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Physical Activity in the Post-Hip-Fracture Period

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Abstract

The purpose of this study was to characterize physical activity (PA) based on survey and ActiGraphy data from older adults at 2 mo post–hip fracture and consider the factors that influence PA among these individuals. The sample included participants from a current Baltimore hip study, the BHS-7. Measurement of PA was based on the Yale PA Survey (YPAS) and 48 hr of ActiGraphy. The sample included the first 200 individuals enrolled in the study, with analyses including 117 individuals (59%) who completed the YPAS and wore the ActiGraph for 48 hr. Half the participants were male, with an overall mean age of 81.3 yr (*SD* = 7.9). Findings indicate that at 2 mo post–hip fracture participants were engaged in very limited levels of PA. Age and comorbidities were the only variables to be significantly associated with PA outcomes.

Keywords

ActiGraphy; survey data; sedentary behavior

Regular physical activity has been associated with better outcomes in the post-hip-fracture period (Fiatarone Singh et al., 2009; Zidén, Frändin, & Kreuter, 2008). Early findings from the Sarcopenia and Hip Fracture study (Fiatarone Singh et al., 2009), for example, suggest that individuals who are less sedentary before sustaining hip fractures tend to have shorter acute-care lengths of stay. In the early post-hip-fracture period, participation in physical activity is predictive of functional recovery (Talkowski, Lenze, Munin, Harrison, & Brach, 2009). Furthermore, individuals who remain sedentary after hip fracture are at risk for a second hip fracture and further functional decline (Rodaro, Pasqualini, Iona, & Di

Benedetto, 2004). Thus, participation in physical activity in the post-hip-fracture period is critical to recovery and subsequent prevention of future fractures.

Factors That Influence Physical Activity After an Acute Event

Physical activity in the post-hip-fracture period is influenced by the physical impact of the fracture and surgical intervention, as well as the philosophy of care in acute-care settings (Brown, Williams, Woodby, Davis, & Allman, 2007; Resnick et al., in press). In addition to patient factors such as age, education, and gender (Browning, Sims, Kendig, & Teshuva, 2009), medical interventions and acute-care environments are associated with functional decline during hospitalizations (Brown, Redden, Flood, & Allman, 2009; Buttery & Martin, 2009; Wakefield & Holman, 2007). Older patients tend to spend about 83% of the time in bed when hospitalized (Brown et al., 2009), and bed rest for these individuals results in loss of muscle strength and lean muscle mass, decreased aerobic capacity, diminished pulmonary ventilation, altered sensory awareness, reduced appetite and thirst, and decreased plasma volume. Recovery from such devastating changes can take time and requires significant participation in rehabilitation and exercise activities, among other behaviors. Patient age, sociodemographic characteristics (e.g., marital status or living alone), preexisting disability and comorbidities, cognitive decline or delirium, depressed mood, poor perceived health status, lack of motivation and resilience, cultural expectations, pain, fear of falling, body-mass index, and polypharmacotherapy can likewise influence physical activity (Benedetti et al., 2009; Browning et al., 2009; Proctor et al., 2008). Along with physical and environment factors, care-related factors (e.g., giving a patient a bedpan vs. helping him or her walk to the bathroom) can cause deconditioning and decrease participation in physical activity (Brown et al., 2009; Brown et al., 2007; Volpato et al., 2007).

Unfortunately, little work has been done to objectively measure physical activity in older adults post–hip fracture. Most studies in which hip-fracture patients were followed over time focused on measurement of functional performance using measures such as Tinetti Gait and Balance (Magaziner, Simonsick, Kashner, Hebel, & Kenzora, 1990; Sherrington, Lord, & Finch, 2004) or basic activities of daily living such as bathing, dressing, toileting, and ambulation (Magaziner et al., 1990; Fiatarone Singh et al., 2009). If physical activity was measured, survey measures were used, such as the Yale Physical Activity Survey (YPAS; Resnick, Riebe, King, & Ory, 2008) or the Physical Activity Scale for the Elderly (Fiatarone Singh et al., 2009), and objective measurement of physical activity was limited to activity that occurred during inpatient rehabilitation sessions (Talkowski et al., 2009).

Measurement of Physical Activity in Older Adults

Information about physical activity obtained from surveys and subjective reports provides important information about an older adult's perception of his or her level of activity (Pruitt et al., 2008; Resnick, Riebe, King, & Ory, 2008) and describes the type of activity completed (e.g., biking, swimming, dancing, gardening). Survey reports, however, are generally not strongly correlated with objective measures of physical activity, such as those obtained with ActiGraphy or step-activity monitors (Ekelund et al., 2006; Kolbe-Alexander, Lambert, Harkins, & Ekelund, 2006; Resnick, Riebe, King, & Ory, 2008). In surveys of physical activity such as the YPAS, moderate-intensity physical activity is defined as activity that raises the heart rate, leaves the person feeling slightly out of breath, and increases the body's metabolism to 3–6 times the resting level (3–6 metabolic equivalents of task [METs]; Cavill, Foster, Oja, & Martin, 2006). Respondents are given examples of moderate-intensity physical activity such as going for a brisk walk and biking. The older individuals completing the survey determine if time spent walking, for example, was at a brisk or a leisurely level and thus differentiate between moderate-intensity and recreational physical activity. Repeatedly it has been noted that older individuals incorrectly assess activities and think that a walk was "brisk" when the actual level of activity was of a low intensity (Ainsworth, 2009; Ekelund et al., 2006; Resnick, Riebe, King, & Ory, 2008; Resnick, Michael, et al., 2008). Given the weaknesses noted with subjective physical activity data, it is critical to augment these findings with objective measures of physical activity (Montoye, Kemper, Wim, & Washburn, 1996; Pruitt et al., 2008; Resnick, Michael, et al., 2008).

Objective physical activity data obtained via accelerometry are more accurate than what is provided from survey information, particularly with regard to walking and stepping activities. Although there is some evidence that accelerometry measures all types of physical activity or movement (e.g., transfers, toileting, bathing; Ekelund et al., 2006; Kolbe-Alexander et al., 2006; Resnick, Riebe, King, & Ory, 2008), it does not accurately measure participation in resistance exercise and does not capture the intensity with which that exercise is performed (Montoye et al., 1996).

Given the many normal changes that occur with aging, energy expenditure in older adults is not equivalent to that of young adult men and women (Ainsworth, 2009). Consequently, the Freedson calculation may result in an underestimation of the amount of energy expended by older individuals. Several different methods have been recommended to overcome inaccuracies in ActiGraphy calculations among older adults. These include the establishment of arbitrary cutoff points (Gerdhem, Dencker, Ringsberg, & Akesson, 2008), setting individualized thresholds (Pruitt et al., 2008), or calculating threshold count values specifically for older adults that represent moderate-intensity physical activity (Copeland & Esliger, 2009). Of these, the method established by Copeland and Esliger provides the most practical and generalizable approach because it can be used across varied samples of older adults. Copeland and Esliger, using a sample of 38 older adults with a mean age 69.7 ± 3.5 years, established threshold counts for moderate physical activity in a laboratory setting using accelerometry data, walking speed, and oxygen utilization. New threshold scores for older adults developed from this sample were set at 1,041 counts/min for moderate-intensity physical activity, in contrast with the 1,964 counts/min established for young adults (Freedson, Melanson, & Sirard, 1998).

The purposes of this study were (a) to describe patterns of physical activity in older adults post–hip fracture and identify factors associated with physical activity when measured using accelerometry and survey reports and (b) to examine the association between objective and subjective measures of physical activity in this population. We hypothesized that the amount of time spent in moderate-intensity physical activity recorded during ActiGraphy (measured using the Freedson & Copeland and Esliger calculations) would be statistically significantly associated with amount of time of moderate-intensity physical activity reported based on the YPAS, steps and counts of activity recorded via ActiGraphy would be statistically significantly correlated with overall time spent in activity based on the YPAS, and age, gender, body-mass index (BMI), comorbidities, education, marital status, and resilience would all independently influence time spent in physical activity based on survey, as well as ActiGraphy, findings.

Methods

Design

This was a descriptive study using data from a prospective cohort study currently being carried out in eight hospitals that are part of the Baltimore Hip Studies (BHS) network that is referred to as BHS-7. The study was approved by the University of Maryland institutional review board and review boards at each of the study hospitals. Informed consent was obtained from patients or a proxy if a patient was not able to self-consent. The purpose of BHS-7 is to investigate the consequences of hip fracture with regard to metabolic, physiologic, neuromuscular, functional, and clinical outcomes over a 12-month period and to consider differences between men and women in this first year post–hip fracture. Patients are screened and enrolled within 15 days of admission, and female enrollment is frequency-matched to men in each hospital so that women are only screened for enrollment when a man has been enrolled. All participants in the study undergo a comprehensive assessment of psychosocial, physical, and physiological outcomes (e.g., inflammatory markers, bone density) at baseline and again at 2, 6, and 12 months postfracture. This descriptive study uses physical activity data obtained at the 2-month post-hip-fracture follow-up in the first 200 participants enrolled in the study.

Sample

Eligible patients were community-dwelling, age 65 years or older, and admitted for surgical repair of a hip fracture to one of eight study hospitals. Individuals were excluded if they had a pathologic fracture, were bedbound during the 6 months before the fracture, or had some type of hardware in the contralateral hip (from either hip fracture or hip replacement), leaving no unaffected hip for bone-density-scanning purposes. Half the target sample (n = 200) had been enrolled as of December 2008. A total of 911 hip-fracture patients had been screened, 517 (57%) were eligible (222 men, 295 women), and 105 men and 107 women consented to participate in the study. Twelve participants have withdrawn, leaving 100 men and 100 women enrolled in the study. Among the 200 participants in BHS-7, 129 (69%) had 2-month ActiGraphy data, and of those, 122 (95%) had complete 48 hr of data. The remaining 7 were incomplete because of problems with batteries in the ActiGraph. Among the 122 participants for which there were ActiGraphy data, 117 also had completed survey data. The 117 with complete activity data at the 2-month visit were included in this study.

Measures

In addition to demographic data, we obtained baseline height, weight, and comorbidities based on a modified Charlson scale using information from medical records (Charlson, Pompei, Ales, & MacKenzie, 1987). BMI was estimated for each participant as weight in kilograms divided by height in meters squared. Measurement of physical activity at 2 months post–hip fracture was based on the YPAS (Dipietro, Caspersen, Ostfeld, & Nadel, 1993) and 48 hr of ActiGraphy data (ActiGraph, 2004).

The YPAS

The YPAS is an interviewer-administered questionnaire that includes five categories of physical activity: housework, yard work, caretaking, exercise (moderate-intensity physical activity including such activities as brisk walking, biking, dance, etc.), and recreational activities performed during a typical week. The YPAS includes a wide range of lower intensity activities commonly performed by older adults. Participation in each activity (hr/week) is multiplied by an intensity code (kcal/min) and then summed over all activities to calculate a weekly energy-expenditure summary index. Prior use provided evidence of 2-week repeatability ($r = .63$, $p < .001$), and the YPAS has been validated against several physiological variables that are indicative of habitual activity (Dipietro et al., 1993; Pescatello, DiPietro, Fargo, Ostfeld, & Nadel, 1994) and against other physical activity surveys (Pescatello et al., 1994).

Resilience

Resilience is defined as the capacity to bounce or spring back from a physical, emotional, financial, or social challenge. It was measured using the 14-item Resilience Scale (Wagnild, 2009), which reflects five interrelated components that constitute resilience in older adults. Participants are asked to respond to each item by either agreeing or disagreeing with the statement on a scale of 1(*disagree*) to 7 (*agree*). The responses are summed, and a higher score reflects stronger resilience, with a possible range from 7 to 98. Prior use of this measure provided support for its internal consistency and construct validity (Wagnild, 2009).

The ActiGraph

The ActiGraph is a triaxial accelerometer that is 5.1 by 4.1 by 1.5 cm and weighs 42.4 g. The device measures magnitudes of acceleration and deceleration at rates of 0.05–2 g (i.e., the acceleration of gravity) with a frequency range of 0.25–2.5 Hz. Measures of activity are provided as counts, with one count being equivalent to 16 mg/s. Measurement was set over a predetermined 48-hr period for each participant. This time period was selected because it is known to be a tolerable period of time to wear the device and to provide reliable daily activity among older adults (Martin, Marler, Harker, Josephson, & Alessi, 2007). Unlike younger individuals, older adults do not vary with regard to type or amount of physical activity performed on weekdays or weekends, and there is little systematic variability resulting from specific day of the week (Rowe, Kemble, Robinson, & Mahjar, 2007). Using activity counts, the ActiGraph provides minute-by-minute and hourly reports of the amount of time the individual is engaged in moderate-intensity physical activity using the Freedson calculation (Freedson et al., 1998). Prior work provided evidence of reliability of the ActiGraph, with reliability being better at higher intensities of physical activity (Matthews, Ainsworth, Thompson, & Bassett, 2002). Validity of the ActiGraph was based on correlations with physical activity surveys (Grap, Borchers, Munro, Elswick, & Sessler, 2005; Jacobi et al., 2009; Pruitt et al., 2008; Warms & Belza, 2004), although correlations tend to be variable, with Pearson's correlations of .29–.70. The ActiGraph was worn for 48 hr, and data captured during that time frame were used in all analyses. None of the participants were actively engaged in rehabilitation at the time of testing.

Data Analysis

Descriptive analysis with regard to demographics and daily physical activity based on survey findings and ActiGraphy was performed using SPSS 17.0. ActiGraphy and physical activity survey findings were positively skewed, and resilience was negative skewed, and all were transformed to be normally distributed. The amount of time in moderate-intensity physical activity was described based on the Freedson calculation and recalculated using the Copeland and Esliger (2009) calculation. Bivariate Pearson's correlations were calculated to examine the relationship between survey findings (time spent in moderate-intensity and overall physical activity), ActiGraphy data (time spent in moderate-intensity physical activity based on the Freedson & Copeland and Esliger calculations), counts of activity, and number of steps taken. Finally, we used linear-regression analyses with a hierarchical block approach to test the relationship between demographic variables (age, race, gender, marital status, and education), descriptive variables (comorbidities and BMI), resilience on time spent in moderate and overall physical activity based on survey results and moderate-intensity physical activity, the Freedson and Copeland and Esliger calculations counts of physical activity, and number of steps taken based on ActiGraphy.

Results

The mean age of participants was 81.3 (*SD* = 7.9) years, 49% were male, 92% were White (92%), 42% were married, and on average they had 13.3 (*SD* = 3.2) years of education and 2.0 (*SD* = 1.7) comorbidities. The mean BMI was 25.7 kg/m ^{2} (*SD* = 5.2), with 52% of the sample being overweight or obese based on BMIs of >25 kg/m^2. Generally the sample was resilient, with a mean score of 84.8(*SD* = 10.4). Table 1 provides descriptive results of survey and ActiGraphy data. There were no differences among those who completed the YPAS and wore the ActiGraph with regard to age, gender, education, race, marital status, or BMI. Those who did not complete the YPAS or wear the ActiGraph had a greater number of comorbid conditions (2.9 vs. 2.1; $F = 5.1$, $p = .02$). This was controlled for in the regression analyses.

Survey results indicated that participants spent 2.9 hr/week (*SD* = 3.3) in moderate-intensity physical activity, or approximately 24.9 min daily, and expended 586.6 (*SD* = 72.0) kcal/ week. Participants spent 8.3 hr/week (*SD* = 9.6), or 1.2 hr or 70.4 min/day, in all types of physical activity and expended 1,561.4 kcal/week (*SD* = 1,914.4), or 223.3 kcal daily. ActiGraphy results indicated that participants engaged in 103,431 (*SD* = 1.1) counts of activity overall and spent 3.6 min/48 hr (*SD* = 8.9) in moderate-intensity physical activity (1.8 min/day) based on the Freedson calculation. When recalculated using the Copeland and Esliger calculation, the mean time increased to 25.1 min/48 hr (*SD* = 55.8), or 12.6 min of moderate-intensity physical activity daily. Based on ActiGraphy, study participants expended 143.5 kcal/48 hr (*SD* = 142.4), or 71.8 kcal/day, and completed 2,165 steps/48 hr (*SD* = 2,342), or 1,082 steps/day.

As shown in Table 2, there was not a statistically significant correlation between YPAS survey reports of time spent in moderate-intensity physical activity and moderate-intensity physical activity calculated from ActiGraphy data using the Freedson calculation ($r = .04$, $p = .70$) or the Copeland and Esliger calculation ($r = –.11$, $p = .32$). Survey-reported time spent in moderate-intensity physical activity was correlated with overall counts of physical activity ($r = .29$, $p = .01$) and number of steps based on ActiGraphy ($r = .36$, $p = .001$). There was a statistically significant correlation between time spent in all physical activity based on survey reports with moderate-intensity physical activity using the Copeland and Esliger calculation ($r = .30$, $p = .01$), counts of physical activity ($r = .51$, $p = .001$), and number of steps ($r = .59$, $p = .001$) based on ActiGraphy. Regression analyses (Table 3) showed that age was the only variable significantly associated with time spent in all physical activity and accounted for 10% of the variance. Specifically, as age increased there was a decrease in time spent in all physical activity. Age and number of comorbidities were associated with steps taken based on ActiGraphy. As age and number of comorbidities increased there was a decline in the number of steps taken over a 48-hr period. Together age and comorbidities accounted for 21% of the variance in steps taken. Race, education, gender, marital status, BMI, and resilience were not associated with any of the dependent variables.

Discussion

The findings from this study support prior studies suggesting that older adults post–hip fracture engage in very limited amounts of physical activity, particularly moderate-intensity physical activity (e.g., exercise; Resnick et al., 2007; Rodaro et al., 2004; Zidén et al., 2008). The level of physical activity engaged in by study participants at 2 months postfracture did not meet public health guidelines for physical activity with regard to time spent in moderate-intensity physical activity, amount of energy expended, or number of steps taken per day (American Heart Association & American College of Sports Medicine, 2007; U.S Department of Health and Human Services, 2008). The amount of activity reported or observed was less than that reported by community-dwelling older adults with degenerative joint disease (204,593 counts/day; Murphy et al., 2008), those at risk for disability (113,695.6 counts/day; Pruitt et al., 2008), those living in nursing homes (55,710–103,647 counts/day; Chin A Paw, Van Poppel, & Mechelen, 2006; Galik et al., 2008), and healthy community-dwelling older adults (113,696–237,425 counts/day; Janney et al., 2008; Pruitt et al., 2008).

Similarly, with the exception of residents in assisted living who only engaged in 0.36 min of moderate-intensity physical activity per day (Resnick, Galik, Gruber-Baldini, & Zimmerman, 2010), the participants in BHS-7 engaged in fewer minutes of moderate-intensity physical activity per day based on ActiGraphy than older adults in community or nursing-home settings. Specifically, based on the Freedson calculation, the BHS-7 sample spent only 1.8 min/day in moderate-intensity physical activity, whereas residents in nursing homes were noted to spend 32 min/day in moderate-intensity physical activity (sample included only those who could ambulate 6 m; Chin A Paw et al., 2006), healthy community-dwelling older adults engaged in 19 min/day of moderate-intensity physical activity (Janney et al., 2008), and community-dwelling older adults with arthritis engaged in 13 min/day of moderate-intensity physical activity (Gerdhem et al., 2008).

In contrast to ActiGraphy findings, the BHS-7 participants reported that they engaged in 24 min/day of moderate-intensity physical activity (e.g., brisk walking, biking). There was no significant correlation between this self-report of time spent in moderate-intensity physical activity calculated using the Freedson or Copeland and Esliger calculation. There was a significant correlation between survey reports of moderate-intensity physical activity and counts of activity and number of steps taken. It is possible that the moderate-intensity physical activity that participants reported involved resistance exercise or postrehabilitation lower extremity exercises done lying or sitting that were not picked up by the ActiGraph. Alternatively, it is possible that participants believed the activity they engaged in during the course of a usual day (e.g., walking to the bathroom, dining room, or to get the mail) was of moderate intensity. This is supported by the significant relationship between total time participants reported in all physical activity per the YPAS (housework, yard work, caretaking, exercise, and recreational activity) and ActiGraphy results using the Copeland and Esliger approach and the approaching-significance results using the more conservative Freedson calculation.

The correlations between all physical activity and ActiGraphy findings were actually higher in this study than reported in prior studies reporting verbal reports of physical activity and ActiGraphy results in older adults (Cust et al., 2008; Orsini et al., 2008; Resnick, Riebe, King, & Ory, 2008). In review of the minute-by-minute recordings from the ActiGraph, most activity was focused on times in which activities of daily living were likely occurring (e.g., early morning bathing and dressing, toileting during the middle of the night). Confirming this and developing lifestyle interventions may be an important way to increase activity among these individuals. Future research, therefore, should explore the actual activities being performed that coincide with the minute-by-minute ActiGraph recordings and expand the time spent in those activities.

The intent of this study was not to confirm the validity of the revised calculation for moderate-intensity physical activity established by Copeland and Esliger (2009). The relationship between survey report of moderate-intensity physical activity and ActiGraphy findings calculated using the Copeland and Esliger calculation (which approached significance, $p = .06$, vs. the Freedson, which was nonsignificant, $p = .70$) provided additional support to use this or alternative adjustments (Gerdhem et al., 2008; Pruitt et al., 2008) when describing moderate-intensity physical activity based on ActiGraph findings in older adults. Furthermore, the findings support prior work suggesting that choice of cut point for establishing moderate-intensity physical activity among older adults has a considerable impact on outcomes related to time spent in physical activity needed for health promotion among older adults (Ainsworth, 2009; Matthew, 2005; Pruitt et al., 2008).

Age and comorbidities were the only variables associated with physical activity findings. As would be expected, as individuals aged and had a greater number of comorbidities there was a decline in their overall physical activity. These findings are consistent with other studies of hip-fracture patients (Magaziner et al., 1990; Resnick et al., 2007; Resnick, Riebe, King, & Ory, 2008; Rodaro et al., 2004) and serve as a reminder that older patients post–hip fracture (i.e., those older than our mean age of 81) and those with multiple comorbidities may require additional attention to encourage physical activity.

Our findings did not support prior findings suggesting that those with higher BMIs would engage in fewer counts of physical activity (Benedetti et al., 2009; Li et al., 2010). Prior studies have suggested, for example, that older adults with elevated BMIs do not engage in physical activity because of gait changes that influence energy expenditure, making activity more difficult (Ko, Stenholm, & Ferrucci, 2010), or because of body-image-related challenges (Schmalz, 2010). Given the frailty associated with the hip-fracture experience, it is possible that weight, and the reserve of weight, may be beneficial to the recovery process. Ongoing research is needed to explore the impact of baseline BMI in the post-hip-fracture period in terms of optimizing physical activity and functional recovery.

Marital status, gender, education, and resilience were not significantly associated with physical activity among our participants. Other factors to consider in future research might be living location and situation (alone or with a caregiver), physical environment, self-efficacy and outcome expectations associated with activity, mood, cognitive status, pain, fear of falling, and lifelong physical activity.

Study Strengths and Limitations

This study was limited by the small sample size, single testing time point, and missing ActiGraphy and physical activity survey data, with noncompleters having more comorbidities than those for whom data were available. We anticipate that the sample reported on may have been healthier than all hip-fracture patients and thus may have been even more physically active. In addition, timing of ActiGraphy data collection and survey reports may not have coincided. Although there is evidence to suggest that 2 days of physical activity monitoring in healthy older adults living in the community is sufficient (Rowe et al., 2007), this may not be the case among older adults post–hip fracture. Aside from ActiGraphy data, information was based on recall and thus may be inaccurate. Despite these limitations, the findings do provide important information about the low level of physical activity being performed by older adults in the 2-month post-hip-fracture period. Given the importance of physical activity to recovery and prevention of future falls and fractures among these individuals, there is a critical need to establish appropriate interventions to decrease time in sedentary activity and increase the time these individuals engage in physical activity.

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Table 1

Descriptive Outcomes for Physical Activity Data

Variable	Range	*M*	*SD*
ActiGraphy data (min/48 hr)			
steps	0–13,846	2,165	2,342
moderate intensity (Freedson calculation)	0–96	3.6	9.0
activity counts	0–1,013,520	103,431	1.1
minutes of moderate intensity (Copeland & Esliger calculation)	0–580	25.1	55.8
Survey data			
total time (hr) in moderate-intensity physical activity/week	0–17.5	2.9	3.3
total time (hr) in physical activity/week	0–62.9	8.3	9.6

Table 2

Bivariate Pearson's Correlations Exploring Relationships Between Survey and Objective ActiGraphy Data

			ActiGraphy Time in Moderate-Intensity Activity	
	ActiGraphy counts	**ActiGraphy steps**	**Freedson**	**Copeland & Esliger**
Survey time in moderate-intensity activity	.29 (.01)	.36 (.001)	.04 (.70)	.11 (.32)
Survey time in all physical activity	.51 (.001)	.59 (.001)	.20 (.06)	.30 (.01)

Note. *p* value provided in the parentheses.

Table 3

Regression Analyses for Each Physical Activity Outcome

	Unstandardized Coefficients					
	B	*SE*	Beta	*t*	*p*	95% *CI* for *B*
ActiGraphy total counts of physical activity						
marital status	.048	.110	.055	0.435	.665	−.171 to .266
age	−.011	.006	−.197	−1.667	.100	−.023 to .002
gender	.006	.108	.007	0.055	.956	−.210 to .222
education	.003	.015	.020	0.180	.858	−.028 to .033
race	−.211	.190	−.126	−1.111	.270	−.589 to .167
comorbidities	−.044	.030	−.171	−1.465	.147	−.103 to .016
body-mass index	−.002	.010	−.018	−.153	.879	−.022 to .019
resilience	.009	.033	.031	0.269	.789	−.057 to .075
ActiGraphy moderate-intensity physical activity (Freedson)						
marital status	.061	.088	.088	0.689	.493	−.115 to .236
age	−.007	.005	−.172	−1.450	.151	−.018 to .003
gender	−.034	.087	−.049	−0.388	.699	−.207 to .140
education	.007	.012	.066	0.582	.562	−.017 to .031
race	−.177	.153	−.132	−1.156	.251	−.481 to .128
comorbidities	−.026	.024	−.129	−1.103	.274	−.074 to .021
body-mass index	−.003	.008	−.043	−0.375	.709	−.020 to .013
resilience	.011	.026	.049	0.423	.673	−.041 to .063
ActiGraphy number of steps						
marital status	−.046	.103	−.052	−0.448	.656	−.251 to .159
age	−.024	.006	−.442	−4.110	.000	−.036 to −.013
gender	.047	.102	.052	0.459	.648	−.156 to .249
education	−.002	.014	−.014	−0.139	.890	−.030 to .026
race	−.073	.176	−.043	−0.414	.680	−.423 to .278
comorbidities	−.067	.028	−.258	−2.416	.018	−.123 to −.012
body-mass index	−.004	.010	−.040	−0.377	.707	−.023 to .016
resilience	−.009	.031	−.031	−0.295	.769	−.071 to .053
ActiGraphy moderate-intensity physical activity (Copeland & Esliger)						
marital status	.017	.139	.015	0.119	.905	−.261 to .294
age	−.008	.008	−.122	−1.032	.305	−.025 to .008
gender	−.194	.138	−.178	−1.412	.162	−.469 to .080
education	.018	.019	.105	0.918	.362	−.021 to .056
race	−.362	.242	−.171	−1.499	.138	−.844 to .119
comorbidities	−.005	.038	−.016	−.135	.893	−.081 to .070
body-mass index	.008	.013	.067	0.580	.564	−.018 to .034

	Unstandardized Coefficients					
	B	***SE***	**Beta**	***t***	***p***	**95% *CI* for *B***
resilience	.018	.042	.049	0.426	.672	−.065 to .100
Survey total time in all physical activity						
marital status	−.075	.110	−.081	−0.687	.494	−.294 to .143
age	−.020	.006	−.353	−3.198	.002	−.033 to −.008
gender	−.031	.109	−.034	−0.287	.775	−.247 to .185
education	−.002	.015	−.015	−0.140	.889	−.033 to .028
race	.171	.191	.095	0.897	.372	−.209 to .551
comorbidities	−.067	.030	−.245	−2.243	.028	−.126 to −.007
body-mass index	.003	.010	.026	0.246	.806	−.018 to .023
resilience	−.006	.033	−.021	−0.194	.847	−.072 to .059
Survey total time in moderate-intensity physical activity						
marital status	−.021	.092	−.028	−0.230	.819	−.204 to .162
age	−.013	.005	−.277	−2.418	.018	−.024 to −.002
gender	.099	.091	.133	1.091	.279	−.082 to .280
education	−.008	.013	−.070	−0.638	.526	−.034 to .017
race	.116	.160	.080	0.729	.468	−.202 to .434
comorbidities	−.031	.025	−.141	−1.247	.216	−.081 to .019
body-mass index	.010	.009	.123	1.108	.272	−.008 to .027
resilience	−.019	.027	−.077	−0.692	.491	−.074 to .036