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Awareness of National Physical Activity Recommendations for Health Promotion among US Adults

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Abstract

Purpose—To examine whether knowledge of the 1995 Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) national physical activity recommendations varies by sociodemographic, behavioral, and communication-related factors.

Methods—Cross-sectional analyses of 2381 participants in the 2005 Health Information National Trends Survey, a national probability sample of the US population contacted via random-digit dial.

Results—Only a third of respondents were accurately knowledgeable of the CDC/ACSM physical activity recommendations. Recommendation knowledge was higher among women (OR = 1.70; 95% confidence interval (CI) = 1.35–2.14) than men, the employed compared with those not currently working (OR = 0.73; 95% CI = 0.55–0.95), foreign-born individuals (OR = 1.62; 95% CI = 1.15–2.30) compared with the US-born, and those meeting CDC/ACSM recommendations vs those who do not (OR = 0.74; 95% CI = 0.58–0.96).

Conclusions—There is not widespread knowledge of the consensus national physical activity recommendations. These findings highlight the need for more effective campaigns to promote physical activity among the American public.

Keywords

HINTS; EXERCISE; DIET; PHYSICAL INACTIVITY

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In 1995, an expert panel convened by the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM), recommended that, “Every US adult should accumulate 30 minutes or more of moderate-intensity activity on most, preferably all, days of the week” to derive health benefits (32). This recommendation was endorsed in the US Public Health Service’s 1996 Surgeon General’s Report on Physical Activity and Health (39), in the 2005 Dietary Recommendations for Americans, published by the US Department of Health and Human Services and the US Department of Agriculture (40), and has served as the basis for similar recommendations issued by other organizations (16,23,25,30).

In 2007, ACSM and the American Heart Association (AHA) updated the 1995 recommendations to clarify issues related to duration, frequency, and bout length (18). These updated recommendations specify that, “to promote and maintain health,” individuals should engage in a minimum of 30 min of moderate-intensity physical activity on 5 $d \cdot wk^{-1}$. Whereas the CDC/ACSM statement is widely recognized in the scientific and medical communities as the consensus national recommendation, others have received widespread popular dissemination. In 2005, the Dietary Recommendations for Americans were published jointly by the US Department of Health and Human Services and the US Department of Agriculture and recommended that individuals accumulate “30 minutes of moderate-intensity physical activity, above usual activity” on “most” days of the week (42). Perhaps most notably, the 2002 Institute of Medicine (IOM) recommendations (which followed a comparable 2001 ACSM position (4) statement) called for the accumulation of 60 min of physical activity on at least 5 $d \cdot wk^{-1}$. In contrast to the CDC/ACSM, however, the IOM recommendations were intended for the prevention of unhealthful weight gain (21).

Despite the clear health benefits of physical activity and the presence of national recommendations, fully one-quarter of US adults are not physically active during leisure time (29) and 49% of Americans meet the 1995 CDC/ACSM recommendations (34). Participation in moderate-intensity physical activity (particularly during leisure time) is consistently shown to be low among women, older-aged individuals, most racial/ethnic minority groups, and those of lower socioeconomic position (2).

The purpose of the present study was to examine the extent to which knowledge of the 1995 CDC/ACSM national physical activity recommendations has diffused through the US population. In addition, we examined the sociodemographic, behavioral, and communication correlates of recommendation knowledge, on the basis of prior research demonstrating these factors to be related to physical inactivity levels (5).

METHODS

The Health Information National Trends Survey (HINTS) is a probability-based sample of the US population contacted via a random-digit dial (RDD) telephone survey conducted biennially (since 2003) by the National Cancer Institute (NCI). Data from the 2005 HINTS (n = 5586) were used in this analysis; the development and details and the sampling design have been described in greater detail elsewhere (13). Briefly, during a period of 25 wk in 2005, trained interviewers collected data using a list-assisted, RDD sample of all telephone

exchanges in the United States. One adult (aged 18 yr and older) per household was selected to complete an extended interview. The response rates for the initial and extended screening interviews were 34.01% and 61.25%, respectively, calculated according to recommendations of the American Association for Public Opinion Research (3). Verbal consent was obtained from participants before the conduct of the telephone survey. The NCI's human subjects' protection committee approved the HINTS.

Measures

Accurate knowledge of the CDC/ACSM physical activity recommendations— Participants were asked two questions to ascertain their knowledge of the 1995 CDC/ACSM physical activity recommendations. First, participants were presented with a frequency item: "How many days a week of physical activity or exercise are recommended for the average adult to stay healthy?" An openended response option was provided. Participants were then asked a duration item: "On those days, how long should the average adult be physically active to stay healthy?" Participants were provided an open-ended response option along with a choice of unit (min or h). We created three separate variables to identify accurate knowledge of the 1995 CDC/ACSM moderate-intensity recommendation components. The duration item was categorized as follows: ≥30 min = accurate; <30 min = inaccurate. Frequency was scored as follows: 5–7 d = accurate; <5 d = inaccurate. Finally, to characterize our primary outcome—moderate-intensity recommendation knowledge—we categorized those reporting a frequency of 5–7 d and duration of ≥30 min as accurately identifying the CDC/ACSM recommendations for moderateintensity physical activity.

Given, however, the presence of targets for the accumulation of vigorous physical activity as well as the potential for differential interpretation of the moderate-intensity recommendations, we created two exploratory outcome definitions. The "vigorous" definition considered those reporting a frequency of ≥3 d and a duration of ≥20 min as accurate. In addition, an "alternative moderate" definition identified responses of a frequency of ≥4 d and ≥30 min in duration as accurate. The latter alternative moderate definition was included to account for the potential that some might interpret the recommendations specification of "most days" to include 4 d as an option.

Participant characteristics—Gender and age were self-reported. Participants also reported their employment status, race/ethnicity, highest level of education, and whether they were born in the United States (nativity). Because of the small numbers in some categories, employment status was grouped into four levels: employed (full time and part time), not currently working, student, or retired; homemakers were classified as "not currently working." Participants reported their race as white, black, Asian, American Indian/ Alaskan Native, or Native Hawaiian, or other Pacific Islander. Participants were also asked whether their ethnicity was Hispanic or Latino. Hispanic/Latino participants were classified as such regardless of their answer to the race question. Education was reported in 11 categories and grouped, owing to small numbers in some categories, as less than high school, high school graduate, some college, and college and above. Participants selfreported their height (in ft/inches) and weight (in lb), which was used to calculate body mass index (BMI) as kilograms per squared meter ($kg \cdot m^{-2}$). Participants reported the number of days

(per wk) and duration (min or h) of their moderate-intensity physical activity or exercise. Those who reported participating in physical activity at least 5 $d \cdot wk^{-1}$ for at least 30 min were classified as meeting physical activity recommendations. Those who reported participating in some physical activity but did not meet the requirements were classified as insufficiently active.

Communication measures—Participants were asked a series of questions about their media use and attention to health news. Participants reported hours of daily television viewing, radio listening, and Internet use. Participants also reported number of days per week they read the newspaper and watched national and local television news. In addition, individuals were asked two questions concerning whether, during the last 12 months, they read health news in a magazine or newspaper or watched a health segment on the local news; a yes/no response option was provided. A subset of participants was asked whether they pay attention to or ignore new recommendations for physical activity/exercise when they hear or read about them. The subset of participants was also asked whether they agree or disagree with the idea that, because there are so many different recommendations for physical activity/exercise, it is hard to know which ones to follow.

Statistical Methods

We limited our sample to the subset of participants who received questions on physical activity recommendations. This amounted to approximately half (n = 2701, 48.2%) the respondents of the 2005 HINTS. We further restricted the sample, because of small numbers, to only those participants who reported their race/ethnicity as non-Hispanic Black, Hispanic, or non-Hispanic White (excluding 187 of other or unknown race/ethnicity) as well as those of normal BMI classification or above (≥18.5 $kg \cdot m^{-2}$; excluding 86 with no reported weight and 47 underweight participants). After these exclusions, 2381 participants remained in the analytic sample.

Basic descriptive statistics (frequencies for categorical variables, means, and SD for continuous variables) were calculated and tests of normality were conducted. Age-adjusted associations were tested using a series of logistic regression models. To identify covariates for potential inclusion in the multivariable model, we conservatively included participant characteristic variables that were associated with the outcome in age-adjusted analyses at the $P \leq 0.10$ level. In the multivariable model, variables that were significant at the $P \leq 0.05$ level were retained. In analyses examining associations with the communication exposures, separate logistic regression models were estimated; bivariate models adjusted for age and multivariable models adjusted for age, gender, employment status, nativity, and meeting physical activity recommendations; these variables were selected because they comprised the final multivariable model for the primary exposure. All analyses used weighted HINTS data to reflect US population demographic characteristics and to account for over-sampling and nonresponse. Analyses were conducted using SAS 9.1 and SUDAAN 9.1, taking into account the complex sampling design.

RESULTS

Descriptive characteristics of the sample are provided in Table 1. Briefly, the samples were largely white (77%) and approximately half (52%) were females. Most participants were employed (58%). Approximately half (55%) the participants attended at least some college, and most (86%) completed high school. Most respondents (85%) reported that they participated in some physical activity, but only a third (36%) met CDC/ACSM physical activity recommendations. A majority of participants were either overweight (37%) or obese (25%).

Concerning knowledge of the CDC/ACSM moderate-intensity physical activity recommendations, 57% of participants accurately identified the frequency component (5–7 d) and 86% correctly identified the duration (≥30 min) portion of the recommendations. However, only 33% of respondents were able to accurately identify the complete (frequency and duration) CDC/ACSM moderate-intensity physical activity recommendations.

In age-adjusted bivariate analyses, gender, nativity, and physical activity level were associated (at the $P \leq 0.10$ level) with accurate identification of the CDC/ACSM recommendations. These variables remained statistically significant in multivariable analyses (at the $P < 0.05$ level), along with age and employment status (Table 2). There was T2 a slight positive association with age. Women were 70% more likely to accurately identify the minimum physical activity recommendations than men. Foreign-born individuals had higher odds (62%) of accurate recommendation knowledge. Those with current employment were more likely to demonstrate accurate recommendation awareness when compared with those who were not currently employed, as were individuals who were currently meeting the CDC/ACSM–recommended levels of physical activity.

Exploratory outcome definitions

When we expanded the outcome definition to capture those participants who presumably responded with knowledge of the vigorous physical activity recommendations (≥3 d, ≥20 $min \cdot d^{-1}$), 80% of the sample was considered to have accurate recommendation knowledge. As shown in Table 3, gender and T3 employment status were both significantly associated with the outcome. However, in contrast to the primary outcome definition, no association was observed for nativity or physical activity. However, a positive educational attainment gradient was apparent, however, such that highest levels of recommendation knowledge were found among those with the highest levels of education. The “alternate moderate” exploratory outcome definition (≥4 d, ≥30 $min \cdot d^{-1}$), included those individuals who interpreted “most days of the week” to include 4 d. Using this outcome definition, 47% of the study sample was considered to have accurate recommendation knowledge. The only predictors of this outcome identified in multivariable analyses were gender and physical activity (Table 3).

Communication variables

In addition to examining the sociodemographic correlates of accurate identification of current physical activity recommendations, we also examined associations with several

communication variables (data not shown). In bivariate analyses, the only communication variable (across the primary and exploratory outcomes) associated with accurate knowledge of the physical activity recommendations was newspaper reading. However, this association did not persist when explored in the multivariable model.

DISCUSSION

Despite efforts during the past decade to promote physical activity using the CDC/ACSM recommendations, just a third of US adults can accurately identify the complete recommendations. We found this lack of knowledge to be more pronounced among men, the unemployed, US-born individuals, and those not currently meeting physical activity recommendations. Together, these findings should be concerning the US public health system; Americans have relatively limited knowledge of the consensus national physical activity recommendations.

Sociodemographic and behavioral factors were related to accurate knowledge of the 1995 CDC/ACSM moderate-intensity recommendations. Those already meeting the CDC/ACSM recommendations may have been more attentive to national physical activity recommendations, but given our cross-sectional data, we are unable to determine whether a causal link exists. Consistent with other evidence, however, only 36% of participants were found to meet CDC/ACSM recommendations; this highlights the importance of better understanding correlates of population uptake of the national recommendations. It is unclear why women were consistently shown to have greater levels of recommendation knowledge relative to men. We can speculate that it may result from the frequent observation that women have higher risk perceptions than men for serious health conditions such as cancer (19,28,31,35) and also exhibit more associated worry (14,28). Possibly, women might direct greater attention to recommendations for modifiable health behaviors to counter their perceptions of disease risk and worry. Why foreign-born individuals would have more accurate knowledge relative to their US-born counterparts is largely unclear. Given the limitations of our data, we are unable to speculate about possible explanations; nevertheless, future research should explore this unexpected finding.

Given the consistent evidence of racial/ethnic disparities in physical activity, we were surprised to find no variation by race/ethnicity, perhaps suggesting (consistent with other evidence) (7) that the frequently observed racial/ethnic disparities in physical activity (2) may not be accounted for by limited knowledge. Given differences in physical activity prevalence (11), we were similarly surprised to find no effect for educational attainment. However, employment status also serves as an important marker of socioeconomic standing and may reflect differential exposure to health information. Extant research highlights the presence of socioeconomic disparities in access to health information (43). In our current media-saturated environment, this “knowledge gap” may be magnified because individuals in higher socioeconomic position may derive greater benefit from health promotion messages and health communication campaigns (38,43,44).

Our findings should be interpreted in light of our decision to define the primary moderate-intensity outcome using duration responses of ≥30 min. By suggesting that individuals

accumulate “30 min or more” of physical activity daily, the CDC/ACSM recommendations are best interpreted as minimum recommendations. Indeed, among those who were accurately knowledgeable of the recommendations, only a quarter (24.69%) responded that precisely 30 min in duration was recommended. From a behavior change perspective, however, it is not necessarily beneficial that most perceive the recommended duration to be greater than 30 min. Particularly among the sedentary, motivation for physical activity promotion may be stymied if one perceives the recommendations to be unachievable.

The HINTS items did not ask participants to indicate whether they were responding with moderate- or vigorous-intensity physical activity in mind. We thus developed an exploratory outcome definition to capture those individuals with accurate knowledge of the vigorous-intensity physical activity recommendations. Indeed, fully 80% of the study sample demonstrated accurate knowledge using this outcome definition; as such, we suggest that caution be used when interpreting this finding. To best reflect the CDC/ACSM vigorous-intensity physical activity recommendations, our outcome definition captured those who reported that greater than or equal to 3 d, 20 $min \cdot d^{-1}$ of physical activity is recommended. As a result, our outcome definition captures those who accurately report knowledge of the vigorous-intensity physical activity recommendations and those who inaccurately under-report knowledge of the moderate-intensity physical activity recommendations. Further, given the low prevalence of vigorous-intensity physical activity, we believe it to be unlikely that 80% of the sample had this subset of the recommendations in mind.

Our alternative moderate-intensity outcome showed that a larger proportion of the sample could be identified as having accurate knowledge by expanding the frequency definition to 4 d. A larger proportion of individuals—nearing half of the population—would have accurate recommendation knowledge using this definition. That considerably more individuals would be captured using a 4- versus 5-d frequency definition is striking and perhaps suggests that the 2007 updated ACSM/AHA recommendations (which specified that individuals should “do moderately intense cardio 30 minutes a day, five days a week”) hold potential for clarifying the issue in the public’s mind. Future research is needed to determine whether these updates and those made in the most recent US Department of Health and Human Services’ 2008 Physical Activity Recommendations for Americans (41) are more accurately recalled.

We found little evidence that communication-related variables were associated with accurate knowledge of the recommendations. This may result from the highly generalized, saturating effect of media in the current environment. Through varied sources, many are bombarded with multiple physical activity and general health promotion “recommendations” that may be challenging to differentiate (10,44). This confluence of varied messages may obscure the primacy of the CDC/ACSM recommendations (23). The most prominent source of potential confusion may be the IOM recommendations issued in 2002 (21), which recommended that individuals participate in 60 min of daily physical activity to prevent unhealthful weight gain. Interestingly, nearly a third of those demonstrating accurate recommendation knowledge (using the primary outcome definition) in our sample reported that a 60-min duration of daily physical activity is recommended (32.9%). Numerous reports in the popular press since 2002 have described the confusion promoted by the two sets of

apparently conflicting recommendations (8,15,33,37). In fact, several press reports from 2002 incorrectly described the IOM recommendation release as an update to the earlier CDC/ACSM 30-min recommendations (rather than as a distinct recommendation) (17,24,26). Still, other press reports included quotes from noted physical activity researchers, many of whom openly questioned both the validity and the utility of the IOM recommendations (22,26,45). In this context, it is not surprising that the public would have difficulty making sense of the varied suggestions. Illustrating the problem, fully 74.5% of respondents in the 2005 HINTS sample agreed (either somewhat or strongly), “there are so many different recommendations about physical activity or exercise that it’s hard to know which ones to follow.” A host of evidence suggests that when health promotion messages are disseminated in a media-saturated environment without coordination, repetition, and frequency, they may be limited in their ability to enhance knowledge and promote health behavior change (20,27,36).

Several limitations should be considered when drawing interpretations from these findings. Our measures are based on self-report and are therefore subject to reporting bias. 2005 HINTS did not survey individuals who were institutionalized or without landline telephone service; this affects both the generalizability of our findings and, if these groups vary on knowledge of recommendations, may have biased our estimates. However, as of 2006, the number of households without a landline is low (15.8%) and tends to be concentrated among those younger the 30 yr (9). Generalizability of these findings should also be considered in light of the somewhat low response rate (although nonresponse was much lower to the extended interview) and because racial/ethnic minorities were not oversampled. Nonresponse is a major challenge for all RDD household telephone surveys (6,12) and constrains the representativesness of our sample to the responding portion of the population. Our estimates may be biased if variation exists between the responding and nonresponding portions of the target population. Finally, given that these are cross-sectional analyses, causal relations cannot be inferred.

We do not intend to suggest that accurate knowledge of the CDC/ACSM recommendations is sufficient to rectify the national problem of physical inactivity in the US population. Indeed, despite widespread knowledge regarding the ills of cigarette smoking, it retains a surprisingly high prevalence (1). Nevertheless, accurate knowledge of national physical activity recommendations may be an important first step in raising awareness about the importance of physical activity in the American population. Our data highlight the need to develop more creative, coordinated, and consistent campaigns to promote national physical activity recommendations.

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TABLE 1

Demographic characteristics of the study sample (n = 2701).

Gender, *n* (%)	
Male	941 (48.11)
Female	1760 (51.89)
Education, *n* (%)	
Less than high school	331 (14.31)
High school	723 (31.08)
Some college	756 (30.71)
College or more	853 (23.90)
Income (US $), *n* (%)	
<10,000	120 (4.21)
10,000–25,000	527 (21.17)
25,000–50,000	588 (24.43)
50,000–100,000	719 (34.52)
>100,000	325 (15.68)
Physical activity, *n* (%)	
Meets guidelines	935 (36.11)
Less than guidelines	1295 (48.99)
No reported activity	455 (14.90)
BMI ($kg \cdot m^{-2}$), mean (SE)	27.09 (0.14)
Age (yr), mean (SE)	45.52 (0.33)

TABLE 2

Sociodemographic predictors of accurate CDC/ACSM guideline (5 d, 30 min·d^{-1}) knowledge.

	Age-Adjusted OR (95% CI)*	Multivariable-Adjusted OR (95% CI)
Age		*P* = 0.0277
		1.01 (1.00–1.02)
Gender	*P* = 0.0001	*P* < 0.0001
Men	Ref	Ref
Women	1.60 (1.28–1.99)	1.70 (1.35–2.14)
Race/ethnicity	*P* = 0.6053	
White	Ref	
Black	1.21 (0.73–2.02)	
Hispanic	1.19 (0.79–1.79)	
Education	*P* = 0.1417	
College and above	Ref	
Some college	0.73 (0.53–0.99)	
High school	0.80 (0.57–1.12)	
<High school	1.0 (.60–1.66)	
Employment status	*P* = 0.1179	*P* = 0.0286
Employed	Ref	Ref
Not working	0.83 (0.65–1.05)	0.73 (0.55–0.95)
Student	0.53 (0.25–1.09)	0.52 (0.25–1.08)
Retired	0.88 (0.61–1.25)	0.85 (0.58–1.23)
Nativity	*P* = 0.0167	*P* = 0.0074
US-born	Ref	Ref
Foreign-born	1.52 (1.08–2.13)	1.62 (1.15–2.30)
Physical activity	*P* = 0.0435	*P* = 0.0052
Meets guidelines	Ref	Ref
Exercises but does not meet guidelines	0.82 (0.64–1.05)	0.74 (0.58–0.96)
No reported exercise	0.69 (0.52–0.93)	0.60 (0.44–0.81)
BMI	*P* = 3744	
Normal	Ref	
Overweight	0.90 (0.70–1.17)	
Obese	1.08 (0.77–1.53)	

TABLE 3

Sociodemographic predictors of accurate knowledge of alternative definitions of the CDC/ACSM guidelines (3 d, 20 min·d^{-1}; 4 d, 30 min·d^{-1}).

	Vigorous Definition (3 d, 20 min·d^{-1})		Alternative Moderate Definition (4 d, 30 min·d^{-1})	
	Age-Adjusted OR (95% CI)*	**Multivariable-Adjusted OR (95% CI)**	**Age-Adjusted OR (95% CI)***	**Multivariable-Adjusted OR (95% CI)**
Age		*P* = 0.1187		*P* = 0.7600
		0.99 (0.98–1.00)		1.00 (0.99–1.00)
Gender	*P* < 0.0001	*P* < 0.0001	*P* < 0.0001	*P* = 0.0001
Men	Ref	Ref	Ref	Ref
Women	1.74 (1.36–2.23)	1.95 (1.49–2.56)	1.49 (1.25–1.78)	1.52 (1.25–1.84)
Race/ethnicity	*P* = 0.5650		*P* = 0.6507	
Black	Ref		Ref	
White	1.04 (0.61–1.80)		0.96 (0.61–1.49)	
Hispanic	0.81 (0.41–1.59)		0.82 (0.48–1.40)	
Education	*P* = 0.0001	*P* = 0.0007	*P* = 0.0502	*P* = 0.0908
College and above	Ref	Ref	Ref	Ref
Some college	0.66 (0.45–0.96)	0.68 (0.46–1.00)	0.73 (0.53–1.00)	0.74 (0.54–1.02)
High school	0.48 (0.32–0.71)	0.50 (0.33–0.76)	0.67 (0.50–0.92)	0.69 (0.51–0.95)
<High school	0.33 (0.20–0.53)	0.37 (0.22–0.60)	0.70 (0.45–1.10)	0.73 (0.46–1.17)
Employment status	*P* = 0.0128	*P* = 0.0249	*P* = 0.3418	
Employed	Ref	Ref	Ref	
Not working	0.62 (0.44–0.88)	0.60 (0.41–0.89)	0.76 (0.56–1.03)	
Student	2.29 (0.86–6.11)	2.27 (0.83–6.24)	0.72 (0.32–1.62)	
Retired	0.62 (0.43–0.88)	0.66 (0.45–0.97)	0.95 (0.69–1.31)	
Nativity	*P* = 0.5200		*P* = 0.2582	
US-born	Ref		Ref	
Foreign-born	1.17 (0.72–1.90)		1.17 (0.89–1.54)	
Physical activity	*P* = 0.6306		*P* = 0.0014	*P* = 0.0017
Meets guidelines	Ref		Ref	Ref
Exercises but does not meet guidelines	1.11 (0.82–1.52)		0.80 (0.61–1.05)	0.74 (0.55–0.98)
No reported exercise	0.96 (0.64–1.44)		0.60 (0.47–0.78)	0.57 (0.43–0.77)
BMI	*P* = 0.1182		*P* = 0.2477	
Normal	Ref		Ref	
Overweight	0.87 (0.64–1.19)		0.80 (0.60–1.05)	
Obese	1.26 (0.84–1.88)		0.86 (0.63–1.18)	