

Comparison of Two Adult Leisure-Time Physical Activity Recodes: National Health Interview Survey, 1998

The National Health Interview Survey (NHIS) has fielded two sets of leisure-time physical activity (LTPA) questions for purposes of national surveillance. Both sets have been linked to the data needs of the National Health Promotion and Disease Prevention Objectives initiated by the Department of Health and Human Services in 1980 (1). The first set of questions, adapted from the 1981 Canada Fitness Survey (CFS), was designed to assess leisure-time physical activity levels that were consistent with cardiovascular fitness (1-3). These questions consisted of a series of items asking about frequency, duration and intensity of participation in 23 specific exercises, sports, or physically active hobbies (walking, football, swimming, etc.) over a 2 week period. This information was used to construct an estimate of daily kilocalorie expenditure for the activity. The average total daily energy expenditure for all activities combined (kilocalories per kilogram per day) was then calculated. Respondents were classified as "sedentary" [less than 1.5 kcal/kg/day], "moderately active" [1.5 < kcal/kg/day<3.0] and "very active" [>3.0 kcal/kg/day]. First asked in 1985 and 1990, these questions provided data for tracking the 1990 National Health Promotion and Disease Prevention Objectives (1). With some modifications, these questions were repeated in NHIS supplements in 1991, 1995, and 1998 to provide data for monitoring the 2000 National Health Promotion Objectives (2).

For the third cycle of health promotion objectives --- Healthy People 2010 --- the focus of leisure-time physical activity objectives shifted from cardiovascular fitness to promotion of regular leisure-time physical activity (4-5). In response to this change, the NHIS began using the current set of LTPA surveillance questions in 1997. The 1997 Sample Adult Core indicator of physical activity differs substantially from the kilocalorie energy expenditure classification of 23 specific activities. The core measure focuses instead on regularity of activity. Based on a set of four questions asking about usual frequency and duration of light-moderate and vigorous leisure-time physical activities, respondents are classified as: "inactive," "some activity, < regular," and "regularly active." "Inactive" is defined as engaging in no leisure time physical activity or unable to participate in such activities. "Some activity, < regular" is defined as engaging in leisure-time activity but less than the amount needed to qualify as "regular." "Regularly active" is defined as engaging in vigorous activity 3 or more times per week for at least 20 minutes each time or engaging in light-moderate activity at least 5 times a week for at least 30 minutes each time, or both. These questions were adapted from questions asked in population-based studies in Australia, Canada, Finland, and studies of older adults in the United States (6-9). This classification is consistent with the recommendations set forth for adults in the Healthy People 2010 Objectives.

The 1998 NHIS contained both sets of LTPA questions. The 1998 NHIS Healthy People 2000 Supplement questionnaire, asked of sample adults, included a 23-item set of questions on exercise, sports, and physically active hobbies, for the end-of-decade assessment of the achievement of Year 2000 Health Promotion Objectives. The 1998 NHIS Sample Adult Core questionnaire included the current set of usual light-moderate and usual vigorous leisure-time physical activity questions, providing baseline data for tracking Healthy People 2010 Objectives. The inclusion of both sets of questions, asked of the same respondents in the same interview, provides a unique opportunity for comparing estimates based on the two sets of questions. Earlier studies have found associations between leisure-time physical activity and health status (14).

The two sets of NHIS leisure-time physical activity questions are compared in terms of overall LTPA prevalence and in terms of LTPA prevalence among adults with various health conditions and impairments (Table A). Odds ratios, showing the likelihood of selected health characteristics by level of LTPA (Table B) highlight the association between LTPA and health for the two sets of questions, controlling for sex, age, race and Hispanic ethnicity, education, and poverty status.

Health characteristics examined in this analysis include:

- a. Respondent assessed health status: "Would you say {your/name's} health is excellent, very good, good, fair, or poor?";
- b. Unable to do or a lot of difficulty with routine physical activities: walking 1/4 mile, climbing 10 steps, standing for two hours, sitting, stooping or bending, reaching over head, grasping, carrying 10 pounds, pushing or pulling large objects;
- c. Unable to do or a lot of difficulty with walking [a component of "difficulty with routine physical activities" but also shown separately due to its particular significance of leisure-time physical activity];
- d. Ever having been diagnosed with diabetes;
- e. Having been told by a doctor or other health professional on two or more occasions that he or she had hypertension;
- f. Serious psychological distress measured in terms of an index of six negative emotions --- sad, hopeless, worthless, nervous, restless, everything was an effort --- during the past 30 days; and
- g. Obese body weight defined as a body mass index of 30 or greater.

The analysis is based on data for sample adults (n=32,440) collected in the 1998 National Health Interview Survey. Estimates were weighted to reflect the population of adults aged 18 years and over. All physical activity and most health information were self-reported as part of the Sample Adult Core interview. Sex, age, race, poverty status and reported health status were asked in the family core interview and therefore may have been proxy reported. The household response rate was 90.0%. The final response rate for the sample adult component was 73.9%.

Estimates and their associated standard errors and confidence intervals shown in this report were calculated using SUDAAN, a software package designed to account for a complex survey design such as that used in the NHIS. SUDAAN PROC DESCRIPT was used to produce estimates shown in Table A. Age-adjusted estimates were calculated using the 2000 projected U.S. population as the standard population for age groups 18-44 years, 45-64 years, and 65 years and over. SUDAAN PROC RLOGIST was used to calculate odds ratios shown in Table B. All models were adjusted for sex, age, race and Hispanic ethnicity, education, and poverty status using the imputed income files released by the National Center for Health Statistics.

Table A shows age-adjusted and crude percent distributions of leisure-time physical activity (LTPA) status for U.S. adults overall and by selected health characteristics. Among all U.S. adults, 22% were classified as "very active" based on the two-week (supplement) average daily kilocalorie measure and 30% were classified as "regularly active" based on the usual (core) activity measure. Regardless of the health status characteristic studied, the 2 week kilocalorie indicator of leisure-time physical activity yielded lower estimates of physical activity than the usual (core) activity indicator.

Although the two indicators yielded different prevalence estimates, the percent distributions shown in Table A suggest that both LTPA indicators are associated with health in the expected direction. In each case, adults in the best health (that is, excellent/very good health; no difficulty with routine physical activities; no difficulty walking; no diabetes, no hypertension, no serious psychological distress; healthy body weight) were considerably more likely to engage in the highest levels of leisure-time physical activity (very active or regularly active) than adults who had health problems.

Table B shows the likelihood of selected health characteristics among adults who engaged in leisure-time physical activity compared with adults who engaged in little or no activity, using the two (supplement and core) LTPA indicators. Controlling for sex, age, race and Hispanic ethnicity, education, and poverty status, adults who engaged in the highest level of leisure-time physical activity ("very active" or "regularly active") were less likely than sedentary or inactive adults to report fair or poor health, difficulty with routine activities, difficulty walking 1/4 mile, diabetes, hypertension, serious psychological distress, and obesity. Adults who engaged in lesser amounts of LTPA (that

is, "moderate" or "less than regular") were less likely than sedentary/inactive adults to be in fair or poor health, have difficulty with routine physical activities including walking, or experience symptoms of serious psychological distress. Moderate levels of physical activity did not significantly lower the likelihood of either diabetes or hypertension regardless of LTPA indicator. The likelihood of obesity for adults who engaged in moderate levels of leisure-time physical activity differed for the two LTPA indicators. Whereas adults who were moderately active based on the two-week measure were less likely to be obese than adults who were sedentary, adults who engaged in "less than regular" LTPA as measured in the Sample Adult Core, were no less likely to be obese than adults who were completely inactive.

Several explanations are possible for the observed differences. The usual activity questions may be picking up activity that is missed in the 23 activity-specific questions. The differences also could be attributable to over-reporting of activity in the usual leisure-time physical activity questions due to social desirability, wishful thinking, or the fact that people in poor physical condition may find that any activity causes increases in sweating, heart rate, or breathing (changes that are specified in the questions as the criteria for reporting the activities.) Although both sets of questions asked about leisure-time activities, the 2 week questions captured only activities performed in the preceding two weeks whereas the usual activity question asked about LTPA which may or may not have occurred in the recent 2 week period. Further, the usual activity questions allowed the respondent to self-define, to a large extent, the concept of LTPA whereas the 2 week questions asked about specific exercises, sports, or physically active hobbies.

Despite differences between the two LTPA indicators in terms of overall prevalence and in terms of prevalence among specific health risk groups, adults who engaged in the highest levels of leisure-time physical activity were less likely than sedentary or inactive adults to report adverse health characteristics, regardless of the LTPA indicator used.

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