

Variables related to meeting the CDC/ACSM physical activity guidelines

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ABSTRACT

MARTIN, S. B., J. R. MORROW, JR., A. W. JACKSON, and A. L. DUNN. Variables related to meeting the CDC/ACSM physical activity guidelines. *Med. Sci. Sports Exerc.*, Vol. 32, No. 12, 2000, pp. 2087–2092. **Purpose:** The purpose of this study was to investigate the relation between perceived importance of physical activity and demographic variables and current physical activity level with specific reference to the CDC/ACSM guidelines for sufficient physical activity for a health benefit. **Methods:** Physical activity levels were assessed by a telephone survey of 2002 households throughout the continental United States and the District of Columbia to determine whether the individuals met the CDC/ACSM physical activity guidelines. **Results:** Results indicate that 68% of the respondents are physically active below the CDC/ACSM criterion. Chi-square analysis revealed significant relationships between meeting the CDC/ACSM physical activity guidelines and 1) perceived importance of physical inactivity as a health risk ($P < 0.0001$), and 2) gender ($P < 0.0001$). Logistic regression analysis revealed that having a greater awareness of the health risks of physical inactivity improved the odds ratio (OR = 1.40, 95% CI = 1.21–1.62) of being sufficiently physically active for a health benefit by 40% ($P < 0.0001$) and being a male improved the odds ratio (OR = 1.45, 95% CI = 1.17–1.79) of being sufficiently physically active for a health benefit by 45% ($P < 0.0006$). **Conclusions:** Implications for health and physical fitness researchers and practitioners are that they need to improve awareness of life span fitness benefits and develop intervention programs based on individuals' current physical activity levels. **Key Words:** PHYSICAL ACTIVITY, HEALTH, GUIDELINES, EXERCISE

Physical inactivity has increasingly been recognized as an important risk factor associated with morbidity and mortality in adults (6,30). Despite evidence on the social, health, and personal benefits of physical activity, many people still choose not to exercise (29). Only about 12–22% of U.S. adults engage in leisure time physical activity at recommended levels and 24–60% have been reported to be very sedentary and unfit (5). Furthermore, approximately 50% of the individuals who do initiate exercise programs drop out during the first 3–6 months (8,9,20).

Understanding the reasons why people choose to be physically inactive has been a source of much discussion over the past several years. Increasingly, researchers and practitioners are evaluating physical activity levels and behavior change for exercise adoption and maintenance (3,4,18,19,23). Research has revealed many influential determinants of physical activity (10,11,12,14,15,16,24). The known determinants associated with physical inactivity include (a) personal attributes (e.g., demographics, biomedical, activity history, psychological traits, knowledge, attitudes, and beliefs) and (b) environmental factors (e.g., access to facilities, time, and social support). Understanding

the determinants of physical activity continues to be important from a practical standpoint because they can identify population segments that may be responsive or resistive to physical activity interventions (10).

Accurate knowledge about the importance of physical inactivity as a health risk has been found to be associated with adopting a healthy lifestyle (10,12,14,15,16,24) and plays a central role in lifestyle choices, health care interactions, and compliance with therapeutic advice (25). Although factual knowledge is generally considered necessary, it may not be sufficient to stimulate appropriate health behavior or changes to improve health behaviors (25).

In addition to correct knowledge, personal attributes such as gender, ethnicity, age, education level, and income/socioeconomic status have been found to be associated with adopting and maintaining a healthy lifestyle (10,11,16). For example, African-American women, the less educated, overweight individuals, older adults, individuals with disabilities, low income workers, and the undernourished are more likely to be inactive (30). The influence of personal characteristics varies according to the physical activity level being assessed. A limitation of some studies assessing physical activity levels has been that the participants were composed of a nonrandom convenient sample (e.g., white, college students) and that physical activity was not evaluated according to the CDC/ACSM recommended guidelines for health benefits.

0195-9131/00/3212-2087/\$3.00/0

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Received for publication December 1999.

Accepted for publication March 2000.

The purpose of the present study was to examine a national random sample of American adults to determine whether perceived importance of physical activity and personal characteristics are related to meeting the CDC/ACSM physical activity guidelines for health benefits. Specifically, the relationship between the perceived importance of physical activity for maintaining a healthy lifestyle and personal characteristics on reported physical activity behavior were investigated. These comparisons allow specific subgroup needs and preferences to be identified so intervention programs can be targeted to meet specific needs.

METHODS

Participants

United States residents ($N = 2002$) 18 yr of age and older from the 48 contiguous states and the District of Columbia were contacted via telephone and agreed to participate in a national survey related to the Surgeon General's Report on Physical Activity and Health (30). Before the interview volunteers gave informed consent.

Questionnaire

A computer programmed questionnaire was developed with input from a number of representatives from physical activity research agencies (i.e., the American Alliance for Health, Physical Education, Recreation and Dance; American College of Sports Medicine; the American Heart Association; the Association for Worksite Health Promotion; the International Health, Racquet & Sportsclub Association; and the National Coalition for Promoting Physical Activity). The number of items was reduced, reformatted, and grouped together in common categories for ease of telephone questioning, understandability, and response coding. The revised instrument was reviewed and pilot tested in person and via the telephone. None of the data collected during pilot testing were used in the actual data collection or analyses. Based on the feedback obtained from the pilot-testing phase, a final questionnaire consisting of approximately 50 items was created in both English and Spanish. Due to branching, not all questions were answered by all respondents. A more comprehensive summary of the research and questionnaire development is described by Morrow et al. (21). The current analyses focus on physical activity levels of adults in the United States and relation of perceived importance of physical inactivity as a health risk and personal characteristics. Specifically, the respondents were asked to respond to a question related to perceived importance of physical inactivity as a health risk by selecting one of the response categories of "very important," "important," "somewhat important," or "not important." In addition, they were asked to select the response that best described their current physical activity level (see Table 1). The demographic variables and the response to these two items served as the data for the present study.

TABLE 1. Physical activity level.

| Level | CDC/ACSM Guidelines for Health Benefit |
|---|--|
| 1. I do not exercise or walk regularly now, and do not intend to start in the near future. | → Does Not Meet (0) |
| 2. I do not exercise or walk regularly, but I have been thinking of starting. | |
| 3. I am trying to start to exercise or walk, or I exercise or walk infrequently. | |
| 4. I am doing vigorous exercise less than 3 times per week or moderate physical activity less than 5 times per week. | |
| 5. I have been doing moderate physical activity 5 or more times per week (or more than 2 ½ hours per week) for the last 1–6 months. | → Does Meet (1) |
| 6. I have been doing moderate physical activity 5 or more times per week (or more than 2 ½ hours per week) for 7 months or more. | |
| 7. I have been doing vigorous exercise 3 to 5 times per week for 1–6 months. | |
| 8. I have been doing vigorous exercise 3 to 5 times per week for 7 or more months. | |

National Survey Procedures

Institutional Review board approval was received before collecting data. During the months of June and July, 1997, telephone interviewers trained by the Survey Research Center at the University of North Texas completed a national computer random-digit-dial telephone survey of U.S. residents (18 yr of age or older) in the 48 contiguous states and the District of Columbia. This survey (21) was conducted during evening hours Monday through Thursday and covered all time zones from Eastern (starting at 6:00 p.m.) to Pacific (ending at approximately 9:00 p.m.). Each phone number was dialed a minimum of three times. Once an adult was contacted the telephone interview lasted approximately 12–15 min. The true refusal rate was approximately 50%, resulting in 2002 respondents. Based upon the sample size, the margin of error was less than $\pm 2\%$.

Data Analyses

Definitions of vigorous (i.e., "basketball, jogging, running fast, step aerobics, swimming laps, singles tennis, racquetball, etc.") and moderate (i.e., "brisk walking, gardening, slow cycling, dancing, or hard work around the house") activities were provided to the respondents. Respondents were classified into one of the eight physical activity levels (see Table 1) based on self-reported physical activity levels. Chi-square analyses were conducted to determine whether the respondent's physical activity level (PAL) was related to perceived importance of physical inactivity as a health risk factor and personal characteristics (i.e., gender, household family income, age, educational level, and ethnicity). Individuals were grouped into one of two categories (0 = PAL response 1, 2, 3, or 4; 1 = PAL response 5, 6, 7, or 8). Category 0 indicates that the respondent was not doing sufficient physical activity to achieve a health benefit as defined by the Centers for Disease Control and Prevention and the American College of Sports Medicine (22), and those in category 1 meet the minimum guidelines for a health benefit (i.e., accumulating 30 min or more

TABLE 2. Percentage of American adults at each physical activity level.

| Level | % (Actual <i>N</i>) | No. in Millions ^a |
|---|-------------------------|---------------------------------|
| 1. I do not exercise or walk regularly now, and do not intend to start in the near future. | 5 (98) | 6.5 |
| 2. I do not exercise or walk regularly, but I have been thinking of starting. | 7 (138) | 9.1 |
| 3. I am trying to start to exercise or walk, or I exercise or walk infrequently. | 19 (362) | 24.7 |
| 4. I am doing vigorous exercise less than 3 times per week or moderate physical activity less than 5 times per week. | 37 (728) | 48.1 |
| 5. I have been doing moderate physical activity 5 or more times per week (or more than 2 ½ hours per week) for the last 1–6 months. | 10 (192) | 13 |
| 6. I have been doing moderate physical activity 5 or more times per week (or more than 2 ½ hours per week) for 7 months or more. | 11 (214) | 14.3 |
| 7. I have been doing vigorous exercise 3 to 5 times per week for 1–6 months. | 3 (53) | 3.9 |
| 8. I have been doing vigorous exercise 3 to 5 times per week for 7 or more months. | 8 (164) | 10.4 |

^aBased on an estimated 140,000,000 American adults as measured in the July 1997 census within weeks of the actual study.

of moderate physical activity for a minimum of 5 d·wk⁻¹ or vigorous physical activity for a minimum of 3 d·wk⁻¹). Logistic regression was then used to calculate odds ratios for perceived benefit, gender, income, age, education, and ethnicity to determine their influence on PAL while controlling for the other variables in the model.

RESULTS

Of the 2002 respondents, 1232 were female, 766 were male, and 4 refused to indicate gender. The responses to the eight different levels of physical activity are reported in Table 2. As reported in a related paper (21) describing the demographics, the sample distributions generally reflected the 1997 U.S. census, with the exception that there were more female ($N = 1232$) than male ($N = 766$) respondents to the survey. A total of 1326 respondents (68.1%) did not meet the CDC/ACSM recommended guidelines of physical activity for a health benefit, whereas 623 respondents (31.9%) met the minimum level of physical activity for a health benefit.

Perceived Importance of Physical Inactivity as a Health Risk

Of the 2002 respondents, 52% identified physical inactivity as a very important risk factor, 37% viewed physical inactivity as an important risk factor, 8% indicated physical inactivity as a somewhat important health risk factor, and 3% believed lack of physical activity was not an important health risk factor. A chi-square analysis revealed a significant relationship between the perceived importance of physical inactivity as a health risk factor and PAL (see Table 3). Of the 623 respondents who reportedly met the CDC/ACSM guidelines for physical activity, 362 (58.1%) thought physical inactivity was a very important health risk factor, 216 (34.7%) believed physical inactivity was an important health risk factor, 27 (4.3%) perceived physical inactivity was a somewhat important health risk factor, and 18 (2.9%)

held the notion that physical inactivity was not an important health risk factor. Table 3 indicates that as the PAL becomes higher, the perceived importance of the physical activity/health relation generally raises.

Personal Characteristics

The distribution of respondents and PALs are provided in Table 3. Chi-square analyses were performed to examine the relations between meeting the CDC/ACSM physical activity guidelines and personal characteristics (i.e., gender, income, age, education, and ethnicity). Family household income, age, educational level, and ethnicity were not related to meeting the CDC/ACSM guidelines. However, a significant relation was identified between meeting the CDC/ACSM guidelines and gender. Male respondents were more likely to participate in vigorous physical activity than female respondents (see Table 3).

The Logistic regression results (see Table 4) reveal that perceived importance and gender in the presence of the remaining variables improves the likelihood that one meets the CDC/ACSM guidelines for healthy physical activity. As an individual's perceptions of the health risks associated with physical inactivity improved the odds ratio of meeting the CDC/ACSM guidelines improves by 40% ($P < 0.0001$). In addition, being a male improves the odds ratio of meeting the guidelines by 45% ($P < 0.0006$). The Hosmer and Lemeshow goodness-of-fit test indicated the logistic regression model was an adequate fit for the data ($P = 0.79$).

DISCUSSION

Both moderate and vigorous physical activity have been shown to be important for long-term health (2,30). The present study found that a majority of survey respondents thought physical inactivity was a very important or somewhat important risk factor for poor health outcome. Further, a relation was demonstrated between this attitudinal question and meeting the CDC/ACSM criterion. Gender, but not household family annual income, age, educational level, occupational setting, and ethnicity, was also found to be related to meeting the CDC/ACSM guidelines criterion.

The physical activity behavioral data (i.e., physical inactivity vs physical activity) collected in the present study are similar to the findings reported by other national studies using different measures. Specifically, the percentages of adults (68%) with sedentary lifestyle by ethnicity, gender, and level of education in the current study are similar to those reported by the U.S. Surgeon General (30), the American Heart Association (1), Marcus and colleagues (16,17,19), and Sallis and colleagues (27). These studies generally indicate that approximately 50–80% of American adults fail to engage in sufficient PA to achieve a health benefit.

Although the participants' responses in the current study did indicate that physical activity behaviors vary as a function of perceived importance and gender; the overall findings did not reveal that family household income, age,

TABLE 3. Percentage of adults meeting the CDC/ACSM recommended guidelines for physical activity by demographic group (gender, income, age, education, perceived importance, and ethnicity).

| Demographic Group | Does not Meet the Recommended Guidelines ^a | Does Meet the Recommended Guidelines | χ^2 (df) | P |
|----------------------|---|--------------------------------------|---------------|--------|
| Overall | 68.1 | 31.9 | | |
| Perceived importance | | | 23.45 (3) | 0.0001 |
| Very important | 64.2 (33.3) | 35.8 (18.6) | | |
| Important | 69.9 (25.8) | 30.1 (11.1) | | |
| Somewhat important | 82.5 (6.5) | 17.5 (1.4) | | |
| Not important | 72.7 (2.5) | 27.3 (0.9) | | |
| Gender | | | 15.86 (1) | 0.0001 |
| Male | 62.9 (24.1) | 37.1 (14.2) | | |
| Female | 71.4 (44.1) | 28.6 (17.6) | | |
| Annual income | | | 6.10 (7) | 0.53 |
| ≤5,000 | 70.4 (3.3) | 29.6 (1.4) | | |
| 5,001–15,000 | 71.7 (7.5) | 28.3 (3.0) | | |
| 15,001–25,000 | 70.1 (12.0) | 29.9 (5.1) | | |
| 25,001–35,000 | 69.6 (13.0) | 30.4 (5.7) | | |
| 35,001–55,000 | 66.7 (15.9) | 33.3 (7.9) | | |
| 55,001–75,000 | 63.1 (12.5) | 36.9 (5.0) | | |
| 75,001–100,000 | 65.5 (4.5) | 34.5 (2.3) | | |
| >100,000 | 64.4 (3.2) | 35.6 (1.8) | | |
| Age (yr) | | | 5.20 (5) | 0.39 |
| 18–25 | 65.9 (9.7) | 34.1 (5.0) | | |
| 26–35 | 65.6 (13.0) | 34.4 (6.8) | | |
| 36–45 | 68.7 (15.8) | 31.3 (7.2) | | |
| 46–60 | 70.1 (16.0) | 29.9 (6.8) | | |
| 61–70 | 65.7 (6.7) | 34.3 (3.5) | | |
| >70 | 73.0 (6.9) | 27.0 (2.5) | | |
| Education | | | 0.30 (1) | 0.59 |
| No BS degree | 68.4 (48.4) | 31.6 (22.4) | | |
| BS degree | 67.1 (19.7) | 32.9 (9.6) | | |
| Ethnicity | | | 0.87 (1) | 0.35 |
| White | 68.7 (51.0) | 31.4 (23.3) | | |
| Nonwhite | 68.0 (17.0) | 32.0 (8.6) | | |

Note: Percent within each category and (Percent of total)

^a Surgeon General's Report

Does not meet the CDC/ACSM guideline is levels 1, 2, 3, and 4 from Table 1.

Does meet the CDC/ACSM guideline is levels 5, 6, 7, and 8 from Table 1.

education (i.e., BS degree vs no BS degree), and ethnicity (i.e., whites vs nonwhites) were associated with meeting physical activity guidelines. Originally, education was investigated across six levels and no relationship was found. Therefore, the investigators split education into BS and no BS degree, and still no relationship was apparent. The percentage of individuals with a BS or advanced degree was slightly higher in the current study (30%) than in the July 1997 census (24%). The present study was performed within weeks of the 1997 census data used for comparison purposes. The results in the current study indicate that household annual income level approached statistical significance. Generally, as income went up so did the percentage of respondents meeting the CDC/ACSM physical activity guidelines for health benefits. Likewise, the findings of the present study reveal that there was a small association between older age and the failure to meet the CDC/ACSM

recommended guidelines for physical activity. A slight decline regarding moderate physical activity is consistent with past research (30). Older adults have also been found to be less likely to participate in strength and moderate-to-vigorous exercise. These general tendencies are consistent with previous research on physical inactivity and income and age (5,12,13,14,28,30). Education and ethnicity were not found to be associated with PALs which is contrary to past research (30). These findings might have occurred as a result of the researchers restricting their comparisons to (a) individuals with a BS degree and to those that had not received a BS degree and (b) whites and nonwhites. Further, using meeting the CDC/ACSM recommended guidelines versus not meeting the guidelines may have also influenced the outcomes more than just evaluating general PALs or behavioral categories. This is the first research to use CDC/ACSM

TABLE 4. Logistic regression results predicting if an individual meets the minimum level of physical activity for a health benefit ($n = 1702$).

| Variable | P< | R | OR | .95 CI | |
|------------------------|--------|-------|------|--------|-------|
| | | | | Lower | Upper |
| Perceived importance | 0.0001 | 0.09 | 1.40 | 1.21 | 1.62 |
| Gender ^a | 0.0006 | 0.07 | 1.45 | 1.17 | 1.79 |
| Annual income | 0.097 | 0.02 | 1.06 | 0.99 | 1.13 |
| Age | 0.048 | -0.03 | 0.93 | 0.86 | 1.00 |
| Education ^b | 0.92 | 0.00 | 0.99 | 0.78 | 1.25 |
| Ethnicity ^c | 0.43 | 0.00 | 0.91 | 0.71 | 1.16 |

^a 0, female; 1, male.

^b 0, no baccalaureate degree; 1, at least a baccalaureate degree.

^c 0, nonwhite; 1, white.

guidelines as a criterion to evaluate physical inactivity as a health risk.

The Logistic regression analysis utilized perceived importance of physical inactivity as a health risk, gender, income, age, education, and ethnicity because these variables have been shown in previous studies to be related to physical inactivity. Logistic regression analyses indicated that perceived importance of physical inactivity as a health risk and gender were the variables related to being physically active enough to achieve a health benefit.

In the current study, as individuals' perceptions of the importance of physical inactivity as a health risk increases, so does the likelihood that they will meet the CDC/ACSM recommended guidelines. Factual knowledge may not always be sufficient to stimulate appropriate health behavior or changes to improve health behaviors (25). Attitudes and beliefs have been associated with lack of physical activity (7,12,30). Some people may perceive physical activity as a potential health risk instead of a health benefit. For example, individuals have associated physical activity with joint problems, fatigue, and/or injury. Individuals' beliefs about physical activity may need to be recognized and discussed to fully help them maintain and adopt a healthier lifestyle (12).

The current research also found that women were less likely to engage in physical activity that meets the CDC/ACSM recommended guidelines. The finding that women were less likely to participate in moderate-to-vigorous exercise than were men is consistent with previous research on physical inactivity and gender (7,13,28,30). Men usually report greater levels of total and vigorous activity whereas women tend to report participating in low-to-moderate activities (13,17,27,28,30). Although an operational definition was provided to the participants, not all types of physical activity (e.g., child care) were assessed. Dishman and Buckworth (10) suggested that walking and other forms of moderate activity might be more acceptable to women. Interventions for women that aid in initiating and maintaining physical active lifestyle behavior change include (a) recog-

nizing that physical activity comes in many forms (i.e., includes many possible activities) rather than just high volume and high intensity exercise and (b) learning behavior change skills (7,26).

CONCLUSIONS

Physical activity is more prevalent among those that perceive physical activity as important (30). It appears individuals at various PALs have different perceptions about the importance of physical inactivity as a health risk. This is also consistent with previous research (30) and suggests that people may benefit from interventions that focus on the particular level of physical activity in which they currently engage. For example, individuals that originally joined a gym to lose weight may need additional information about benefits other than weight loss to maintain motivation.

In conclusion, approximately 100 million American adults are in a position that indicates they would benefit from additional physical activity. Interventions must be directed toward the PAL, individual characteristics and the determinants, and barriers that have the greatest potential for effectively changing physical activity lifestyle behaviors. The current results suggest that the most important characteristics for meeting the CDC/ACSM physical activity guidelines for a health benefit are perceived importance of physical activity and gender. Future research should investigate the relation of other social and environmental variables to achieving these public health recommendations.

Procedures were approved by the University Institutional Review Board for Protection of Human Subjects. This work was supported in part by a grant from the National Coalition for Promoting Physical Activity. The authors acknowledge the valuable support provided by the Survey Research Center at the University of North Texas and individuals associated with the National Coalition for Promoting Physical Activity for their contributions.

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