exerc* 2000;32(9 suppl):S498-504.
12. National Institutes of Health (NIH). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. Vols. 98-4083. Hyattsville MD: USDHHS; 1996.
13. Ahmed NU, Smith GL, Flores AM, et al. Racial/ethnic disparity and predictors of leisure-time physical activity among U.S. men. *Ethn Dis* 2005;15:40-52.
14. Liao Y, Tucker P, Okoro CA, Giles WH, Mokdad AH, Harris VB. REACH 2010 surveillance for health status in minority communities—United States, 2001–2002. *MMWR Surveill Summ* 2004;53:1-36.
15. Gillum RF, Sempos C. Ethnic variation in validity of classification of overweight and obesity using self-reported weight and height in American women and men: the Third National Health and Nutrition Examination Survey. *Nutr J* 2005;4:27.
16. Airhihenbuwa CO, Kumanyika S, Agurs TD, Lowe A. Perceptions and beliefs about exercise, rest, and health among African-Americans. *Am J Health Promot* 1995;9:426-9.
17. Henderson KA, Ainsworth BE. Sociocultural perspectives on physical activity in the lives of older African American and American Indian women: a cross cultural activity participation study. *Women Health* 2000;31:1-20.
18. Henderson KA, Ainsworth BE. A synthesis of perceptions about physical activity among older African American and American Indian women. *Am J Public Health* 2003;93:313-7.
19. Ainsworth BE, Richardson M, Jacobs DRJ, Leon AS. Gender differences in physical activity. *Women Sport Phys Activity J* 1993;2:1-15.
20. Ainsworth BE, Irwin ML, Addy CL, Whitt MC, Stolarczyk LM. Moderate physical activity patterns of minority women: the Cross-Cultural Activity Participation Study. *J Womens Health Gend Based Med* 1999;8:805-13.
21. Lawlor DA, Taylor M, Bedford C, Ebrahim S. Is housework good for health? Levels of physical activity and factors associated with activity in elderly women. Results from the British Women's Heart and Health Study. *J Epidemiol Community Health* 2002;56:473-8.