Assessment of Physical Activity with a Single Global Question in a Large, Multiethnic Sample of Midlife Women

Barbara Sternfeld, Jane Cauley, Sioban Harlow, Gao Liu, and Marion Lee

This study compared responses from 13,621 African-American, Chinese, Hispanic, Japanese, and White women to a single, global physical activity question. Respondents aged 40–55 years were randomly selected from seven geographic locations in the United States for the 1996–1997 cross-sectional survey of the Study of Women's Health Across the Nation, a longitudinal, observational study of the menopause transition. Respondents rated their activity level as much less, less, the same as, more, or much more than other women their age. Physical activity rating varied minimally by race/ethnicity. The proportions of women who rated themselves much less active and much more active ranged from 3.1% for Whites to 4.8% for Japanese and from 13.6% for Japanese to 16.4% for African Americans, respectively. Multiple logistic regression models, stratified by race/ethnicity, showed independent associations between a low level of activity and higher body mass index, poor health, functional impairment, perceived stress, difficulty sleeping, and not being employed. A high level of activity was associated with excellent health, single marital status, higher education, lower body mass index, and older age. These findings suggest that a comparative rating of physical activity may rank women by activity level within a specific racial/ethnic group but may not capture differences across racial/ethnic groups. Am J Epidemiol 2000;152:678–87.

cross-sectional studies; ethnic groups; exercise; women

Physical activity is a complex behavior that encompasses such disparate domains as sports and exercise, occupational tasks, and household chores. In the broadest sense, physical activity refers to any bodily movement produced by skeletal muscles that results in energy expenditure (1). As with other complex behaviors, such as dietary intake, physical activity is difficult to measure. Over the past decade, developments in the methodology of physical activity assessment have paralleled increased interest in understanding the role of physical activity in disease prevention and health promotion (2, 3). Methods of direct measurement, such as accelerometers, have become more sophisticated, practical, and valid (4, 5), and survey methods have expanded to include a wider range of activities relevant to both men and women (6), to older persons (7), and to diverse racial and ethnic groups (8). However, single, global activity questions that ask for an overall assessment of activity level rather than about participation in specific activities or categories of activity are still desirable, particularly for studies in which physical activity is not the main variable of interest, and participant burden and investigator expense are major concerns.

A number of studies have found that global questions can be used to rank people roughly by activity level and to differentiate those who participate in vigorous exercise from those who do not (9–12). However, the relatively low correlations between global questions and more detailed assessments of activity suggest that respondents may use different constructs for responding to these two types of activity measures. To date, little is known about how people translate their specific behavior into the general concept of physical activity level. This problem is exacerbated when a global question is used in a racially and ethnically diverse population in which the meaning and value of physical activity may not be commonly shared.

The purpose of the present study was to compare responses to a global physical activity question in a large, community-based sample of midlife African-American, Chinese, Hispanic, Japanese, and White women and to examine the correlates of high and low rating of activity within and across the different racial/ethnic groups. Specifically, this study examined the race-ethnic-specific relation between a comparative self-rating of physical activity and demographic and health status variables known or hypothesized to be associated with varying levels of activity in the population to evaluate whether this global question appears to measure the same construct in different ethnic groups.
 MATERIALS AND METHODS

Study sample

As part of the Study of Women’s Health Across the Nation, 16,065 women aged 40–55 years in seven geographic areas of the United States were interviewed by telephone, or infrequently in person (about 10 percent of the total sample, limited to those sampling units for which telephone numbers could not be determined), to provide cross-sectional data on the health status of midlife women and to screen for eligibility for the prospective cohort study. Sampling of women, described in detail in Sowers et al. (13), was based on either random digit dialing or list-based sampling frames; one of four specific racial/ethnic communities was oversampled at each site (African Americans in Boston, Massachusetts; Chicago, Illinois; the Detroit area of Michigan; and Pittsburgh, Pennsylvania; Chinese in Oakland, California; Hispanics in Newark, New Jersey; and Japanese in Los Angeles, California). In addition, all seven of the sites surveyed a random sample of White women. The sampling strategies were designed to produce a study sample that was racially/ethnically and socioeconomically diverse and representative of the various communities from which the samples were drawn. The overall response rate, calculated by adding to the denominator of known eligibles a proportion of sampling units with unknown eligibility assumed to be eligible, was 46.6 percent and varied by site from a low of 29.6 percent to a high of 73.7 percent, largely reflecting differences in sampling frames. Although, as discussed by Sowers et al., the relatively low response rates at some sites may limit generalizability, the sampling strategies for the Study of Women’s Health Across the Nation successfully achieved a socioeconomically diverse sample broadly representative of five major racial/ethnic groups in the United States (13).

Of 16,065 women who completed the 1996–1997 cross-sectional survey, 2,444 (15.2 percent) were excluded from the present analysis. Reasons for exclusion included missing physical activity data (n = 501); mixed race/ethnicity, race/ethnicity other than the five purposely sampled, or no specified race/ethnicity (n = 426); pregnant at the time of the interview or no menstrual period in the prior 12 months because of pregnancy or lactation (n = 391); and self-reported diagnosis of myocardial infarction or angina (n = 431). In addition, women who reported severe functional limitation, defined as “a lot of difficulty” with walking one flight of stairs, walking one block, or bathing (n = 695), were excluded since they generally tended to rate themselves at the lowest end of the activity spectrum (39 vs. 6.1 percent in the sample as a whole). After exclusions, 13,621 women remained in the sample.

Assessment of physical activity and other covariates

Physical activity was assessed in the cross-sectional survey by using a single global question that asked women to rate their level of physical activity as much less, less, the same as, more, or much more than other women their age. This comparative self-rating of activity has been used in a number of previous population-based surveys, including the 1985 National Health Interview Survey. Health Promotion/Disease Prevention Supplement, in which a more detailed criterion method of measuring activity was also included in order to evaluate the validity of this and other global activity questions (11). In that data set, the overall Spearman’s correlation coefficient between the more detailed measure of energy expenditure and the comparative rating of activity was 0.29, ranging from 0.41 for persons aged 18–24 years to 0.23 for those aged more than 75 years. Although these correlations are relatively weak, they are comparable to the correlations observed between other global measures and more extensive physical activity assessments (14).

Although the comparative activity question is a standard one used in studies of English-speaking populations, to our knowledge it has not been used previously with non-English-speaking people. Since the sample for the Study of Women’s Health Across the Nation included women who spoke Cantonese, Japanese, and Spanish, the entire cross-sectional survey, including the physical activity question, was translated into these three languages and then back-translated into English to ensure the accuracy of the translations. The back-translation of the original Cantonese activity question revealed that the meaning had been altered from the concept of physical activity to physical strength. Therefore, only the responses from those Chinese-speaking women who were interviewed after the translation of the activity question was corrected were included in the present analysis; the responses of those interviewed prior to that point (n = 63) were set to missing, accounting for 12.6 percent of the 501 women for whom activity data were missing.

The independent variables of primary interest for this analysis included seven demographic factors and 10 self-reported indicators of health status; standard questions from previous population-based surveys were used wherever possible. For this analysis, the demographic variables were categorized as follows: 1) age: 40–44/45–49/50–55 years; 2) education: high school graduate or less/more than high school graduate; 3) marital status: married or living as married/not married, including single, widowed, separated, or divorced; 4) number of children: none/one or two/three or more; 5) employment status: working for pay outside the home (either full-time or part-time) not working; 6) ability to pay for basic family needs: very difficult/somewhat difficult/not at all difficult; and 7) interview language, a crude marker of acculturation.

The 10 indicators of health status were categorized as follows: 1) overall self-reported health: excellent or very good/good/fair or poor; 2) overall quality of life indicated on a 10-point scale, with higher indicating better quality: seven or less/eight or more; 3) number of diagnosed medical conditions (high blood pressure, osteoporosis, fibroids, cancer, diabetes): none/one or more; 4) number of symptoms experienced during the previous 2 weeks (hot flashes; night sweats; forgetfulness; irritability; feeling blue or depressed; feeling tense or nervous; vaginal dryness; leaking urine; pounding or racing heart; stiff or sore joints, neck, or shoulders; headaches): three or less/four or more; 5) difficulty sleeping during the previous 2 weeks: yes/no; 6) perceived...
stress level based on Cohen et al.’s four-item perceived stress scale (15), with a higher score indicating greater stress: eight or less/more than eight; 7) any functional limitation, defined as any limitation on activity due to impairment or health problems: yes/no; 8) a five-level menopausal status variable: premenopause and early perimenopause (at least one menstrual cycle within the previous 3 months with or without change in regularity)/late perimenopause (no period for 3–12 months)/postmenopause (no period for more than 12 months)/surgical menopause (hysterectomy and/or bilateral oophorectomy)/hormone user (current use of hormones with undetermined status); 9) smoking status: current smoker/not current smoker; and 10) body mass index (BMI), calculated as weight in kilograms divided by height in meters squared, from self-reported height and weight.

**Statistical analysis**

The distributions of all independent variables, except BMI, were examined across the five-level physical activity rating by using proportions and were evaluated with the chi-square statistic. For BMI, which was treated as a continuous variable, means and standard deviations were calculated by activity level, and differences were evaluated by using analysis of variance. Similar descriptive and analytical statistics were used to examine the associations between race/ethnicity and the other independent variables.

Because the correlates of a low level of activity may not be merely the inverse of the correlates of a high level of activity, separate logistic regression analyses, stratified by racial/ethnic group, were used to examine two distinct sets of relations: 1) the associations between the independent variables and a reported low activity level relative to an average activity level (the same as one’s peers) and 2) the associations between the independent variables and a reported high activity level relative to an average activity level. Average activity level was selected as the reference category to focus on sedentary behavior on the one hand and a highly active lifestyle on the other. Initially, only the extreme levels of activity (1 vs. 3, 5 vs. 3) were modeled. However, because small sample sizes in these extreme categories limited the statistical power, particularly for the Chinese and Japanese women, for whom the overall sample sizes were smaller, and because relations were similar when categories 1 and 2 (much less and less activity than one’s peers) and categories 4 and 5 (more and much more activity) were combined, all of the data presented here were based on the combined categories.

To assess the independent associations between demographic factors and indicators of health status and a low or high level of activity, multivariable logistic regression models included all variables that were statistically significant at the $p < 0.05$ level in unadjusted analyses. Variables were then selected for final, race-/ethnic-specific multivariable models if they continued to show a statistically significant relation to the outcome in that particular racial/ethnic group or in at least three of the other racial/ethnic groups. The common variables included in all of the final, race-/ethnic-specific multivariable models were 1) BMI, overall health status, perceived stress level, functional limitation, sleep problems, and employment status for activity less than one’s peers relative to average activity level and 2) BMI, overall health status, age, marital status, and education for activity more than one’s peers relative to average activity level. These final models provided race-/ethnic-specific estimates of the odds ratios and 95 percent confidence intervals associated with specific demographic and health status variables. Goodness of fit of each model was examined by using the Hosmer-Lemeshow test. All analyses were conducted with SAS software, version 6.11 (SAS Institute, Inc., Cary, North Carolina).

**RESULTS**

**Characteristics of the sample**

As shown in table 1, the sample was almost equally divided between Whites and other racial/ethnic groups, and slightly more than 40 percent of the women reported that paying for basics was very difficult or somewhat difficult. More than a third had a high school education or less. The sample was relatively uniformly distributed within the specified age range (40–55 years), but more than half were either premenopausal or early perimenopausal. Although only 14 percent rated their overall health as fair or poor, more than half reported one or more chronic medical conditions, and more than a third reported difficulty sleeping.

All of the demographic characteristics and indicators of health status varied significantly by race/ethnicity (data not shown). For instance, only 38.3 percent of the Hispanic women had more than a high school education compared with 79.8 percent of the Japanese women. Only 7.0 percent of the Whites considered their health to be fair or poor compared with 31.4 percent of the Hispanics. In contrast, only 7.9 percent of the Hispanics, but 15.8 percent of the Whites, reported any functional limitation. The Chinese group had the lowest proportion of any diagnosed chronic condition (33.9 percent) and also the lowest proportion of current smokers (2.2 percent), while African Americans had the highest proportions (70.1 and 28.0 percent, respectively).

**Distribution of comparative rating of physical activity**

Despite the relatively large racial/ethnic differences in demographic characteristics and indicators of health status, the variations in rating of physical activity by race/ethnicity, although statistically significant, were slight (table 1). Among those women who rated themselves as much less active than their peers, the proportions only ranged from a low of 3.1 percent of the Whites to 4.8 percent of the Japanese. At the high end, the proportion of women rating themselves as much more active ranged from 13.6 percent of the Japanese to 16.4 percent of the African Americans, a difference of only 2.8 percentage points. Somewhat more variation existed in the proportions rating themselves as having the same level of activity as their peers; about 40 percent of the African Americans, Japanese, and Whites placed themselves in that category compared with 45.3 percent of the Chinese and 52.6 percent of the Hispanics.
In contrast, the magnitude of the variation in physical activity rating by other demographic and health status variables was more notable (table 1). Only 1.5 percent of those who considered their overall health to be excellent or very good, but 12.2 percent of those rating their health as fair or poor, considered themselves much less active than their peers. Conversely, 20.3 percent of those who reported their health to be excellent or very good rated themselves as much more active than their peers compared with only 7.3 percent of those reporting fair or poor health. Also, relatively more women with any functional limitation considered themselves much less active than those with no limitations (10.4 vs. 2.6 percent), while the opposite was true for those rating themselves as much more active (9.8 percent of those with vs. 16.2 percent of those without functional limitation). BMI declined steadily across the five activity categories, from a mean of 31.8 kg/m² at the low end to a mean of 24.7 kg/m² at the high end.

Even when differences were not so pronounced, the relations generally were in the expected direction. For instance, a higher proportion of women with more than a high school education compared with women with less education considered themselves much more active (16.9 vs. 12.4 percent), while 16.4 percent of employed women reported being much more active compared with 11.6 percent of those not working. Similarly, women with a high quality of life and lower stress levels were overrepresented in the higher activity categories, while those with a lower quality of life and more stress were overrepresented in the lower categories. Only menopausal status and smoking status showed little relation to physical activity rating.

**Independent correlates of activity more than one’s peers**

As summarized in table 3, multivariable analysis of factors associated with activity more than one’s peers, relative to average activity, also showed both consistency and inconsistency across the racial/ethnic groups. For instance, BMI had a significant independent, inverse relation and excellent/very good health a significant independent, direct relation in all racial/ethnic groups except the Chinese, for whom there was a suggestive relation. In addition, being single was significantly related to an increased likelihood of a high activity rating in all five groups; in four of the five groups, older age and higher education were directly associated, while not being employed was inversely associated. A higher level of perceived stress was associated with a reduced likelihood of a high activity level only for African Americans and Whites (not significant), while a higher quality of life was related to an increased likelihood only for Whites. Completing the interview in Japanese was associated with increased odds of a high activity rating, and a site difference was indicated for African Americans (the only other racial/ethnic group represented at more than one site was Whites, for whom no site difference was observed) that suggested an increased odds of a high activity rating in Michigan relative to Pittsburgh.

**DISCUSSION**

This study of the correlates of comparative rating of physical activity level in a large, multiethnic cohort of midlife women found only minimal racial/ethnic differences in self-reported activity level. In contrast, substantial differences in activity level across a number of other demographic and health status variables were observed, and these relations were generally consistent across the racial/ethnic groups. Some variables, such as BMI, overall health status, employment, and, to some extent, age and perceived stress level, were related to both low and high activity, showing decreased likelihood of the one and increased likelihood of the other. Other variables, such as functional limitations, difficulty sleeping, and number of children, were associated only with low activity; still others, namely education and marital status, were more generally associated only with high activity.

The finding within each of the five racial/ethnic groups of the expected relations between comparative physical activity rating and established correlates of activity, such as BMI, overall health status, and employment status (16), suggests that different races/ethnicities may share a similar construct for responding to this global question and that it is as valid for assessing physical activity in non-White populations as it is in White populations. Therefore, the comparative physical activity rating may be an appropriate method for assessing activity in large, epidemiologic studies of a single racial/ethnic population group, in which relative ranking of activity level, rather than an absolute level, is the exposure of interest. For such studies, the global comparative rating may be particularly useful, given its simplicity and ease of administration either by in-person or telephone interview, as in the present study, or by self-administration.
However, this study failed to observe any substantial differences in rating of physical activity by race/ethnicity. Fewer than 5 percent of any racial/ethnic group rated themselves as much less active than their peers, while between 13.5 and 16.5 percent of each group rated themselves as much more active. Given national and other survey data (3, 17–19) that consistently report lower levels of regular, recreational physical activity in minorities, especially minority women, relative to Whites, the absence of such differences in the present study is noteworthy and may have resulted from the specific wording and intent of the question itself. Because the question asks respondents for a compar-

| TABLE 1. Rating of physical activity compared with that of peers, by demographic variables and indicators of health status,* for midlife women participating in the SWAN† cross-sectional survey, United States, 1996–1997 |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|                                  | No. | %     | Rating of physical activity relative to peers (%)‡ |                                  |                                  |                                  |
|                                  |     |       | Much less | Less | Same as | More | Much more |
| Total sample                     | 13,621 | 100.0 | 3.7 | 13.8 | 41.4 | 25.7 | 15.4 |
| Race/ethnicity                   |     |       |                                  |                                  |                                  |                                  |
| African American                 | 3,630 | 26.8 | 4.4 | 15.9 | 40.0 | 23.4 | 16.4 |
| Chinese                          | 554  | 4.1  | 4.3 | 13.5 | 45.3 | 22.6 | 14.3 |
| Hispanic                         | 1,651 | 12.2 | 4.1 | 10.9 | 52.6 | 17.0 | 15.5 |
| Japanese                         | 796  | 5.9  | 4.8 | 15.2 | 40.5 | 26.0 | 13.6 |
| White                            | 6,990 | 51.6 | 3.1 | 13.3 | 39.4 | 29.2 | 15.1 |
| Age (years)                      |     |       |                                  |                                  |                                  |                                  |
| 40–44                            | 4,542 | 33.4 | 3.8 | 15.5 | 41.5 | 25.5 | 13.8 |
| 45–49                            | 5,007 | 36.8 | 3.7 | 13.8 | 42.5 | 25.1 | 14.9 |
| 50–55                            | 4,072 | 29.9 | 3.6 | 11.9 | 40.1 | 26.7 | 17.7 |
| Education                        |     |       |                                  |                                  |                                  |                                  |
| High school graduate or less     | 4,677 | 34.5 | 4.4 | 15.2 | 46.9 | 21.1 | 12.4 |
| More than high school graduate   | 8,889 | 65.5 | 3.4 | 13.1 | 38.6 | 28.2 | 16.9 |
| Difficulty paying for basics     |     |       |                                  |                                  |                                  |                                  |
| Very difficult                   | 1,387 | 10.2 | 8.1 | 18.2 | 41.5 | 16.5 | 15.7 |
| Somewhat difficult               | 4,326 | 31.9 | 4.2 | 14.9 | 44.7 | 23.0 | 13.2 |
| Not at all difficult             | 7,861 | 57.9 | 2.6 | 12.4 | 39.6 | 28.8 | 16.5 |
| Interview language               |     |       |                                  |                                  |                                  |                                  |
| English                          | 11,832 | 86.9 | 3.6 | 14.1 | 40.0 | 26.7 | 15.5 |
| Spanish                          | 1,212 | 8.9  | 4.0 | 10.2 | 55.7 | 16.3 | 13.9 |
| Cantonese                        | 242  | 1.8  | 3.7 | 12.8 | 46.7 | 22.3 | 14.5 |
| Japanese                         | 334  | 2.5  | 6.6 | 15.3 | 35.3 | 26.4 | 16.5 |
| Marital status                   |     |       |                                  |                                  |                                  |                                  |
| Married or living as married     | 8,784 | 64.6 | 3.0 | 13.2 | 43.6 | 26.4 | 13.8 |
| Not married                      | 4,812 | 35.4 | 4.9 | 14.9 | 37.5 | 24.5 | 18.3 |
| No. of children                  |     |       |                                  |                                  |                                  |                                  |
| None                             | 2,209 | 16.2 | 4.5 | 16.0 | 37.1 | 26.2 | 16.2 |
| 1–2                             | 6,844 | 50.3 | 3.6 | 13.5 | 41.4 | 26.5 | 15.0 |
| 3 or more                       | 4,557 | 33.5 | 3.5 | 13.1 | 43.6 | 24.2 | 15.5 |
| Employment status                |     |       |                                  |                                  |                                  |                                  |
| Employed                        | 10,671 | 75.4 | 2.8 | 12.5 | 41.0 | 27.3 | 16.4 |
| Not employed                     | 2,945 | 21.6 | 7.1 | 18.3 | 43.2 | 19.9 | 11.6 |
| Menopausal status                |     |       |                                  |                                  |                                  |                                  |
| Premenopause, early perimenopause | 7,409 | 54.4 | 3.5 | 13.9 | 41.9 | 25.8 | 14.9 |
| Late perimenopause               | 553  | 4.1  | 4.9 | 14.7 | 38.3 | 23.9 | 18.3 |
| Postmenopause                    | 1,922 | 14.1 | 3.5 | 13.6 | 40.7 | 26.1 | 16.1 |
| Surgical menopause               | 2,647 | 19.4 | 4.1 | 14.2 | 42.6 | 24.1 | 15.1 |
| Hormone user/undetermined        | 1,090 | 8.0  | 3.9 | 11.9 | 38.4 | 29.3 | 16.4 |
| Smoking status                   |     |       |                                  |                                  |                                  |                                  |
| Nonsmoker                        | 10,579 | 77.8 | 3.5 | 13.4 | 41.9 | 25.9 | 15.2 |
| Current smoker                   | 3,026 | 22.2 | 4.3 | 15.0 | 39.7 | 25.0 | 16.0 |

Table continues
Global Assessment of Physical Activity in Women

Although racial/ethnic differences in activity level among women are well documented and persist even when domains of activity other than sports and exercise are assessed (6) and when efforts are made to assess a wide range of culturally relevant activities (20), little is known about racial/ethnic differences in the meaning or interpretation of the concept of physical activity. In a qualitative study of perceptions and beliefs about exercise among mostly low-socioeconomic-status African Americans, focus groups suggested that rest was more highly valued than exercise and that physically

**TABLE 1.** Continued

<table>
<thead>
<tr>
<th>Rating of physical activity relative to peers (%)‡</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much less</td>
<td>Less</td>
<td>Same as</td>
</tr>
<tr>
<td>Excellent/very good</td>
<td>1.5</td>
<td>8.3</td>
</tr>
<tr>
<td>Good</td>
<td>3.8</td>
<td>18.1</td>
</tr>
<tr>
<td>Fair/poor</td>
<td>12.2</td>
<td>25.6</td>
</tr>
<tr>
<td>No. of diagnosed medical conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>2.1</td>
<td>11.1</td>
</tr>
<tr>
<td>1 or more</td>
<td>5.1</td>
<td>16.1</td>
</tr>
<tr>
<td>No. of reported symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–3</td>
<td>2.5</td>
<td>10.2</td>
</tr>
<tr>
<td>4 or more</td>
<td>4.9</td>
<td>17.4</td>
</tr>
<tr>
<td>Difficulty sleeping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2.6</td>
<td>11.4</td>
</tr>
<tr>
<td>Yes</td>
<td>5.5</td>
<td>18.0</td>
</tr>
<tr>
<td>Any functional limitation</td>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>2.6</td>
<td>11.6</td>
</tr>
<tr>
<td>Yes</td>
<td>10.4</td>
<td>27.1</td>
</tr>
<tr>
<td>Perceived stress level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>5.3</td>
<td>17.4</td>
</tr>
<tr>
<td>Low</td>
<td>2.2</td>
<td>10.5</td>
</tr>
<tr>
<td>Quality of life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>2.3</td>
<td>11.2</td>
</tr>
<tr>
<td>Low</td>
<td>6.3</td>
<td>18.8</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Study site</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ypsilanti/Inkster, Michigan</td>
<td>2,072</td>
<td>15.2</td>
</tr>
<tr>
<td>Boston, Massachusetts</td>
<td>1,833</td>
<td>13.5</td>
</tr>
<tr>
<td>Chicago, Illinois</td>
<td>1,234</td>
<td>9.1</td>
</tr>
<tr>
<td>Oakland, California</td>
<td>1,336</td>
<td>9.8</td>
</tr>
<tr>
<td>Los Angeles, California</td>
<td>2,001</td>
<td>14.7</td>
</tr>
<tr>
<td>Newark, New Jersey</td>
<td>2,825</td>
<td>20.7</td>
</tr>
<tr>
<td>Pittsburgh, Pennsylvania</td>
<td>2,320</td>
<td>17.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean (±SD)</th>
<th>Rating of physical activity relative to peers (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body mass index (kg/m²)</td>
<td>26.8 ± 6.16</td>
</tr>
</tbody>
</table>

* Chi-square statistics for the association between activity rating and all demographic and health status variables (F statistic for body mass index) were statistically significant, p < 0.001.
† SWAN, Study of Women's Health Across the Nation.
‡ Row percentages may not add to 100 because of rounding.
demanding work was indicative of limited education and opportunity (21). On the other hand, exercise was thought to contribute to well-being and to alleviate various health problems. A limitation of the current study is the lack of knowledge about how respondents conceptualized physical activity and whether that conceptualization varied systematically by race/ethnicity. For instance, did women from one racial/ethnic group interpret the question primarily in terms of sports and exercise, while those from another group respond more in terms of “busy-ness” and their social roles (22)? The inverse relation between low activity rating and number of children generally observed in this study, and the direct relation with unemployment, may indicate that, on some level, all women interpreted this global question about

### TABLE 2. Adjusted* prevalence odds ratios associated with demographic and health status factors, stratified by ethnicity, for midlife women less and much less physically active than their peers,† SWAN‡ cross-sectional survey, United States, 1996–1997

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Body mass index§</th>
<th>Overall health status</th>
<th>Perceived stress level</th>
<th>Functional limitation</th>
<th>Employment status</th>
<th>Difficulty sleeping</th>
<th>No. of children¶</th>
<th>Age (years¶)</th>
<th>Quality of life¶</th>
<th>Marital status¶</th>
<th>No. of symptoms¶</th>
<th>Interview language¶</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POR† 95% CI†</td>
<td>Excellent/very good</td>
<td>Good</td>
<td>Fair/poor</td>
<td>Employed</td>
<td>Not employed</td>
<td>None</td>
<td>1–2</td>
<td>3 or more</td>
<td>Married</td>
<td>Less than 4</td>
<td>English</td>
</tr>
<tr>
<td>African American</td>
<td>1.07 1.05, 1.08</td>
<td>0.69 0.54, 0.87</td>
<td>1.00</td>
<td>1.58 1.24, 2.03</td>
<td>1.00</td>
<td>1.00</td>
<td>1.31 0.92, 1.85</td>
<td>0.67 0.53, 0.85</td>
<td>0.83 0.67, 1.03</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>1.12 1.04, 1.20</td>
<td>0.82 0.44, 1.56</td>
<td>1.00</td>
<td>2.00 1.08, 3.73</td>
<td>1.00</td>
<td>1.00</td>
<td>1.45 0.77, 2.63</td>
<td>1.55 1.13, 2.22</td>
<td>0.95 0.69, 0.98</td>
<td>1.45 1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.05 1.02, 1.08</td>
<td>0.79 0.47, 1.29</td>
<td>1.00</td>
<td>1.86 1.28, 2.71</td>
<td>1.00</td>
<td>1.00</td>
<td>1.55 0.77, 2.63</td>
<td>2.00 1.13, 2.22</td>
<td>0.95 0.69, 0.98</td>
<td>1.55 1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Japanese</td>
<td>1.02 0.96, 1.08</td>
<td>0.81 0.51, 1.31</td>
<td>1.00</td>
<td>1.38 0.80, 2.31</td>
<td>1.00</td>
<td>1.00</td>
<td>1.55 0.77, 2.63</td>
<td>2.00 1.13, 2.22</td>
<td>0.95 0.69, 0.98</td>
<td>1.55 1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1.08 1.06, 1.09</td>
<td>0.63 0.53, 0.75</td>
<td>1.00</td>
<td>1.82 1.40, 2.36</td>
<td>1.00</td>
<td>1.00</td>
<td>1.55 0.77, 2.63</td>
<td>2.00 1.13, 2.22</td>
<td>0.95 0.69, 0.98</td>
<td>1.55 1.00</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

* Each variable was adjusted for all other variables included in the race-/ethnic-specific logistic regression model.
† Relative to rating of Same as.
‡ SWAN, Study of Women’s Health Across the Nation; POR, prevalence odds ratio; CI, confidence interval.
§ Per one-unit increase from the mean.
¶ Not included in the final model for all race/ethnic groups because this variable was statistically significant in fewer than three of the groups (refer to the statistical analysis discussion in the Materials and Methods section of the text).
physical activity as much in terms of the activities they do in daily life as in terms of organized sports or exercise. Since occupational activity levels may be relatively high for some women, particularly in some racial/ethnic groups, and household and caregiving activities account for a large proportion of most women’s total daily energy expenditure, physical activity instruments that tend to focus more on vigorous exercise may tend to underestimate women’s true activity level (23). In that sense, the comparative rating of activity may be a more valid measure for women than other global questions, such as the number of times of sweating from exertion per week, particularly for differentiating women at the lower levels of activity.

Previous studies of the descriptive epidemiology of physical activity have consistently found that younger age and higher socioeconomic status are associated with higher lev-

### TABLE 3. Adjusted prevalence odds ratios associated with demographic and health status factors, stratified by ethnicity, for midlife women more and much more physically active than their peers, SWAN cross-sectional survey, United States, 1996–1997

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>African American</th>
<th>Chinese</th>
<th>Hispanic</th>
<th>Japanese</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POR† 95% CI‡</td>
<td>POR 95% CI</td>
<td>POR 95% CI</td>
<td>POR 95% CI</td>
<td>POR 95% CI</td>
</tr>
<tr>
<td>Body mass index§</td>
<td>0.95 0.94,0.97</td>
<td>0.93 0.87,1.00</td>
<td>0.97 0.94,0.99</td>
<td>0.93 0.87,0.98</td>
<td>0.90 0.92</td>
</tr>
<tr>
<td>Overall health status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent/very good</td>
<td>1.80 1.52,2.13</td>
<td>1.51 0.98,2.33</td>
<td>1.82 1.39,2.39</td>
<td>2.08 1.40,3.12</td>
<td>1.45,1.91</td>
</tr>
<tr>
<td>Good</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.66</td>
</tr>
<tr>
<td>Fair/poor</td>
<td>0.69 0.53,0.89</td>
<td>0.51 0.27,0.96</td>
<td>0.90 0.67,1.21</td>
<td>0.61 0.36,1.04</td>
<td>1.00 0.69,1.25</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40–44</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.93</td>
</tr>
<tr>
<td>45–49</td>
<td>0.88 0.73,1.07</td>
<td>0.88 0.57,1.37</td>
<td>1.07 0.81,1.41</td>
<td>1.03 0.69,1.54</td>
<td>1.00 0.99,1.28</td>
</tr>
<tr>
<td>50–55</td>
<td>0.92 0.75,1.13</td>
<td>1.88 1.12,3.19</td>
<td>1.45 1.08,1.93</td>
<td>1.65 1.07,2.54</td>
<td>1.13 1.17,1.54</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school graduate</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>More than high school graduate</td>
<td>1.32 1.12,1.56</td>
<td>0.73 0.46,1.14</td>
<td>1.82 1.43,2.32</td>
<td>0.88 0.57,1.37</td>
<td>1.04,1.33</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Not married</td>
<td>1.19 1.02,1.39</td>
<td>1.78 1.08,2.97</td>
<td>1.47 1.15,1.89</td>
<td>2.50 1.58,4.01</td>
<td>1.00 1.12,1.44</td>
</tr>
<tr>
<td>Perceived stress level¶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.92</td>
</tr>
<tr>
<td>High</td>
<td>0.83 0.70,0.97</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.90</td>
</tr>
<tr>
<td>Employment status¶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.77</td>
</tr>
<tr>
<td>Not employed</td>
<td>0.76 0.59,1.00</td>
<td>0.57 0.38,0.86</td>
<td>1.00 0.67,0.90</td>
<td>1.00 0.67,0.90</td>
<td>1.00</td>
</tr>
<tr>
<td>Study site¶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ypsilanti, Michigan</td>
<td>1.33 1.07,1.67</td>
<td>0.91 1.46</td>
<td>0.96 1.56</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Boston, Massachusetts</td>
<td>1.15 0.91,1.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago, Illinois</td>
<td>1.22 0.95,1.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh, Pennsylvania</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of life¶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>High</td>
<td>1.00 1.11,1.43</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.26</td>
</tr>
<tr>
<td>Interview language¶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>1.00 1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Japanese</td>
<td>2.95 1.91,4.63</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* Each variable was adjusted for all other variables included in the race/ethnic-specific logistic regression model.
† Relative to rating of Same as.
‡ SWAN, Study of Women’s Health Across the Nation; POR, prevalence odds ratio; CI, confidence interval.
§ Per one-unit increase from the mean.
¶ Not included in the final model for all race/ethnic groups because this variable was statistically significant in fewer than three of the groups (refer to the statistical analysis discussion in the Materials and Methods section of the text).
els of recreational activity (24). In the present study, in which the age range was narrow and included only the midlife years (age 40–55 years), older age was associated with higher activity. This finding may be chance or may reflect a widening gap between the perception of one's own activity level and the average activity level of one's peers as one ages. It also may reflect a true change in women's opportunities to engage in diverse activities as they move from one life stage to another (such as full-time employment to retirement), although the lack of association of menopausal status with either high or low activity level suggests that chronologic age, or the social meaning of chronologic age, may define life stages more than hormonal events do, at least in terms of physical activity behavior.

On the other hand, consistent with previous literature (24, 25), this study found that higher education, one dimension of socioeconomic status, was associated with a high activity rating while unemployment was inversely associated with high activity and directly associated with low activity. In addition, being single was related to high activity but not to low activity (except in Hispanics). Taken together, this constellation of factors suggests a picture of the women who rated themselves as more active than their peers: educated, employed, and without family responsibilities, a picture generally consistent with the demographic description of women who regularly participate in sports and exercise that emerges from more detailed assessments (6, 26). This consistency suggests that the comparative rating of physical activity also may be a valid measure for differentiating more-active women from those with an average activity level.

Fewer studies have examined the correlates of inactivity or sedentary behavior. Although national data show that the demographic characteristics of persons who do not participate in any recreational physical activity tend to be the inverse of those who do (less education, non-White, and female) (27), lack of participation in recreational physical activity does not necessarily imply lack of activity in all domains, especially among women (6), nor is sedentary behavior merely the opposite of physical activity behavior (28). For instance, heavy television viewing, which may be one measure of sedentary behavior, has been associated with factors such as hostility and alcohol consumption that may or may not be associated with physical activity (29). In the current study, activity less than one's peers appeared to be less related to low socioeconomic status and more to a state of poor health, both overall and in terms of specific complaints (functional impairment and sleeping problems). Unfortunately, given the cross-sectional nature of these data, it was not possible to determine the directionality of the observed relations.

From a public health perspective, this study suggests that different standards of usual or even “appropriate” activity level may prevail in different racial/ethnic groups. In 1997, the Surgeon General’s report on physical activity and public health recommended that to achieve health benefits, everybody should engage in a minimum of moderate-intensity activity for a total of 30 minutes a day most days of the week (3). Given the racial and ethnic diversity of the United States, the public health challenge is to promote efforts that encourage and enable all groups to accept and follow that recommendation.

ACKNOWLEDGMENTS

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