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Participation in Types of Physical Activities Among US Adults— National Health and Nutrition Examination Survey 1999–2006

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Abstract

Background—Information on specific types of physical activities in which US adults participate is important for community and program development to promote physical activity.

Methods—Prevalence of participation and average time spent for 33 leisure-time aerobic activities and 10 activity categories were calculated using self-reported data from 22,545 participants aged 18 years in the National Health and Nutrition Examination Survey 1999–2006.

Results—Overall, 38% of US adults reported no leisure-time physical activities, and 43% reported 1 or 2 activities in the past 30 days. Walking was the most frequently reported activity for both men (29%) and women (38%). Among walkers, the average time spent walking was 198 minutes/week for men and 152 minutes/week for women. The most reported activities for men after walking were bicycling and yard work, and for women were aerobics and dance. For most activity categories, participation was lower among adults aged 65 years than among younger adults, and among Mexican Americans and non-Hispanic blacks than among non-Hispanic whites. Participation in most categories increased with increasing educational attainment.

Conclusions—Participation in physical activity differs by types of activities and demographic characteristics. Physical activity promotion programs should take these differences into account when developing intervention strategies.

Keywords

specific physical activity; NHANES; duration of activities

Regular physical activity has many health benefits, including prevention of weight gain and lower risk for heart disease, stroke, hypertension, depression, certain cancers, type 2 diabetes, and early death. The majority of US adults, however, are not participating in sufficient physical activity to attain these health benefits. To increase the proportion of adults who participate in regular physical activity, effective promotion programs are needed.

Understanding what activities people like to do is important for the development of such programs. Participation, as well as the time spent engaging in physical activity, may differ in important ways across various types of activities and by demographic characteristics.³ Those who allocate resources for physical activity programs may wish to consider activities that have the broadest population appeal. Popular activities may be more likely to be accepted and, therefore, could be included as part of a physical activity program. Identifying popular activities among different population groups can be helpful in allocating resources and developing physical activity programs, especially identifying detailed information on participation patterns (ie, type of activity, prevalence of participation, amount/volume of activity, and number of different activities in which individuals participate).

The information on participation in specific types of activities may also be useful for determining the extent to which certain physical activities may be missed when using motion devices (eg, accelerometer) to measure physical activity. Motion devices may not capture activities that are underwater (eg, swimming) or do not involve ambulation (eg, bicycling),⁴ which may lead to biased estimates of physical activity participation at a population level. Knowing what percentage of the population participates in these types of activities may be important when explaining the differences in physical activity participation assessed using motion devices versus questionnaires.

Few recent population-based studies have provided detailed information on patterns of participation in specific types of physical activity in the US population.^{5–7} Available reports are mostly limited to a few types of activities and focus either on the overall population⁶ or on specific population groups, such as overweight or obese individuals,^{8,9} cancer survivors,¹⁰ or those trying to lose weight.^{8,11} Findings from a study using National Health and Nutrition Examination Survey (NHANES) data from 1999–2004 indicated that the most common activities reported by US adults were walking, biking, gardening and yard work, and dancing.⁶ The study, however, did not report findings by demographic characteristics. Knowing what types of physical activity are popular in specific population subgroups may aid the development of physical activity programs. It would allow for intervention strategies to be tailored to what people usually do in the target population subgroups.

Our analysis extends the existing NHANES study⁶ by exploring the participation and time spent in specific types of leisure-time physical activities in population subgroups. We used NHANES data from 1999–2006, including both data from the 1999–2004 study and an additional cycle of NHANES data collected in 2005–2006. The specific purpose of the current analysis was to answer the following questions relevant to the overall US population and to population subgroups: a) How many different types of leisure-time aerobic activities do US adults usually engage in? b) What are the most popular types of activities in which they engage? c) How much time do they spend participating in each reported activity?

Methods

Study Sample

NHANES is a nationally representative sample of the civilian, noninstitutionalized US population and collects data from survey participants via household interviews and physical examinations in mobile examination centers. Detailed information about NHANES procedures is available elsewhere. Data on specific types of leisure-time physical activities were collected in NHANES during 1999–2006, so we used the data from the 1999–2000, 2001–2002, 2003–2004, and 2005–2006 cycles of NHANES for the current analysis. The overall interview response rates (ie, percentage of eligible survey participants who were actually interviewed) for the 4 survey cycles ranged from 79% in 2003–2004 to 84% in 2001–2002. Of the 22,624 survey participants aged 18 years and older, 22,545 with complete data on sex, age, race/ethnicity, education, and physical activity were included in the current analysis. Reliability of estimates was determined based on a relative standard error (RSE; 100% × [SE/estimate]) 30% and sample size and statistically unreliable estimates are noted in tables. The National Center for Health Statistics (NCHS) Research Ethics Review Board approved the survey protocols, and all adults who participated in the survey provided their informed consent.

Physical Activity

From 1999–2006, the NHANES physical activity questionnaire ¹³ included a series of questions on participation in leisure-time physical activities that queried the type, intensity, frequency, and duration of activities. For vigorous intensity activities, survey participants were first asked, "Over the past 30 days, did you do any vigorous activities for at least 10 minutes that caused heavy sweating, or large increases in breathing or heart rate?" Participants who answered "yes" to this question were then asked to identify the activities in which they participated. They were provided a card with a list of example leisure-time physical activities with the question, "What vigorous activities did you do?" For each of the identified activities, participants were further asked, "How often did you (do the) activity? How many times per day, per week, or per month?" and "On average about how long did you (do the) activity each time?" Questions about moderate intensity activities that caused only light sweating or a slight to moderate increase in breathing or heart rate were asked in the same manner as those for vigorous intensity activities. Participants were asked to identify activities in which they had participated.

Many specific activities were included in lists of both vigorous- and moderate-intensity activities. Leisure-time gardening and yard work were only included in 1999–2002 survey cycles. To determine an individual's participation in and the amount of time spent doing each type of leisure-time physical activity, we combined the time reported for moderate and vigorous intensity for each activity. Of the 41 surveyed leisure-time physical activities, 5 nonaerobic activities (ie, push-ups, sit-ups, stretching, weight lifting, and yoga) were excluded from the analysis, and 3 pairs of similar activities were combined (baseball with softball, skating with rollerblading, and downhill skiing with cross-country skiing). We excluded the nonaerobic activities to focus only on aerobic activities because of the differences between aerobic and others activities in the way activities are performed, related health benefits, and the recommended frequency and amount of activities. To facilitate comparison across demographic subgroups and to account for small percentages in participation (< 1%), the resulting 33 aerobic activities were grouped into 10 larger activity categories according to classifications in the 2011 Compendium of Physical Activities. ¹⁴

Demographics

NHANES survey participants were classified by sex, age (18–29, 30–44, 45–64, or 65 years), race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American, or other), and educational attainment (< high school graduate, high school graduate, some college, or college graduate).

Statistical Analysis

Data from the 4 NHANES cycles during 1999-2006 were combined into a single crosssectional dataset. We estimated the weighted prevalence and corresponding 95% confidence interval (CI) of a) adults who reported participating in 0, 1, 2, 3, or 4 or more different types of activities, and b) adults who participated in specific types of activities. We estimated the mean and corresponding 95% CI for time spent in specific activities among adults who reported participating in each activity. Because of differences between men's and women's participation, the prevalence of participation and mean time spent in specific types of activities were stratified by sex. ^{7,8} To account for the ordinal nature of the data, Cochran-Mantel-Haenszel chi-square statistics were used to test for differences in the number of different types of activities by demographic characteristics. Orthogonal polynomial contrasts and pairwise t-tests were used to identify demographic differences in prevalence and mean time spent in each of the activities. A P-value of < .05 was considered statistically significant. SAS-callable SUDAAN, release 11.0.0 (RTI International, Research Triangle Park, NC) was used for all analyses, taking into account the stratification, clustering, and weighting used in the complex survey design. Interview sample weights were used in all analyses. A combined interview weight for 1999-2006 was created using the method specified by NCHS.¹⁵

Results

Participant Characteristics

The analytic sample included 22,545 participants aged 18 years or older, with about half being male and a quarter being in each of the 4 age groups (Table 1). When the sample was

weighted, 62% were aged 30–64 years, 8% were Mexican American, 11% were non-Hispanic black, and 21% had less than a high school education.

Number of Different Types of Activities Reported

About 8 in 10 US adults reported participating in 2 or fewer different types of physical activities. The number of different activities reported varied significantly by sex, age, race/ethnicity, and educational attainment (Table 2). For example, 35% of men reported participation in no activity and 40% in multiple (2) activities, compared with 40% and 33% of women, respectively. Similarly, the percentage of adults who did not participate in any activities increased from 27% for the youngest age group (18–29 years) to 54% for the oldest age group (65 years); whereas the percentage of adults who participated in multiple activities decreased from 49% for the youngest to 19% for the oldest age group.

Participation in Specific Types of Physical Activity

Overall Participation—The percentage of adults who participated in each of the 33 activities varied from < 1% for hockey to 34% for walking (Table 3). Walking was the most frequently reported activity followed by bicycling (12%), yard work (11%), dance (8%), and treadmill (8%). Similar to the wide range of participation in each specific activity, the average time adults spent in a specific activity varied from 52 minutes/week for Frisbee to 254 minutes/week for hunting, among those who participated in the activity.

Participation by Sex—The prevalence of participating in most leisure-time physical activities differed significantly by sex (P < .05). Compared with women, more men reported participating in and spending more time doing bicycling, yard work, basketball, and golf activities. Conversely, compared with men, more women reported participating in aerobics, dance, treadmill, and walking activities, and also spent more time in treadmill activity. Based on percentage of adults who participated, walking (29%), bicycling (14%), yard work (13%), running (10%), and basketball (10%) were the top 5 activities among men. Walking (38%), aerobics (11%), dance (10%), bicycling (10%), and treadmill (9%) were the top 5 activities among women (Table 3).

Participation in Categories of Physical Activity

Overall Participation—Among the physical activity categories, the most common activities were walking/hiking (36%), sports (19%), dancing/aerobics (14%), lawn/garden (13%), and bicycling (12%) (Table 3). For each of these activity categories, the average time spent engaging in the activity among those who did the activity was > 100 minutes/week. The average reported time for fishing/hunting was 263 minutes/week, the most among all 10 activities, although prevalence of participation was less than 4%.

Participation by Sex—More men, compared with women, reported participating in and spending longer average time in sports, lawn/garden, and bicycling activities, while more women, compared with men, reported participating in walking/hiking, dancing/aerobics, and conditioning exercises.

Participation by Age Group—For most activity categories among women, and for sports, dancing/aerobics, running/jogging, and water activities among men, the prevalence of participation decreased with increasing age (Table 4). Among women, walking/hiking was similar in the 2 youngest age groups and declined from 45% in the 30- to 44-year age group to 29% in the 65-year age group; performing lawn/garden activities was highest (13%) in the 45- to 64-year age group. Among men, participation in walking/hiking and lawn/garden activities increased with age up to the 45- to 64-year age group, then decreased slightly in the 65-year age group. Sports (48%), running/jogging (29%), and walking/hiking (28%) were the most frequently reported activities among men aged 18–29 years. Walking/hiking (33%) and lawn/garden (17%) were the most frequently reported activities among men ages 65 years. Among women, walking/hiking was the most frequently reported activity in all age groups. Dancing/aerobics (32%) is the second most frequently reported activity in the 18- to 29-year age group and lawn/garden (9%) is the second most frequently reported activity in the 65-year age group.

Average time spent in specific activity categories among participants differed by age. However, there was no consistent trend of time spent in activity by age (Table 4). Among men, those in the 18- to 29-year age group spent an average of 245 minutes/week walking or hiking, the most among all age groups. Among women, the average weekly time spent walking/hiking ranged between 147 minutes and 170 minutes among the 4 age groups. Both men and women in the youngest (18–29 years) and oldest (65 years) age groups reported spending more time per week in dancing/aerobics and sports than those aged 30–64 years.

Participation by Race/Ethnicity—For most activity categories, the prevalence of participation was significantly higher among non-Hispanic whites compared with non-Hispanic blacks and Mexican Americans (Table 5). However, more Mexican American men (12%) and non-Hispanic black men (11%) reported dancing/aerobics than did non-Hispanic white men (8%), and more non-Hispanic black women (22%) reported dancing/aerobics than did non-Hispanic white women (18%). For running/jogging, participation was not significantly different among non-Hispanic whites compared with non-Hispanic blacks and Mexican Americans among both men and women.

There were racial/ethnic differences in the average time reported for several activities. For example, non-Hispanic black men and women reported spending longer weekly time walking/hiking than non-Hispanic whites and Mexican Americans, and non-Hispanic black men reported spending more time engaging in sports, running/jogging, and bicycling than did non-Hispanic white and Mexican American men.

Participation by Education—The prevalence of participation for most categories of activity increased with increasing educational attainment, except for fishing/hunting in both men and women and for lawn/garden activities in men (Table 6). Participation in lawn and garden activities in men was lower among those with less than a high school education (9%) than among those with more than a high school education (about 17%).

The reported average participation time decreased with increasing educational attainment for many activities, including walking/hiking and water activities in both men and women;

bicycling, conditioning exercises, and fishing/hunting in men; and sports and dancing/aerobics in women. For example, the average time reported for walking/hiking was 159 minutes/week among male college graduates and 148 minutes/week among female college graduates, compared with 254 minutes/week and 207 minutes/week among men and women with less than high school education.

Discussion

Our findings show that the vast majority of US adults (81%) participated in 2 or fewer different types of physical activities. We also found participation in specific activities varied substantially by demographic characteristics. Walking, however, was the most commonly reported type of activity among all adults, and those who walked spent more than 2.5 hours/week, on average, doing so. Bicycling, yard work, dance, and treadmill were also popular activities in the general population, especially among some population subgroups.

To our knowledge, the number of different types of activities in which US adults usually engage has not been previously reported. We found that 38% of US adults engage in no leisure-time physical activity and another 43% participate in 1 or 2 activities. This information may be useful in the development of physical activity promotion programs. For example, our findings reflect that many US adults may be quite attached to routine in their physical activity choices, rarely engaging in many different types of activities. Their choices may have been made based on interests, convenience, or other reasons. Similar underlying causes may exist to influence the choices of others. Public health programs may need to focus on encouraging those who are inactive to do a simple, common activity such as walking. In addition, those who engage in only 1 or 2 activities could be encouraged to increase the amount of time they spend in those activities to attain the health benefits. ¹⁶

Our results also provide evidence regarding the completeness of physical activity assessment using questionnaires that only query a few of the most frequently performed activities, such as the questionnaire used in the Behavioral Risk Factor Surveillance System. ^{17,18} In that survey, respondents are asked about the 2 physical activities or exercises they spent the most time doing during the past month. Our results indicate the BRFSS questions would capture all activities for 81% of US adults who report 2 or fewer leisure-time physical activities but would not capture complete information for those who engage in more than 2 activities.

Consistent with other studies, 5,7,8,11,19 the current study also finds that adults prefer different types of activities, depending on their demographic characteristics. Walking, bicycling, yard work, dancing, and treadmill were the most frequently reported activities. We noted several activity participation differences by sex, such as golf, basketball, running, yard work, aerobics, and dance. Similar sex differences were reported from previous population-based studies for healthy adults and for those trying to lose weight. Our analysis also showed marked differences in several categories of activities by age and race ethnicity, such as a decline with age in participation in sports and the higher popularity of dancing/aerobics in non-Hispanic blacks and Mexican Americans compared with non-Hispanic whites. Similar age-related declines in activities, especially in vigorous or contact sports, have been reported previously. The current analysis further revealed that

participation in most physical activity categories increased with increasing educational attainment. The finding is consistent with previous observations on the association between overall leisure-time physical activity and education.^{7,8,11,20} The information suggests that physical activity promotion programs may need to be tailored to the types of physical activities that appeal to the target population. For example, parks and recreation planners should take their community demographics into account when planning to build parks, walking/jogging trails, gyms, and/or dancing facilities with limited resources.

Motion devices may not capture activities that are underwater or do not involve ambulation.⁴ We found, for example, that 12% of US adults participated in bicycling and 6% in swimming. The finding suggests that estimates based on motion devices may be underestimates of overall physical activity because of these missed activities. As motion devices are increasingly used in physical activity surveillance,^{4,21} further studies are needed to assess the magnitude of underestimation in prevalence and volume of physical activity because of specific activities not captured by motion devices.

Our analysis provided population estimates for average duration of activity for 33 common leisure-time physical activities and 10 activity categories. Existing reports on the amount of time spent in specific activities have been limited in the number of activities and have differed in estimating methods. ^{3,6,9–11,22,23} Knowing the time spent participating in an activity in addition to the prevalence of participation may provide information on the contribution of the activity to overall population volume of activity. Popular activities in which participants spend substantial amounts of time may contribute considerably to population-level physical activity and, thus, affect population health. Our results showed that participants spent the most time in certain recreational activities (eg, hunting, fishing, and horseback riding) and sports (eg, golf and martial arts); however, prevalence of participation for these activities was generally low (ie, 5.7% for golf and 0.6%-2.8% for the others). On the other hand, popular activities (ie, those with relatively high prevalence of participation) were usually the activities in which participants engaged for a substantial amount of time. For example, average weekly time spent by participants was 108 minutes for bicycling and 172 minutes for yard work. Because of both high participation and substantial time spent on these activities, promoting such popular activities may result in greater population-level health benefits than promoting activities with lower participation.

In this study, walking was the most commonly reported activity. Walking is the most popular leisure-time physical activity in the general population as well as among specific population groups, as reported in previous national surveys. 3,6–11 We found that among leisure-time walkers, men walk an average of 198 minutes/week and women walk 152 minutes/week. Walking/hiking is also the most popular of the 10 categories of physical activity in the current analysis among most demographic subgroups, indicating that it is well-accepted by many adults. Walking's high frequency of participation, substantial time spent among walkers, and popularity among female and older adults makes it a practical choice for promotion in public health programs to foster active lifestyles in the population, especially in subgroups with typically lower levels of physical activity. 24,25

There are several limitations to this study. First, the current analysis used data collected during the 1999-2006 NHANES, because data on individual types of leisure-time physical activities were not collected in NHANES after 2006. Inference based on the findings for contemporary physical activity patterns should be made with caution. Second, leisure-time physical activity was assessed by self-report, which may be subject to recall and social desirability biases, potentially resulting in overestimation of frequency and duration of activity. ²⁶ However, self-report continues to be the most widely used type of physical activity assessment, especially in large population-based surveys. ²⁶ One of the benefits of self-report instruments is the possibility of assessing participation in specific types of physical activity. In addition, previous studies have validated similar population-based surveys²⁷ and self-report leisure-time physical activity questionnaires, ²⁸ which provide indirect support for the validity of the NHANES survey data used in the current analysis. Third, season-specific variations in physical activity may not be fully captured in the NHANES, because it is a "fair weather" survey that avoids extreme hot/cold weather²⁹ and participants are asked about their activities in the past 30 days. Thus, there may be a seasonal aspect to the findings; for example, some cold weather activities (like skiing) might be underrepresented and, therefore, underestimated.

There are several strengths to this study. NHANES has relatively high response rates (79%–84%)³⁰ that may limit the likelihood of bias because of low participation. In addition, its use of in-person data collection might improve data accuracy. Finally, the availability of nationally representative data on 33 types of leisure-time aerobic activities and 10 activity categories makes it possible for the current analysis to include most common activities in which US adults participate. In addition, the NHANES sampling method allows comparison across multiple subgroups.

Conclusions

Understanding participation in types of leisure-time physical activity in the US population has important public health implications. The majority of US adults either does not participate in any leisure-time activity or participates in just 1 or 2 types of activities. Accordingly, programs to promote physical activity may need to focus on getting these adults to begin some simple activities or to increase their activity volume. Walking is the most popular leisure-time activity for most demographic groups. Therefore, promotion of and providing greater opportunities for walking may be a viable public health approach to increasing physical activity in the general population, particularly among those who are inactive. Programs to promote physical activity other than walking may need to be tailored to the types of physical activities that appeal to the target population.

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References

 Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report 2008. Washington, DC: U.S. Department of Health and Human Services; 2008.

- 2. Centers for Disease Control and Prevention. Summary health statistics for U.S. adults: National Health Interview Survey, 2012. Vital Health Stat. 2014; 10(260):1–161.
- 3. Humphreys BR, Ruseski JE. Participation in physical activity and government spending on parks and recreation. Contemp Econ Policy. 2007; 25:538–552.10.1111/j.1465-7287.2007.00079.x
- 4. Troiano RP, Berrigan D, Dodd KW, et al. Physical activity in the United States measured by accelerometer. Med Sci Sports Exerc. 2008; 40:181–188.10.1249/mss.0b013e31815a51b3 [PubMed: 18091006]
- Crespo CJ, Keteyian SJ, Heath GW, et al. Leisure-time physical activity among US adults. Results from the Third National Health and Nutrition Examination Survey. Arch Intern Med. 1996; 156:93– 98.10.1001/archinte.1996.00440010113015 [PubMed: 8526703]
- 6. Ham SA, Kruger J, Tudor-Locke C. Participation by US adults in sports, exercise, and recreational physical activities. J Phys Act Health. 2009; 6:6–14. [PubMed: 19211953]
- U.S. Department of Health and Human Services. Physical activity and health: a report of the Surgeon General. 1996; xvii:278.
- 8. Centers for Disease Control Prevention. Prevalence of leisure-time physical activity among overweight adults—United States, 1998. Morb Mortal Wkly Rep. 2000; 49:326–330.
- Spees CK, Scott JM, Taylor CA. Differences in amounts and types of physical activity by obesity status in US adults. Am J Health Behav. 2012; 36:56–65.10.5993/AJHB.36.1.6 [PubMed: 22251783]
- Blanchard CM, Cokkinides V, Courneya KS, et al. A comparison of physical activity of posttreatment breast cancer survivors and noncancer controls. Behav Med. 2003; 28:140– 149.10.1080/08964280309596052 [PubMed: 14663921]
- 11. DiPietro L, Williamson DF, Caspersen CJ, et al. The descriptive epidemiology of selected physical activities and body weight among adults trying to lose weight: the Behavioral Risk Factor Surveillance System survey, 1989. Int J Obes Relat Metab Disord. 1993; 17:69–76. [PubMed: 8384167]
- 12. National Center for Health Statistics. [Accessed June 2014] National Health and Nutrition Examination Survey. Survey Methods and Analytic Guidelines. Available at http://www.cdc.gov/nchs/nhanes/survey_methods.htm
- 13. National Center for Health Statistics. [Accessed June 2013] National Health and Nutrition Examination Survey. Physical Activity and Physical Fitness Questionnaire. Available at: http://www.cdc.gov/nchs/data/nhanes/spq-pa.pdf
- Ainsworth BE, Haskell WL, Herrmann SD, et al. 2011 compendium of physical activities: a second update of codes and MET values. Med Sci Sports Exerc. 2011; 43:1575–1581.10.1249/ MSS.0b013e31821ece12 [PubMed: 21681120]
- 15. Johnson, CLP-RR.; Ogden, CL., et al. National Health and Nutrition Examination Survey: analytic guidelines, 1999–2010. National Center for Health Statistics; 2013.
- United States Dept. of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Washington, DC: U.S. Dept. of Health and Human Services; 2008.
- Centers for Disease Control and Prevention. [Accessed June 2013] Behavioral Risk Factor Surveillance System. Survey Data and Documentation. Available at: http://www.cdc.gov/brfss/data_documentation/index.htm
- Centers for Disease Contral and Prevention. [Accessed January 2014] A Data Users Guide to the BRFSS Physical Activity Questions. How to Assess the 2008 Physical Activity Guidelines for Americans. Available at: http://www.cdc.gov/brfss/pdf/PA %20RotatingCore_BRFSSGuide_508Comp_07252013FINAL.pdf
- Hesser JE, Kim H. Preferred types of physical activity among Rhode Island adults. Med Health R I. 1997; 80:307–308. [PubMed: 9327665]

 Droomers M, Schrijvers CT, van de Mheen H, et al. Educational differences in leisure-time physical inactivity: a descriptive and explanatory study. Soc Sci Med. 1998; 47:1665– 1676.10.1016/S0277-9536(98)00272-X [PubMed: 9877337]

- 21. Hansen BH, Kolle E, Dyrstad SM, et al. Accelerometer-determined physical activity in adults and older people. Med Sci Sports Exerc. 2012; 44:266–272.10.1249/MSS.0b013e31822cb354 [PubMed: 21796052]
- 22. Caspersen CJ, Bloemberg BP, Saris WH, et al. The prevalence of selected physical activities and their relation with coronary heart disease risk factors in elderly men: the Zutphen Study, 1985. Am J Epidemiol. 1991; 133:1078–1092. [PubMed: 2035512]
- 23. Littman AJ, Kristal AR, White E. Effects of physical activity intensity, frequency, and activity type on 10-y weight change in middle-aged men and women. Int J Obes. 2005; 29:524–533.
- Centers for Disease Control and Prevention. Vital signs: walking among adults—United States, 2005 and 2010. Morb Mortal Wkly Rep. 2012; 61:595–601.
- Fitzhugh EC, Thompson DL. Leisure-time walking and compliance with ACSM/AHA aerobic-related physical activity recommendations: 1999–2004 NHANES. J Phys Act Health. 2009; 6:393–402. [PubMed: 19842452]
- Sallis JF, Saelens BE. Assessment of physical activity by self-report: status, limitations, and future directions. Res Q Exerc Sport. 2000; 71:S1–S14.10.1080/02701367.2000.11082780 [PubMed: 10925819]
- 27. Nelson DE, Holtzman D, Bolen J, et al. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). Soz Praventivmed. 2001; 46(Suppl 1):S3—S42.10.1007/BF01318790 [PubMed: 11851091]
- Washburn RA, Heath GW, Jackson AW. Reliability and validity issues concerning large-scale surveillance of physical activity. Res Q Exerc Sport. 2000; 71:S104– S113.10.1080/02701367.2000.11082793 [PubMed: 10925832]
- Zipf G, Chiappa M, Porter K, et al. National Health and Nutrition Examination Survey: plan and operations, 1999–2010. National Center for Health Statistics. Vital and Health Statistics. 2013; 56:1–37. [PubMed: 25078429]
- 30. National Center for Health Statistics. [Accessed June 2013] National Health and Nutrition Examination Survey. NHANES Response Rates and CPS Totals. Available at http://www.cdc.gov/nchs/nhanes/response_rates_CPS.htm

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Table 1

Participant Characteristics, NHANES 1999–2006

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	Sample size	Sample %	%	95% CI
Total	22,545	100.0	-	-
Sex				
Male	10,732	47.6	48.1	(47.5–48.7)
Female	11,813	52.4	51.9	(51.3–52.5)
Age (years)				
18–29	6169	27.4	21.9	(20.7–23.0)
30–44	5166	22.9	30.2	(28.8–31.5)
45–64	5723	25.4	31.7	(30.5-33.0)
65+	5487	24.3	16.3	(15.3–17.3)
Race/ethnicity				
Mexican American	5186	23.0	7.6	(6.3–9.1)
Non-Hispanic white	10,834	48.1	71.0	(68.0–73.7)
Non-Hispanic black	4729	21.0	11.2	(9.5–13.1)
Other	1796	8.0	10.3	(8.5–12.4)
Education				
< High school	7509	33.3	20.7	(19.5–22.0)
High school	5565	24.7	26.1	(25.0–27.3)
Some college	5706	25.3	29.6	(28.5-30.7)
College graduate	3765	16.7	23.6	(21.8–25.4)

Abbreviations: NHANES, National Health and Nutrition Examination Survey; CI, confidence interval.

 $[^]a\mathrm{Weighted}$ to represent average US population during 1999–2006.

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Table 2

Participation in Different Types of Leisure-Time Physical Activities in the Past 30 Days Among Adults 18 Years, Overall and by Demographic Characteristics, NHANES 1999-2006

				Number 0	r leisur	Number of feisure-time physical activities	l activit	lies		
		0		1		2		3		4
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Total	37.5	(36.0–39.1)	26.3	(25.5–27.2)	17.1	(16.3–18.0)	8.8	(8.3–9.5)	10.2	(9.4–11.1)
Sex ^a										
Male	35.1	(33.3–37.0)	25.3	(24.2–26.6)	17.7	(16.6–18.8)	9.5	(8.7–10.3)	12.3	(11.3–13.5)
Female	39.7	(38.0-41.3)	27.3	(26.1-28.4)	16.6	(15.7–17.6)	8.3	(7.6–9.0)	8.2	(7.3–9.1)
Age (years) ^b										
18–29	27.1	(25.1–29.2)	23.9	(22.4–25.4)	19.0	(17.8–20.3)	11.4	(10.3–12.5)	18.6	(16.9–20.3)
30-44	34.6	(32.5–36.7)	26.3	(24.9–27.7)	17.6	(16.3–19.0)	10.0	(9.0–11.0)	11.6	(10.3–13.0)
45–64	39.1	(36.8–41.5)	27.5	(26.0–29.1)	18.1	(16.6–19.7)	8.1	(7.0–9.4)	7.1	(6.2–8.2)
+59	53.7	(51.3–56.2)	27.4	(25.7–29.2)	11.9	(10.7–13.2)	4.7	(3.9–5.7)	2.2	(1.6-3.0)
Race/ethnicity ^a										
Mexican American	50.7	(48.1–53.3)	25.0	(23.5–26.6)	13.7	(12.5–15.0)	5.2	(4.5–6.0)	5.3	(4.3–6.6)
Non-Hispanic white	33.7	(31.8–35.7)	27.1	(26.1-28.1)	18.1	(17.1-19.2)	6.7	(8.9–10.6)	11.4	(10.3–12.5)
Non-Hispanic black	48.0	(45.8–50.3)	23.9	(22.5–25.4)	14.2	(12.8–15.7)	9.9	(5.7–7.5)	7.3	(6.2–8.5)
Education ^b										
< High school	58.8	(56.2–61.4)	23.1	(21.2–25.2)	10.0	(8.9–11.2)	4.2	(3.5–5.0)	3.8	(3.2–4.5)
High school graduate	42.7	(40.9–44.5)	27.6	(26.0-29.3)	15.5	(14.2–16.9)	6.9	(6.0-8.0)	7.4	(6.4–8.5)
Some college	32.6	(30.8–34.4)	26.6	(25.1-28.0)	18.6	(17.4–19.9)	6.6	(8.9–10.9)	12.4	(11.2–13.8)
College graduate	19.3	(17.6–21.0)	27.5	(25.9-29.1)	23.4	(21.7-25.3)	13.8	(12.6–15.0)	16.0	(14.5–17.6)

Abbreviations: NHANES, National Health and Nutrition Examination Survey; CI, confidence interval.

 $^{^{\}it a}$ Significant difference (P < .01) in number of activities by demographic group.

 $b_{\rm Significant}$ linear trend (P < .01) for number of activities by demographic group.

Table 3

Prevalence of Participation in Specific Leisure-Time Physical Activities in the Past 30 Days and Average Time (Minutes/Week) Spent in Each Activity Among Those Reporting the Corresponding Activity, Overall and by Sex, NHANES 1999-2006

			Part	Participation ^a			M	linutes/week	among th	Minutes/week among those reporting each activity	g each ac	ctivity
		Total		Male		Female	I	Total		Male	Ē	Female
	%	95% CI	%	95% CI	%	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
$\operatorname{Bicycling}^{b,c}$	11.6	(10.6–12.6)	13.8	(12.8–15.0)	9.5	(8.4–10.8)	108	(98–119)	126	(109–143)	84	(75–94)
$\mathrm{Bicycling} b.c$	11.6	(10.6–12.6)	13.8	(12.8–15.0)	9.5	(8.4–10.8)	108	(98–119)	126	(109–143)	84	(75–94)
Conditioning exercises b	10.9	(10.1–11.8)	9.6	(8.6–10.6)	12.2	(11.3–13.2)	109	(96–121)	110	(87–132)	108	(95–121)
Stair climbing	4.5	(4.1–4.9)	4.2	(3.8-4.8)	4.7	(4.2–5.3)	125	(98–152)	135	(88–183)	1117	(90–144)
${ m Treadmill}^{b,c}$	7.8	(7.1–8.5)	6.5	(5.7–7.4)	0.6	(8.2–9.8)	80	(74–86)	73	(62-29)	85	(77–94)
$\mathrm{Dancing/aerobics}^b$	13.9	(13.1–14.8)	0.6	(8.2–9.8)	18.5	(17.4–19.6)	116	(108–124)	111	(99–123)	118	(109–128)
$Aerobics^b$	7.1	(6.5–7.7)	3.4	(2.9–3.8)	10.6	(9.7–11.5)	111	(104–118)	109	(95–122)	112	(104–120)
$Dance^b$	8.3	(7.6–9.0)	6.2	(5.6–7.0)	10.2	(9.2–11.1)	100	(88–111)	102	(86–117)	66	(86–112)
Fishing/hunting b	3.6	(3.1–4.2)	6.3	(5.5–7.3)	1.1	(0.8–1.4)	263	(227–298)	268	(235–302)	232	(154–309)
${ m Fishing}^b$	2.8	(2.4–3.3)	8.8	(4.1–5.6)	1.0	(0.8–1.3)	238	(203–272)	240	(209–271)	228	(147–308)
$\operatorname{Hunting}^b$	1.1	(0.8–1.4)	2.1	(1.6–2.8)	0.1	(0-0.2)	254	(198–310)	255	(197–313)	e^{-1}	I
Lawn/garden b,c,d	13.0	(10.6–15.9)	15.0	(12.3–18.2)	11.2	(8.8–14.1)	204	(181–226)	235	(198–271)	166	(137–194)
$Gardening^d$	4.9	(3.8–6.3)	4.1	(3.0–5.6)	5.6	(4.2–7.5)	171	(130–212)	217	(129–304)	140	(112–168)
Yard work b,c,d	10.5	(8.5–13.1)	13.3	(10.8–16.2)	8.0	(6.2–10.4)	172	(154–190)	199	(166–232)	131	(1111–151)
${\tt Running/jogging}^b$	11.2	(10.3–12.1)	14.5	(13.4–15.8)	8.1	(7.3–9.1)	66	(93–106)	103	(95–111)	93	(82–105)
$\log_{\mathrm{bing}} b$	5.6	(5.1–6.1)	6.7	(6.0–7.4)	4.5	(4.0–5.2)	82	(73–91)	87	(96-22)	75	(61–89)
${\sf Running}^b$	7.5	(6.8–8.3)	10.4	(9.4–11.5)	4.8	(4.2–5.5)	88	(82–94)	88	(81–96)	87	(26–98)
$\mathrm{Sports}^{b,c}$	19.4	(18.3–20.4)	28.3	(26.7–29.9)	11.1	(10.3–12.0)	214	(201–226)	241	(225–256)	151	(135–166)
${\it Baseball/softball}^b$	2.5	(2.2–2.8)	3.9	(3.4-4.4)	1.2	(0.9–1.6)	162	(137–186)	168	(138–197)	143	(77–208)
Basketball b,c	5.9	(5.3–6.6)	10.2	(9.2–11.4)	1.9	(1.6–2.2)	133	(120–146)	141	(126–156)	94	(69–119)
$\mathrm{Bowling}^b$	1.8	(1.5–2.1)	2.0	(1.6–2.4)	1.6	(1.3–1.9)	118	(91–145)	109	(74–144)	129	(84–173)

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			rar	r ai ticipanon			2	Minutes/week among mose reporting each activity	among n	mindai asor	g cacil at	LIVILY
		Total		Male		Female		Total		Male	Ē	Female
	%	95% CI	%	95% CI	%	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Boxing b	0.4	(0.3–0.5)	8.0	(0.6–1.0)	0.1	(0.1–0.2)	110	(53–166)	116	(51–182)	69	(34–104)
Football ^b	1.6	(1.4–1.8)	2.7	(2.4–3.2)	0.5	(0.4–0.8)	110	(88–132)	116	(93–139)	I	I
${ m Frisbee}^{b,c}$	8.0	(0.6–1.1)	1.2	(0.9–1.6)	0.5	(0.3–0.8)	52	(39–65)	62	(43–80)	30	(18–42)
$\operatorname{Golf}^{b,c}$	5.7	(5.1–6.3)	9.5	(8.5–10.6)	2.2	(1.8–2.6)	251	(221–281)	265	(232–298)	196	(161–231)
Hockey	0.3	(0.2-0.5)	9.0	(0.4–1.1)	1	1	86	(72–124)	95	(67–123)	I	I
Horseback riding	9.0	(0.4-0.8)	0.5	(0.3–0.8)	0.7	(0.5-0.9)	183	(115–251)	193	(80–307)	176	(90–262)
Martial arts b	0.7	(0.6–0.9)	1:1	(0.9-1.4)	0.4	(0.2-0.5)	176	(139–213)	181	(136–225)	162	(106–217)
${ m Racquetball}^b$	9.0	(0.4–0.7)	1.0	(0.8–1.3)	0.2	(0.1-0.3)	86	(76–120)	105	(80–130)	I	I
${\rm Skating/rollerblading}^{\mathcal{C}}$	1.6	(1.3–1.9)	1.7	(1.4–2.2)	1.5	(1.2–1.9)	76	(76–117)	121	(85–158)	70	(52–89)
$\mathrm{Soccer}^{b,c}$	1.8	(1.6–2.1)	3.0	(2.6–3.5)	0.7	(0.5–1.0)	104	(86–121)	112	(92–133)	70	(47–94)
$Tennis^b$	1.8	(1.5–2.1)	2.1	(1.8–2.5)	1.4	(1.2–1.8)	123	(94–153)	134	(94–173)	109	(65–153)
Volleyball	1.2	(1.0–1.5)	1.4	(1.1-1.8)	1.1	(0.9-1.4)	103	(83–123)	104	(76–132)	102	(81–123)
Wrestling	0.5	(0.4-0.6)	8.0	(0.6-1.0)	I	I	108	(77–138)	101	(63–138)	I	I
Walking/hiking b,c	36.4	(35.1–37.8)	32.1	(30.6–33.7)	40.4	(38.9–42.0)	179	(167–191)	204	(185–222)	161	(146–175)
$Hiking^b$	5.1	(4.3–6.0)	5.9	(5.0–7.0)	4.3	(3.5–5.4)	140	(110–171)	131	(99–163)	152	(103–202)
$\mathrm{Walking}^{b,c}$	33.9	(32.6–35.2)	29.1	(27.6–30.6)	38.4	(36.9–39.9)	171	(160–182)	198	(180–217)	152	(139–165)
Water activities b	7.3	(6.3–8.4)	7.9	(6.8–9.2)	6.7	(5.7–7.8)	102	(91–113)	100	(83–117)	104	(93–115)
$\mathrm{Kayaking}^b$	8.0	(0.5–1.1)	6.0	(0.6–1.4)	9.0	(0.4-0.9)	74	(68–65)	92	(58–93)	71	(45–98)
Rowing^b	9.0	(0.5–0.8)	8.0	(0.6–1.1)	0.4	(0.3–0.6)	69	(47–90)	74	(49–100)	57	(23–90)
$\mathrm{Swimming}^b$	6.3	(5.4–7.3)	6.7	(5.7–7.8)	0.9	(5.0–7.0)	102	(91–114)	86	(80–117)	106	(95–117)
Winter activities $^{\mathcal{C}}$	1.0	(0.8–1.2)	1.0	(0.7–1.3)	1.0	(0.8–1.3)	126	(88–163)	161	(99–223)	92	(65–120)
$Skiing^{C}$	1.0	(0.8–1.2)	1.0	(0.7–1.3)	1.0	(0.8-1.3)	126	(88–163)	161	(99–223)	92	(65-120)

Abbreviations: NHANES, National Health and Nutrition Examination Survey; CI, confidence interval.

^aPercentages of individual activities may not sum to category total because some participants may have reported more than 1 activity within a category.

 $^{^{}b}$ Prevalence of participation is significantly different between males and females (P < .05).

 d Data from NHANES 1999–2002.

 $^{\it C}$ Average time spent in specific activity is significantly different between males and females (P < .05).

e A dash indicates estimate statistically unreliable for relative standard error (RSE) (100% * [SE/statistic]) > 30%, and/or sample size < 30 for mean, or RSE > 30% for percentage.

Table 4

Age-Specific Prevalence of Participation in Specific Leisure-Time Physical Activities in the Past 30 Days and Average Time (Minutes/Week) Spent in Each Activity Among Those Reporting the Corresponding Activity, by Sex, NHANES 1999-2006

				Participation	pation					Minut	es/wee	k among tho	se repo	Minutes/week among those reporting each activity	tivity	
	18	18-29 years	30-	30-44 years	45	45-64 years	و	65+ years	18	18-29 years	30-	30-44 years	45	45–64 years	65	65+ years
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	M	95% CI	M	95% CI	M	95% CI	M	95% CI
Males																
Bicycling ^{a2}	14.8	(13.2–16.5)	16.2	(14.4–18.2)	13.1	(11.6–14.8)	8.9	(7.5–10.4)	151	(119–182)	118	(90–145)	120	(91–149)	114	(93–136)
Conditioning exercises ^{a2}	8.8	(7.1–10.7)	10.4	(9.0–12.0)	10.2	(8.6–12.1)	7.4	(6.1-9.0)	105	(69–141)	128	(70–187)	88	(72–103)	128	(95–160)
Dancing/aerobics ^{a2,b2}	15.7	(14.2–17.5)	8.1	(6.9–9.3)	7.0	(5.9–8.3)	8.8	(3.6–6.4)	149	(122–176)	82	(26-99)	82	(69–69)	1111	(79–143)
Fishing/hunting ^{a2}	8.9	(5.3–8.6)	6.2	(5.0–7.8)	7.0	(5.5–8.7)	4.4	(3.3–5.8)	257	(206–308)	239	(193–286)	301	(233–369)	271	(192–349)
Lawn/garden a2,bI,c	8.6	(7.9–12.0)	14.7	(11.6–18.6)	18.5	(14.4–23.4)	16.5	(13.1–20.4)	202	(81–322)	130	(95–165)	274	(211–337)	382	(273–490)
${\tt Running/jogging}^{a2}$	28.6	(26.5–30.8)	15.3	(13.6–17.2)	9.3	(7.9–10.9)	2.1	(1.4–3.1)	105	(90–120)	95	(85–105)	108	(91–126)	129	(75–183)
$Sports^{a2,b2}$	47.6	(44.6–50.6)	31.1	(28.6–33.7)	19.2	(17.1–21.4)	11.7	(10.1–13.5)	267	(243–291)	193	(173–212)	231	(198–265)	381	(307–455)
Walking/hiking a2,b2	27.7	(25.4–30.1)	30.2	(27.7–32.8)	37.0	(34.2–39.8)	32.5	(30.4–34.7)	245	(191–298)	179	(154–204)	199	(173–225)	209	(187–232)
Water activities aI,b2	12.1	(10.2–14.3)	7.9	(6.3–9.7)	9.9	(5.1–8.4)	4.3	(3.1–6.0)	128	(95–160)	98	(57–115)	79	(63–95)	100	(69–131)
Winter activities	<i>p</i> _	I	6.0	(0.5–1.5)	1.5	(1.0–2.3)	I	I	I	I	1	I	I	I	1	I
Females																
Bicycling ^{a2}	11.2	(9.6–12.9)	11.0	(9.2–13.0)	10.1	(8.6–11.8)	4.3	(3.3–5.7)	83	(66–99)	77	(62–92)	91	(74–108)	94	(64–124)
Conditioning exercises ^{a2}	15.1	(13.6–16.7)	14.5	(12.8–16.4)	12.1	(10.6–13.9)	5.2	(4.3–6.4)	100	(78–121)	109	(85–132)	108	(91–125)	130	(82–179)
Dancing/aerobics ^{a2,b2}	31.6	(29.2–34.2)	20.3	(18.6–22.1)	14.5	(13.0–16.1)	7.1	(5.8–8.5)	145	(128–163)	107	(93–121)	68	(77–102)	137	(108–167)
${ m Fishing/hunting}^{aI}$	1.8	(1.1–2.9)	6.0	(0.6–1.4)	1.0	(0.6–1.6)	I	1	173	(81–265)	I	ı	I	I	1	ı
Lawn/garden a2,c	7.0	(4.9–10.0)	13.0	(10.1–16.5)	13.3	(9.9–17.8)	9.2	(6.5–12.9)	148	(94–201)	125	(92–159)	201	(151–250)	189	(146–232)
Running/jogging a2	19.3	(17.2–21.5)	8.9	(7.2–10.8)	4.3	(3.5–5.2)	0.7	(0.4–1.2)	84	(72–97)	06	(76–105)	127	(96–158)		ı
Sports ^{a2} ,b2	20.8	(18.7–23.1)	11.8	(10.4–13.5)	7.9	(6.6–9.4)	4.5	(3.5–5.7)	166	(134–198)	100	(84–115)	163	(136–190)	254	(191–316)
Walking/hiking a2	42.3	(40.1–44.5)	44.9	(42.3–47.6)	41.3	(38.7–44.0)	29.4	(27.3–31.7)	166	(139–194)	147	(126–169)	166	(145–188)	170	(141–200)
Water activities aI	9.5	(7.9–11.5)	7.1	(5.7–8.9)	6.1	(4.9–7.5)	3.7	(2.8–5.0)	86	(71–125)	100	(73–126)	101	(77–124)	145	(1111–178)
Winter activities ^{a1}	1.5	(0.8–2.6)	1.3	(0.9–2.1)	8.0	(0.5–1.4)	ı	ı	96	(61–131)	ı	I	1	I	ı	I

Abbreviations: M, mean. NHANES, National Health and Nutrition Examination Survey; CI, confidence interval.

aI Significant (P < .05) linear trend in prevalence by age group.

 $^{\rm a2}{\rm Significant}~(P<.05)$ quadratic trend in prevalence by age group.

bI Significant (P < .05) linear trend in average time spent in activity by age group.

 $^{b2}\mathrm{Significant}$ (P < .05) quadratic trend in average time spent in activity by age group. $^{c}\mathrm{Data}$ from NHANES 1999–2002. $d_{\rm A}$ dash indicates estimate statistically unreliable for relative standard error (RSE) > 30%, and/or sample size < 30 for mean, or RSE > 30% for percentage.

Table 5

Prevalence of Participation in Specific Leisure-Time Physical Activities in the Past 30 Days and Average Time (Minutes/Week) Spent in Each Activity Among Those Reporting the Corresponding Activity, by Sex and Race/Ethnicity, NHANES 1999-2006

			Parti	Participation				Minutes/week among those reporting each activity	among th	ose reporting	each acti	vity
	Non-Hi	Non-Hispanic White	Non-Hi	Non-Hispanic Black	Mexica	Mexican American	Non-His	Non-Hispanic White	Non-His	Non-Hispanic Black	Mexica	Mexican American
	%	95% CI	%	95% CI	%	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Males												
Bicycling	15.6*	(14.3–17.0)	10.1^{\dagger}	(8.7–11.6)	6.4	(5.2–7.9)	119†	(100–139)	206*	(132–280)	129†	(95–163)
Conditioning exercises	10.4*	(9.2–11.7)	8.5*	(6.9-10.5)	5.1†	(4.0–6.6)	105	(77–133)	135	(96–174)	152	(80–225)
Dancing/aerobics	7.9†	(6.9–8.9)	11.0*	(9.3–12.9)	11.9*	(10.2–13.8)	101	(86–116)	129*	(101–156)	100^{\dagger}	(81–119)
Fishing/hunting	7.6*	(6.5–8.8)	2.5†	(1.9–3.3)	1.8^{\dagger}	(1.2–2.6)	268	(234–302)	247	(180–314)	267	(179–354)
Lawn/garden ^a	17.7*	(14.3–21.6)	5.4 [†]	(4.2–6.8)	7.8†	(4.8–12.4)	241	(197–284)	q^-	I	234	(137–330)
Running/jogging	14.3	(12.9–15.8)	16.0*	(14.1–18.1)	$12.0^{†}$	(10.4–13.9)	94‡	(85–102)	174*	(140–208)	_‡ 26	(77–118)
Sports	28.8*	(26.9–30.8)	29.2*	(26.7–31.9)	24.2†	(21.5–27.2)	235⁴	(217–253)	301*	(257–344)	186^{\ddagger}	(166–207)
Walking/hiking	35.2*	(33.4–37.1)	22.3†	(20.5–24.3)	19.7†	(17.3–22.3)	202^{\dagger}	(180–224)	253*	(223–283)	196^{\dagger}	(146–246)
Water activities	9.5*	(8.1–11.2)	3.9†	(3.2–4.9)	1.6^{\ddagger}	(1.0–2.3)	100*	(81–119)	*601	(72–146)	_↓ 09	(44–76)
Winter activities	1.3	(0.9–1.7)	I	I	I	I	169	(102–235)	I	I	I	I
Females												
Bicycling	11.1*	(9.7–12.7)	5.7	(4.6–7.0)	4.8⁺	(3.8–6.0)	80	(06-69)	94	(69–119)	89	(56–81)
Conditioning exercises	13.2*	(11.9–14.5)	10.2^{\dagger}	(8.7–11.9)	7.4‡	(5.8–9.3)	107	(91–124)	123	(89–157)	106	(85–127)
Dancing/aerobics	17.7	(16.4–19.1)	22.0*	(19.8–24.3)	18.8^{\dagger}	(17.0–20.8)	105^{\dagger}	(96–114)	146*	(128–165)	118^{\dagger}	(99–138)
Fishing/hunting	1.2*	(0.9–1.7)	0.3^{\dagger}	(0.2-0.6)		ı	237	(141–334)	I	I	I	I
$Lawn/garden^{\mathcal{a}}$	14.0*	(10.7–18.1)	3.5†	(2.3–5.2)	5.4	(3.5–8.2)	164	(133–194)	I	I	212	(119–305)
Running/jogging	8.5	(7.4–9.7)	6.9	(5.7–8.3)	7.0	(5.7–8.6)	68	(77–101)	95	(78–111)	93	(74–113)
Sports	12.7*	(11.7–13.9)	7.0*	(5.6-8.8)	6.3	(5.1–7.8)	148	(132–165)	163	(123–203)	150	(93–207)
Walking/hiking	44.0*	(41.9–46.0)	29.5†	(27.3–31.7)	31.4^{\dagger}	(28.7–34.2)	151	(139–164)	207*	(182–231)	155†	(134–177)
Water activities	8.2*	(6.9–9.7)	2.0^{\dagger}	(1.4-3.0)	1.7	(1.1-2.5)	105	(93–117)	78	(54-103)	94	(54–134)
Winter activities	1.2	(0.9-1.6)	I	1	ı	I	86	(66–131)	I	I	I	I

Abbreviations: NHANES, National Health and Nutrition Examination Survey; CI, confidence interval.

Note. * Significantly greater than †; † significantly greater than ‡ (P < .05).

 a Data from NHANES 1999–2002.

Table 6

Prevalence of Participation in Specific Leisure-Time Physical Activities in the Past 30 Days, and Average Time (Minutes/Week) Spent in Each Activity Among Those Reporting the Corresponding Activity, by Sex and Educational Attainment, NHANES 1999-2006

				Partic	Participation					Minu	tes/wee	k among tho	se repo	Minutes/week among those reporting each activity	ctivity	
	× H	< High school	Hi	High school	Sol	Some college	Colle	College graduate	× H	< High school	iH	High school	Son	Some college	Colle	College graduate
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	M	95% CI	M	95% CI	M	95% CI	M	95% CI
Males																
$\operatorname{Bicycling}^{aI,bI}$	6.1	(5.2–7.2)	11.0	(9.5–12.6)	14.8	(12.8–17.1)	22.5	(20.1–25.1)	209	(130–287)	123	(93–154)	131	(97–166)	104	(86–122)
Conditioning exercises a2,b1	3.3	(2.5–4.3)	5.5	(4.4–7.0)	11.5	(10.1–13.0)	17.0	(15.0–19.2)	136	(88–184)	-0	I	102	(83–121)	80	(67–94)
Dancing/aerobics al	7.1	(5.9–8.6)	8.0	(6.7–9.4)	10.9	(9.5–12.6)	9.6	(8.2–11.1)	126	(85–168)	105	(85–125)	112	(90–133)	105	(82–128)
Fishing/hunting a2,bI	4.5	(3.5–5.7)	9.1	(7.5–10.9)	7.7	(6.3–9.4)	3.4	(2.5–4.7)	377	(252–503)	277	(221–333)	239	(201–277)	196	(141–250)
Lawn/garden $a2,d$	9.2	(7.2–11.8)	16.5	(12.9–20.9)	17.3	(13.8–21.4)	16.5	(12.4–21.5)	186	(130–242)	224	(147–302)	270	(194–345)	233	(162–303)
${\sf Running/jogging}^{al}$	7.7	(6.4–9.1)	10.7	(9.2–12.4)	16.7	(14.7–19.0)	21.9	(19.5–24.6)	141	(103–180)	06	(69–110)	107	(90–125)	95	(83–106)
Sports ^{a2}	17.3	(15.3–19.6)	25.5	(23.3–27.8)	33.2	(30.7–35.9)	34.9	(32.6–37.3)	250	(216–284)	253	(218–287)	252	(226–279)	215	(190–240)
Walking/hiking a2,bI	20.0	(17.8–22.4)	27.2	(25.1–29.5)	33.4	(31.1–35.7)	46.4	(43.8–48.9)	254	(203–305)	216	(176–256)	226	(188–264)	159	(136–182)
Water activities aI,bI	3.7	(2.7–5.1)	6.1	(4.5–8.2)	6.6	(8.3–11.8)	11.2	(9.4–13.3)	126	(93–159)	146	(95–198)	93	(70–116)	72	(56–88)
Winter activities	I	I	I	ı	9.0	(0.4-1.1)	2.6	(1.8–3.7)	I	ı	I	ı	I	I	179	(78–279)
Females																
$\operatorname{Bicycling}^{al}$	3.5	(2.8-4.4)	7.2	(5.8–8.8)	10.1	(8.6–11.9)	16.9	(14.6–19.4)	76	(64–131)	94	(75–113)	84	(66–102)	78	(63–93)
Conditioning exercises ^{a1}	4.2	(3.4–5.3)	9.2	(7.8–10.8)	14.0	(12.5–15.7)	20.4	(18.3–22.7)	148	(86–211)	112	(91–133)	111	(87–135)	95	(79–111)
Dancing/aerobicsal,bl	10.7	(9.3–12.2)	14.6	(13.0–16.4)	22.3	(20.4–24.3)	24.7	(22.4–27.1)	145	(106–185)	127	(103–152)	119	(107–130)	101	(91–112)
Fishing/hunting	1.1	(0.6-1.8)	I	I	1.5	(1.1-2.1)	I	I	I	I	1	I	191	(80–302)	I	I
Lawn/garden aI,d	6.7	(4.7–9.3)	6.6	(7.2–13.5)	11.8	(8.9–15.4)	16.5	(12.3–21.9)	183	(89–276)	221	(154–287)	127	(100–154)	155	(131–180)
Running/jogging ^{a2}	3.6	(2.8–4.6)	4.6	(3.7–5.8)	9.5	(7.9–11.3)	14.4	(12.1–16.9)	84	(66–101)	106	(67–145)	88	(73–104)	96	(81–110)
Sports ^{a1}	5.7	(4.7–6.9)	9.4	(7.9–11.0)	13.3	(11.7–15.0)	15.2	(13.3–17.2)	166	(120–211)	186	(138–233)	149	(124–174)	123	(101–146)
Walking/hiking aI , bI	24.4	(22.4–26.5)	37.4	(35.0–39.8)	43.4	(41.1–45.8)	54.3	(51.8–56.7)	207	(150–263)	181	(149–213)	140	(128–152)	148	(133–164)
Water activities aI,bI	2.5	(1.7–3.7)	5.2	(4.0–6.7)	7.9	(6.6–9.5)	10.5	(8.5–12.8)	135	(90–180)	152	(112–192)	68	(74–105)	98	(64–108)
Winter activities aI	I	I	9.0	(0.3–1.1)	1.2	(0.8–1.9)	1.7	(1.1–2.5)	I	I	ı	I	92	(45–139)	I	I

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Abbreviations: M, mean; NHANES, National Health and Nutrition Examination Survey; CI, confidence interval.

aI Significant (P < .05) linear trend in prevalence by educational attainment.

 $^{\rm 42}{\rm Significant}~(P<.05)$ quadratic trend in prevalence by educational attainment.

 bI Significant (P < .05) linear trend in average time spent in activity by educational attainment.

c A dash indicates estimate statistically unreliable for relative standard error (RSE) > 30%, and/or sample size < 30 for mean, or RSE > 30% for percentage.

 $^d\mathrm{Data}$ from NHANES 1999–2002.