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Ambulatory Physical Activity Profiles of Older Adults

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Abstract

This study examined objectively determined walking profiles of older adults across a wide range of sociocultural backgrounds. All individuals (*N* = 415; 131 men age 70.5 ± 9.2 yr and 284 women age 71.5 ± 9.0 yr) underwent physiological measurements, completed pen-and-paper surveys, and wore a pedometer for 7 consecutive days. The total sample accumulated a mean of 3,987 ± 2,680 steps/day. Age ($r = -.485$, $p < .001$) and body-mass index (BMI; $r = -.353$, $p < .001$) were negatively associated with steps per day. Multivariate analysis revealed that race/ethnic category ($F = 3.15$, $df = 3$), gender ($F = 2.46$, $df = 1$), BMI ($F = 6.23$, $df = 2$), income ($F = 9.86$, $df = 1$), education ($F = 43.3$, $df = 1$), and retirement status ($F = 52.3$, $df = 1$) were significantly associated with steps per day. Collectively these categories accounted for 56% of the variance in walking activity in this independently living, community-dwelling older adult sample. Sedentary characteristics highlighted within, and step-per-day values specific to, older adults have implications for planning targeted physical activity interventions related to walking activity in this population.

Keywords

walking; pedometer; behavior

Chronic but preventable conditions such as coronary heart disease, diabetes, hypertension, arthritis, and depression are associated with physical inactivity and affect the older adult population disproportionately (Berg & Casells, 1990; Hoffman, Rice, & Sung, 1996). Older adults are among the most inactive segment of the population, with 51% of 65- to 74-year-olds and 65% of those 75 years or older not engaging in any leisure-time physical activity (Centers for Disease Control and Prevention [CDC], 2004). Racial and ethnic minorities have been repeatedly shown to be less physically active than Whites (CDC) and have also been shown to have a higher prevalence rate of chronic conditions than Whites (Ford, Giles, & Dietz, 2002). Furthermore, population-based evidence has demonstrated positive associations between social class and leisure-time physical activity (Crespo, Ainsworth, Keteyian, Heath, & Smit, 1999) and shown education level to be related to leisure-time physical activity levels (CDC). Most of this epidemiological knowledge of physical activity behavior is derived from self-report physical activity surveys.

Although self-report surveys are practical and feasible to administer to large population-based samples, their ability to measure light to moderate ubiquitous activities has been shown to be imprecise (Ainsworth, Richardson, Jacobs, Leon, & Sternfeld, 1999; Strath, Bassett, & Swartz, 2004). In particular, walking behavior, typically a moderate-intensity activity, has been shown to be underestimated by self-report surveys (Bassett, Cureton, & Ainsworth, 2000). Because walking is the most commonly reported physical activity in both the elderly and ethnic-minority populations (Crespo, Keteyian, Heath, & Sempos, 1996), to comprehensively assess physical activity behavior in this population necessitates that the measurement tool selected be able to accurately assess walking behavior.

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Of late, objective physical activity measures such as motion sensors have become popular tools with which to assess physical activity behavior, because they can overcome limitations associated with self-report measures. Electronic pedometers, inexpensive waist-mounted motion sensors, have documented concurrent validity with other objective activity measures (Bassett, Ainsworth, et al., 2000) and have been shown to be accurate and reliable for measuring walking activities (Schneider, Crouter, & Bassett, 2004). Although there are limitations to pedometer use, such as an inability to assess types of activity other than walking, as well as underestimating slow walking speeds, pedometers do have great utility for assessing ambulatory activity behaviors in large samples.

Although pedometer-determined physical activity has been examined in a variety of populations, across occupational categories (Sequeira, Rickenbach, Wietlisbach, Tullen, & Schutz, 1995), genders (Bennett, Wolin, Puleo, & Emmons, 2006; Tudor-Locke et al., 2004), ethnic groups, and income groups (Tudor-Locke et al., 2004; Whitt, DuBose, Ainsworth, & Tudor-Locke, 2004) and respective to selected health categories such as body-mass index (BMI; Albright & Thompson, 2006; Bennett et al., 2006; Hornbuckle, Bassett, & Thompson, 2005; Krumm, Dessieux, Andrews, & Thompson, 2006; Thompson, Krumm, Dessieux, & Andrews, 2006; Thompson, Rakow, & Perdue, 2004; Tudor-Locke et al.), there has been a paucity of research specifically examining objectively determined walking behavior in an older adult population. Such information is important to guide and provide insight into normative walking values in older adults relative to personal characteristics such as age, ethnicity, education, income, retirement status, and selected health variables and can further serve to guide interventions designed to increase walking activity. Accordingly, the purpose of this study was to describe objectively determined walking volume and provide a thorough examination of personal characteristics associated with walking behavior in a diverse community-dwelling sample of older adults.

Methods

Participants

All individuals were recruited through senior-center announcements, media postings, and targeted mailings. Eligibility consisted of being over the age of 50 years, independently living, and community dwelling and having no physical ailments to prevent one from participating in physical activity and no orthopedic limitations to walking (i.e., cane or walker use). The sample consisted of 415 older adults, 131 men (age = 70.5 ± 9.2 years, BMI = 28.3 ± 5.2 kg/m^2) and 284 women (age = 71.5 ± 9.0 years, BMI = 29.8 ± 5.9 kg/m^2). After study enrollment, participants provided written and witnessed informed consent.

Study Procedures

All participants completed a generic health history and demographic questionnaire. They were asked to self-report race or ethnicity, their highest level of education attainment, and current household income level. Individuals also reported whether they were retired or working (volunteer, part-time, or full-time). After survey completion, all individuals underwent measures of height and weight and were shown how to wear a pedometer and complete a pedometer log. They wore the pedometer for 7 consecutive days and then returned it and the log to an investigator after the monitoring period. All data collection took place within one season (spring).

Demographic Questionnaire

Participants reported race or ethnicity as White, Black, Hispanic, Asian, American Indian, Native Hawaiian/Pacific Islander, or other. They reported their highest education attainment as elementary, high school, some college, or graduate school. Self-reported household income was reported in one of six categories: <$5,000, $5,000–14,999, $15,000–24,999, $25,000–34,999, $35,000–49,999, or ≥$50,000). Individuals reported whether they lived alone; were married, single, divorced, or widowed; and whether they were retired, worked full-time, or worked part-time (including volunteer work).

Anthropometric Measures

Body mass and height were measured with minimal clothing and no shoes. Body mass was measured using a physician's balance-beam scale (Continental Scale Corp., Bridgeview, IL), and height was measured using a stadiometer (Continental Scale Corp.). BMI was calculated as body mass (kg) divided by height squared (m^2).

Pedometer Assessment

All individuals wore an electronic pedometer (SW-200, Yamax Corp., Tokyo, Japan) for a 7-consecutive-day monitoring period. Previous research has shown the Yamax pedometer to be a valid and reliable tool for measuring steps, distance walked, and walking behavior (Schneider et al., 2004). Participants were instructed to place the pedometer on the right side of the body attached to either a belt or waistband, on the anterior midline of the thigh. Each participant completed an individualized 20-step pedometer calibration at his or her usual walking pace to assess the functional status of each pedometer. Pedometers recording 19–21 steps were deemed acceptable. Individuals were given a picture showing correct placement and written instructions to increase the likelihood of proper positioning throughout the weeklong period. Pedometers were worn during all waking hours throughout the entire week, except during bathing or swimming, and removed before sleep at night. Total steps per day and the time from when the pedometer was put on in the morning to when it was taken off in the evening were recorded by the participant in a provided log. Both pedometer and log were returned to investigators after the 7-day monitoring period.

Data Analyses

For a day's worth of pedometer data to be considered valid and be used in analyses, we employed a minimum time requirement, in that the pedometer had to be worn for 10 hr or more, had to register more than 1,000 steps, and had to be worn for 5 or more days. Race and ethnicity categories were collapsed into the following groups: White, Black, Hispanic, and other. The "other" designation consisted of those self-reporting as American Indian, Asian, or Native Hawaiian/Pacific Islander. Income levels were collapsed into three categories: <$14,999, $15,000–34,999, and ≥$35,000. Educational attainment was collapsed into high school and college, and employment was collapsed into either retired or working. The working category included part-time, full-time, and volunteer work. All variables were collapsed into the referenced groups to provide adequate cell-sample size for purpose of analysis. Distributions of mean steps per day (e.g., total steps per week divided by number of days worn) were computed and normalcy assessed by histograms and tests of skewness. Means, standard deviations, medians, and 25th and 75th percentiles were computed for the sample. Spearman's rank-order correlation coefficients were used to examine relationships between steps per day and the total sample characteristics stratified by race. Multiple-regression models, with dummy coding employed for race and ethnic categories and BMI categories, were employed to examine the association between sociodemographic variables and mean daily steps. Age was not entered into the regression models because of multicollinearity with retirement status. Statistical significance was set at alpha = .05. All analyses were conducted with SPSS for Windows version 13.0 (SPSS Inc., Chicago, IL).

Results

A total of 591 individuals responded to the invitation to take part in the study, of which 473 were deemed eligible and enrolled into the study. Four hundred fifteen (92%) of 451 men and women completed the 1-week pedometer-monitoring period with valid pedometer data (Figure 1). Out of a possible 2,905 person-days of pedometer data (415 participants multiplied by 7 days), 2,772 person-days were available for analysis, with the pedometer being worn on average 6.6 days and 13.2 ± 2.1 hr/day. During the 20-step pedometer calibration, two pedometers failed to count more than 10 steps on repeated efforts so were omitted from data-collection use. There were no sociodemographic differences between individuals who completed the study and those who were dropped out because of loss of the pedometer or who were deemed to have invalid pedometer data (<5 days, <10 hr of wear, <1,000 steps/day recorded; data not shown). Study participants were predominantly female (68%) and mostly White (53%). On average participants were 71.1 ± 9.1 years old, with a mean BMI of 29.3 ± 5.8 kg/m^2. Most earned less than $14,999 per year (56%), had completed a high school education (73%), and were retired (68%). Full participant characteristics can be seen in Table 1.

There were no significant differences between men and women in any of the race or ethnic categories for accumulated steps per day. The total sample accumulated a mean of 3,987 ± 2,680 steps/day. Age was negatively correlated with average steps per day for the whole sample ($r = -.485$, $p < .001$) and negatively correlated with each individual race and ethnic category. Similarly, BMI was negatively correlated with average steps per day across individual race and ethnic categories and for the sample as a whole (Table 2).

Bivariate-regression relationships show that race and ethnic category was significantly associated with average steps per day, with Blacks taking 756 fewer steps per day than their White counterparts ($p = .008$; Table 3). Gender was not significantly associated with average steps per day ($p = .428$). Individuals in the overweight category (BMI 25–29.9) took 1,875 fewer steps than those in the normal-weight category (BMI 20.0–24.9), and those in the obese category (BMI ≥30.0) took 2,629 fewer steps than those in the normal-weight category. Participants in higher income brackets took 473 more steps per day than those in lower income classifications ($p = .006$). Participants who had completed some college education took 1,927 more steps per day on average than those who had completed a high school education ($p \le .0001$). Furthermore, individuals who were retired took on average 2,206 fewer steps per day than those who were still working, whether it be full-time, part-time, or as a volunteer ($p \le .0001$).

Results from multivariable model analyses revealed that race or ethnic category ($F = 3.15$, $df = 3$), gender ($F = 2.46$, $df = 1$), BMI ($F = 6.23$, $df = 2$), income ($F = 9.86$, $df = 1$), education ($F = 43.3$, $df = 1$), and retirement status ($F = 52.3$, $df = 1$) were significantly associated with average steps per day, collectively accounting for 56% of the variance in walking behavior.

Discussion

Our examination of ambulatory physical activity profiles in older adults, via pedometry, revealed that on average participants of approximately 71 years of age accumulated just under 4,000 steps/day. Significant variation was found for age, gender, race or ethnicity, education, income, retirement and working status, and BMI. Previous research has alluded to a step range indicating sedentariness as <5,000 steps/day and to a range of 6,000–8,500 steps/day for healthy older adults (Tudor-Locke & Bassett, 2004). Based on these classifications, 74% of our sample would be classified as sedentary, with only 17% accumulating a sufficient step quantity to place them in the healthy older adult category.

Our findings are supportive of other studies using pedometers to discern physical activity behavior and extend results to a heterogeneous older adult population. Bennett et al. (2006), in a sample of 433 participants drawn from multiethnic low-income housing, revealed that those with a post-high-school education accumulated approximately 15% more steps per day than those with less than a high school education. The same authors also revealed that women took approximately 1,000 fewer steps per day than men and that Black individuals took approximately 1,400 fewer steps per day than Whites or Hispanics. Similarly, Tudor-Locke et al. found, in a sample of 209 individuals drawn from one county in South Carolina, that those with some college education accumulated 22% more steps per day than those with less than a high school education, that men took almost 2,000 more steps per day than women, and that Whites took approximately 2,000 more steps per day than non-Whites (Tudor-Locke et al., 2004). The current study's findings reveal similarities with such published work across ethnicities. Our findings, however, show large differences across educational attainment levels, with those with some high school education or less taking 50% fewer steps than those with a college or graduate-school education. Our findings also show little difference between genders in this age population.

Similar to other investigations in adult populations (Bennett et al., 2006; Sequeira et al., 1995; Tudor-Locke et al., 2004; Whitt et al., 2004), we noted an inverse association between age and accumulated steps per day in this older adult sample, to the extent that those over the age of 80 years were taking approximately 4,000 fewer steps per day than those 50–59 years old. We extend findings to show that this inverse relationship is apparent across all ethnicities. Given the strong empirical support for the associations between regular physical activity and health, these low levels of ambulatory activity would indicate a strong need for age-targeted physical activity interventions or walking-based interventions to increase activity levels in older adult populations. This is further exemplified by the current results showing that individuals in the overweight and obese categories took 1,875 and 2,629 fewer steps, respectively, than those in the normal-weight category. Previous literature has reported on inverse associations between markers of obesity and steps per day in a variety of adult populations (Albright & Thompson, 2006; Bennett et al.; Hornbuckle et al., 2005; Krumm et al., 2006; Thompson et al., 2006, [2004]; Tudor-Locke et al.), and the current study's results would support significant inverse relationships specific to an older adult population; this was apparent across all ethnicities. Collectively, there appears to be a tremendous potential to target older adults with walking-based interventions to increase overall low levels of activity and counteract inactivity's associations with overweight and obesity.

This study also reports that individuals who were still working, whether it be full-time, part time, or on a volunteer basis, were considerably more active than their retired counterparts, in that they accumulated approximately 2,200 more steps per day. These results appear similar to those reported by Sequeira et al. (1995), who studied 493 men and women age 25–74 years from western Switzerland as part of the World Health Organization Monitoring Trends and Determinants of Cardiovascular Disease Project. In that study, significant differences in the number of steps accumulated per hour by individuals in varying levels of occupational activity were noted, with those in moderate-effort occupations such as a painter accumulating more steps per hour than those in primarily sitting and standing occupations such as a telephone operator and hairdresser, respectively. Similar occupational differences in accumulated steps per day have also been reported by Chan, Spangler, Valcour, and Tudor-Locke (2003), showing that higher levels of occupational activity are associated with more accumulated steps per day. Results from the aforementioned studies appear parallel to the concept that occupational activity levels are associated with overall accumulated physical activity levels, in terms of accumulated steps per day. For the sample as a whole in the current study, the 2,200-steps/day difference between our retired and working participants would have increased the sample mean from a sedentary category of 4,000 steps/day up to surpass the category referenced as healthy older adult by Tudor-Locke and Bassett (2004). Other studies have reported individuals accumulating more steps per day on workdays than nonworkdays in adult populations (Tudor-Locke et al., 2004), and the current study's results would extend these findings, specific to an older adult population. Efforts to engage older adults in volunteering might prove to be one interventional strategy to increase their overall walking behavior.

Despite the utility of objective step counters to monitor ambulatory profiles of older adults, these devices are not without limitation. Previous research has identified more imprecise estimates of steps at lower walking speeds (Bassett et al., 1996; Schneider et al., 2004). Although this limitation exists irrespective of participants' age, it might serve to underestimate overall walking behavior in this age population. Our sample is cross-sectional in nature, so causality cannot be inferred, and, moreover, results are limited to a sample with no limitations on ambulatory activity. Associations reported comparing walking behavior with markers of adiposity do not take into account dietary influences. Compared with other objective measures of physical activity such as accelerometers, pedometers are unable to quantify the intensity or duration of activity. Given the known limitation of using self-report physical activity (underreporting of walking and cognitive recall) and the high cost of accelerometers, the usefulness of an inexpensive objective monitor such as the pedometer is amplified, especially considering the fact that walking is the most prevalent form of activity in older adults.

Conclusions

To our knowledge this is one of the first larger scale studies to profile ambulatory patterns with objective monitoring specific to independently living, community-dwelling older adults across diverse sociocultural backgrounds. Results extend those of previous research and highlight the sedentary behaviors of older adults and key sociodemographic variables associated with overall walking behavior. Sedentary characteristics highlighted herein have strong implications for planning targeted physical activity interventions related to ambulatory activities in lower income, minority, overweight, obese, and retired older adults.

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References

Ainsworth BE, Richardson MT, Jacobs DR, Leon AS, Sternfeld B. Accuracy of recall of occupational physical activity by questionnaire. Journal of Clinical Epidemiology 1999;52:219–227. [PubMed: 10210239]

Albright C, Thompson DL. The effectiveness of walking in preventing cardiovascular disease in women: A review of the current literature. Journal of Women's Health (2002) 2006;15(3):271–280. [PubMed: 16620186]

Bassett DR Jr, Ainsworth BE, Leggett SR, Mathien CA, Main JA, Hunter DC, et al. Accuracy of five electronic pedometers for measuring distance walked. Medicine and Science in Sports and Exercise 1996;28(8):1071–1077. [PubMed: 8871919]

Bassett DR Jr, Ainsworth BE, Swartz AM, Strath SJ, O'Brien W, King GA, et al. Validity of four motion sensors in measuring moderate intensity physical activity. Medicine and Science in Sports and Exercise 2000;32(9):S471–S480. [PubMed: 10993417]

Bassett DR Jr, Cureton AL, Ainsworth BE. Measurement of daily walking distance—Questionnaire versus pedometer. Medicine and Science in Sports and Exercise 2000;32(5):1018–1023. [PubMed: 10795795]

Bennett GG, Wolin KY, Puleo E, Emmons KM. Pedometer-determined physical activity among multi-ethnic low-income housing residents. Medicine and Science in Sports and Exercise 2006;38(4):768–773. [PubMed: 16679995]

Berg, RL.; Casells, JS. The second fifty years: Promoting health and preventing disability. Washington, DC: National Academy Press; 1990.

Centers for Disease Control and Prevention. Prevalence of no leisure-time physical activity—35 states and the District of Columbia, 1988–2002. MMWR Morbidity and Mortality Weekly Report 2004;53(4):82–85. [PubMed: 14762333]

Chan CB, Spangler E, Valcour J, Tudor-Locke C. Cross-sectional relationship of pedometer-determined ambulatory activity to indicators of health. Obesity Research 2003;11(12):1563–1570. [PubMed: 14694222]

Crespo CJ, Ainsworth BE, Keteyian SJ, Heath GW, Smit E. Prevalence of physical inactivity and its relation to social class in U.S. adults: Results from the third national health and nutrition examination survey, 1988–1994. Medicine and Science in Sports and Exercise 1999;31(12):1821–1827. [PubMed: 10613434]

Crespo CJ, Keteyian ST, Heath GW, Sempos CT. Leisure-time physical activity among U.S. adults. Archives of Internal Medicine 1996;156:93–98. [PubMed: 8526703]

Ford ES, Giles WH, Dietz WH. Prevalence of the metabolic syndrome among U.S. adults: Findings from the third national health and nutrition examination survey. Journal of the American Medical Association 2002;287(3):356–359. [PubMed: 11790215]

Hoffman C, Rice D, Sung H. Persons with chronic conditions: Their prevalence and costs. Journal of the American Medical Association 1996;276:1473–1479. [PubMed: 8903258]

Hornbuckle LM, Bassett DR Jr, Thompson DL. Pedometer-determined walking and body composition variables in African-American women. Medicine and Science in Sports and Exercise 2005;37(6):1069–1074. [PubMed: 15947735]

Krumm EM, Dessieux OL, Andrews P, Thompson DL. The relationship between daily steps and body composition in postmenopausal women. Journal of Women's Health (2002) 2006;15(2):202–210. [PubMed: 16536684]

Schneider PL, Crouter SE, Bassett DR Jr. Pedometer measures of free-living physical activity: Comparison of 13 models. Medicine and Science in Sports and Exercise 2004;36(2):331–335. [PubMed: 14767259]

Sequeira MM, Rickenbach M, Wietlisbach V, Tullen B, Schutz Y. Physical activity assessment using a pedometer and its comparison with a questionnaire in a large population survey. American Journal of Epidemiology 1995;142(9):989–999. [PubMed: 7572981]

Strath SJ, Bassett DR Jr, Swartz AM. Comparison of the College Alumnus Questionnaire Physical Activity Index with objective monitoring. Annals of Epidemiology 2004;14(6):409–415. [PubMed: 15246329]

Thompson DL, Krumm EM, Dessieux OL, Andrews P. Pedometer-measured walking and risk factors for disease. Southern Medical Journal 2006;99(1):100–101. [PubMed: 16466138]

Thompson DL, Rakow J, Perdue SM. Relationship between accumulated walking and body composition in middle-aged women. Medicine and Science in Sports and Exercise 2004;36(5):911–914. [PubMed: 15126729]

Tudor-Locke C, Bassett DR Jr. How many steps/day are enough? Preliminary pedometer indices for public health. Sports Medicine (Auckland, NZ) 2004;34(1):1–8.

Tudor-Locke C, Ham SA, Macera CA, Ainsworth BE, Kirtland KA, Reis JP, et al. Descriptive epidemiology of pedometer-determined physical activity. Medicine and Science in Sports and Exercise 2004;36(9):1567–1573. [PubMed: 15354039]

Whitt MC, DuBose KD, Ainsworth BE, Tudor-Locke C. Walking patterns in a sample of African American, Native American, and Caucasian women: The cross-cultural activity participation study. Health Education & Behavior 2004;31(4 Suppl):45S–56S. [PubMed: 15296691]

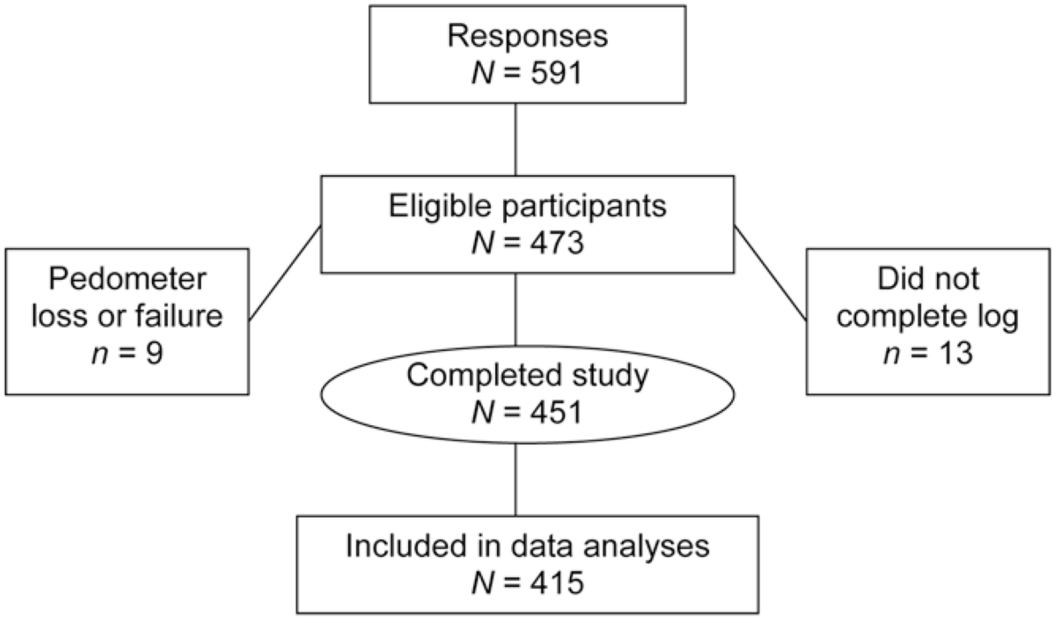

Figure 1.
Profile of study events during the monitoring period.

Table 1

Demographic Distribution of Participants and Pedometer (Steps per Day) Physical Activity Characteristics

			Pedometer Steps per Day	
Characteristic	***N***	**%**	***M***	**Median (IQR)**
Whole sample	415	100	3,986	3,375 (1,987–5,089)
Gender				
male	131	32	4,218	3,587 (2,065–5,408)
female	284	68	3,880	3,154 (1,987–5,048)
Age (years)				
50–59	58	14	6,568	6,012 (4,213–8,816)
60–69	116	28	4,668	4,038 (2,829–5,751)
70–79	165	40	3,261	2,850 (1,987–4,009)
≥80	76	18	2,532	1,869 (1,340–3,184)
Race or ethnicity				
White	218	53	4,398	3,587 (2,371–5,682)
Black	100	24	3,322	2,644 (1,611–4,213)
Hispanic	38	9	3,761	3,112 (1,311–4,886)
other	59	14	3,845	3,332 (2,412–4,900)
Education				
high school	301	73	2,973	2,648 (1,762–3,648)
college	114	27	6,663	5,878 (4,603–8,097)
Income ($)				
<14,999	197	56	3,230	2,842 (1,785–4,126)
15,000–34,999	99	28	4,592	4,009 (2,699–6,361)
≥35,000	53	16	5,615	4,674 (2,572–8,348)
Employment				
retired	281	68	2,852	2,642 (1,707–3,592)
working	134	32	6,367	5,683 (4,525–7,899)
Body-mass index (kg/m^2)				
<24.9	99	24	5,694	4,961 (3,069–8,198)
25.0–29.9	162	39	3,819	3,437 (2,340–4,825)

	Pedometer Steps per Day			
Characteristic	*N*	%	*M*	Median (IQR)
≥30.0	154	37	3,065	2,404 (1,583–4,069)

Note. IQR = interquartile range.

Table 2

Spearman Rank-Order Correlation Coefficients Comparing Total-Sample Participant Characteristics and Ambulatory Walking Behavior Assessed via Pedometer

	Total *N* = 415	White *n* = 218	Black *n* = 100	Hispanic *n* = 38	Other *n* = 56
Age (years)	−.485**	−.525**	−.442**	−.682**	−.276*
Body-mass index (kg/m^2)	−.353**	−.296**	−.338**	−.467**	−.482**

* $p < .05$.

** $p < .01$.

Table 3

Relationship of Number of Daily Steps and Sociocultural Characteristics

	Bivariate Relationships				Multivariable-Model Summary						
	B	*SE*	*t*	*p*	*df*	*F*	R^2	ΔR^2	*SEE*	Sig. *F* change	*p*
Race					3	3.15	.027	—	2,627	—	.025[a]
White[b]											
Hispanic	125	414	0.30	.762							
Black	−756	283	−2.67	.008							
other	−265	325	−0.81	.419							
Female	175	220	0.79	.428	1	2.46	.028	.001	2,630	.526	.045[c]
Body-mass index					2	6.32	.127	.099	2,500	.000	.000[d]
normal[b]											
overweight	−1,875	318	−5.91	.000							
obese	−2,629	321	−8.20	.000							
Income	473	171	2.77	.006	1	9.86	.210	.083	2,381	.000	.000[e]
Education	1,927	295	6.53	.000	1	43.3	.477	.267	1,940	.000	.000[f]
Retired	−2,206	283	7.80	.000	1	52.3	.556	.080	1,789	.000	.000[g]

Note. Coefficients listed from last model with all variables entered; the dependent variable was average steps per day. *SEE* = standard error estimate.

[a] Predictor: race.

[b] Reference group.

[c] Predictors: race, gender.

[d] Predictors: race, gender, body-mass index.

[e] Predictors: race, gender, body-mass index, income.

[f] Predictors: race, gender, body-mass index, income, education.

[g] Predictors: race, gender, body-mass index, income, education, retirement.