

ASSOCIATION OF LEISURE-TIME PHYSICAL ACTIVITY WITH PERCENT BODY FAT IN AFRICAN AMERICAN COLLEGE STUDENTS

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Physical activity, including leisure-time exercise, has many physiological and mental/emotional health benefits. At any age, active individuals have greater work capacities than their inactive peers (Nies, Vollman, & Cook, 1999). Inactivity has been associated with increased risk of obesity, cardiovascular diseases, various cancers, Type II diabetes, and other health problems (Haase, Steptoe, Sallis, & Wardle, 2004).

Young adulthood (ages 18-29), a common age for college attendance, is characterized by life changes such as school, work and other life events, and may result in reduced physical activity and increased weight gain (Racette, S.B., S.S. Deusinger, M.J. Strube, G.R. Highstein and R.H. Deusinger, 2005). Although one of the goals of Healthy People 2010 and recommendations of The Centers of Disease Control and Prevention and the American College of Sports Medicine is to increase the number of people who engage regularly in light to moderate activity for at least 30 minutes per day, most young adults do not meet this minimum goal (Huang, et al., 2003; Gordon-Larsen, Nelson, & Popkin, 2004). Haase, et al. (2004) indicated that between one fifth and one half of college students do not engage in leisure-time physical activity. Also, a decline in physical activity participation was observed in college students as well as a 10% decrease in moderate leisure-time physical activity even though the school environment presents an excellent opportunity to be physically active. Leisure-time physical activity in university students from 23 countries showed that physical activity was higher in males than in females and in those students with stronger health-benefit beliefs (Haase, 2004). Furthermore, physical activity declines started at an earlier age in females than in males. The reasons for this decline in physical activity in college age students can be explained by changes in priorities, increased demand on their time or environmental barriers (Leslie, Sparling, & Owen, 2001). In addition, there are other factors contributing to sedentary lifestyles, such as technology use and motorized transportation. Both male and female students also cited lower social support from family and friends and lower enjoyment of the activity as barriers. Males were motivated by weight gain, while females were motivated by weight loss and looking better.

African Americans are at increased risk for developing chronic and prevalent diseases which may result from lower levels of health promotion behaviors such as physical activity, healthy nutrition and maintaining a healthy body weight. Obesity is one of the major threats to health and welfare all over the world. Within the US population, African Americans are more vulnerable to obesity and weight-related diseases. Although unwanted weight gain can occur at any age, it commonly occurs between 18 and 34 years of age. Weight gain, lack of exercise and unhealthy eating patterns are the most common health behavior problems among college students, including African American students. National surveys suggest that African Americans are less likely to engage in regular physical activity compared with their Caucasian counterparts (Nies, et al., 1999; Young, Gittelsohn, Charleston, Felix-Aaron, & Appel, 2001). Although weight loss and stress reduction are mentioned as key facilitators of physical activity in African American women, common barriers mentioned included lack of time, health concerns, lack of motivation and social support, and concerns about access to facilities and personal safety.

In a study conducted with college students, researchers found that students with higher levels of physical activity had lower Body Mass Index (BMI) or body fat than overweight and obese students (Clement, J.M., C.A. Schmidt, L.W. Bernaix, N.K. Covington, & T.R. Carr, 2004). Decreases in activity with increasing BMI were more marked in women than in men. The amount of physical activity plays a role on body composition which is the relative proportion of fat and fat-free tissue in the body. Therefore, we aimed to assess leisure-time activities and body fat, and correlate the frequency and intensity of leisure-time activities to percent body fat in African-American college students in order to be able to promote healthy lifestyle behaviors early in college years.

Methods

The study was conducted among 128 students at a Southeastern Historically Black University (HBCU). Quota sampling was used to select students who were first enrolled in courses during the 2006-2007 academic year in order to randomize activity and body composition levels.

Researchers received approval from the University Institutional Review Board to contact classroom instructors who teach fitness activity courses, Concepts of Fitness & Health courses, and Freshmen Seminar courses. Members of the research team met one-on-one with each instructor of the aforementioned classes to explain the scope of the study, to provide a Research Study Synopsis, and to receive permission to discuss the study in one class during the first two weeks of the 2006 Fall

semester. After obtaining support from the instructor, the researchers visited the instructor's class for approximately 15 minutes to explain the scope of the project, to provide a Research Study Synopsis, and to answer questions. Researchers reinforced the fact that students' participation in the study was strictly voluntary and not connected to their grade in the class, and that any collected data will remain confidential and will be used for research purposes only. Subjects were then recruited by researchers through telephone calls.

Prior to participation, each subject signed an informed consent form that was approved by the University Institutional Review Board. To reduce the likelihood of skewed results, each subject also completed a Preliminary Screening Questionnaire in order to collect data from a homogenous group whose assessment results would not be influenced by unusual circumstances or factors outside the purview of the study. Subject eligibility requirements were limited to being African Americans and entering freshman who were attending college for the first time. They were excluded from participating in the study if one or more of the following situations existed: physical activity levels are influenced by factors outside the control of students (e.g., sports, disease, health conditions); or physical fitness indices are influenced by unusual health-related factors (e.g., pregnancy, disease, health conditions); or the student participates in more than one of the above-mentioned classes. Subjects were asked to report to the Exercise Science Laboratory on campus for data collection. Only one visit was necessary to collect all the required data and the entire process took approximately thirty minutes.

Leisure time activity levels were assessed using a modified version of the Godin Leisure-Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986) to decipher how many times on average the subject engages in three different intensities of exercise during a typical 7-day week. Strenuous exercise included inducing a rapid heart beat typically stemming from high-aerobic activities such as running, jogging, hockey, football, soccer, basketball, cross-country skiing, judo, roller skating, vigorous swimming and vigorous long distance bicycling. These were estimated to have metabolic equivalent (MET) values of 10 (<http://www.fpnotebook.com/SPO32.htm>). Moderate exercise was quantified as being "not exhausting" stemming from activities such as fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing and dancing (MET= 7). Finally, mild exercise included only "minimal effort" induced by such low level activity levels like yoga, archery, fishing, bowling, horseshoes, golf, snowmobiling and easy walking (MET 3.5). The total METs per week were summed for each subject.

Body fat percentage and body mass index were computed using the Bodystat 1500 bioelectrical impedance (BIA) analyzer. Waist circumference was measured using a flexible tape located one inch superior to the navel rounded to the nearest centimeter. Weight (lbs.) and height (in.) measurements were taken using a Physician's Detecto Scale.

The data were compared using independent samples t-tests and an ANOVA to evaluate statistical differences between and within groups. The statistical software package used was SPSS 15.0.

Results

As noted in Table 1, 33 males ($\bar{X}$ =19.3 years of age) and 95 females ($\bar{X}$ =19.1 years if age) completed the physical activity questionnaires and underwent the body composition assessment. The average weight of males was 162.5 lbs. and of females was 162.0 lbs. with no significant difference. The average height of males and females was 66.4 in. and 65.3 in., respectively. Body mass index and waist circumference were not statistically different between men and women (see Table 2); however, the average percent body fat was significantly lower ($p<0.001$) in males than in females (16.7% and 29.2% respectively).

Table 1: Age, height, and weight of both males and females (Mean $\pm$ SD)

	Males (n = 33)	Females (n = 95)
Age (years)	19.1 $\pm$ 0.35	19.3 $\pm$ 1.1
Height (inches)	66.4 $\pm$ 3.4	65.3 $\pm$ 3.3
Weight (pounds)	162.5 $\pm$ 41.0	162.0 $\pm$ 50.6

Table 2: Body composition comparison between genders (Mean $\pm$ SD).

	Males (n = 33)	Females (n = 95)	p
BMI (kg/m²)	27.9 $\pm$ 9.4	25.9 $\pm$ 5.6	0.133
BF (%)	16.7 $\pm$ 9.7	29.2 $\pm$ 7.9	<0.001*
Waist (cm)	74.7 $\pm$ 9.1	76.5 $\pm$ 14.4	0.500

* $p = .05$

Self-reported leisure-time activities levels were similar between genders (Table 3 and Figure 1). One notable difference was the significantly higher frequency of mild physical activity bouts per week amongst males ($p=0.022$). Despite this difference, the total METS calculated per week did not differ

Table 3: Self-reported activity levels; frequency and calculated METS per week. (Mean $\pm$ SD).

	Total n = 128)	Male (n = 33)	Female (n = 95)	p
Strenuous (5-7 days)	1.96 $\pm$ 1.94	1.7 $\pm$ 1.6	2.0 $\pm$ 2.0	0.417
Moderate (3-5 days)	2.38 $\pm$ 2.09	2.5 $\pm$ 2.0	2.3 $\pm$ 2.1	0.718
Mild (< 3 days)	2.73 $\pm$ 2.64	3.7 $\pm$ 2.9	2.4 $\pm$ 2.5	0.022*
METweek	47.9 $\pm$ 29.3	52.5 $\pm$ 30.0	46.4 $\pm$ 29.1	0.321

* $p = .05$

between men and women. Combining data for both men

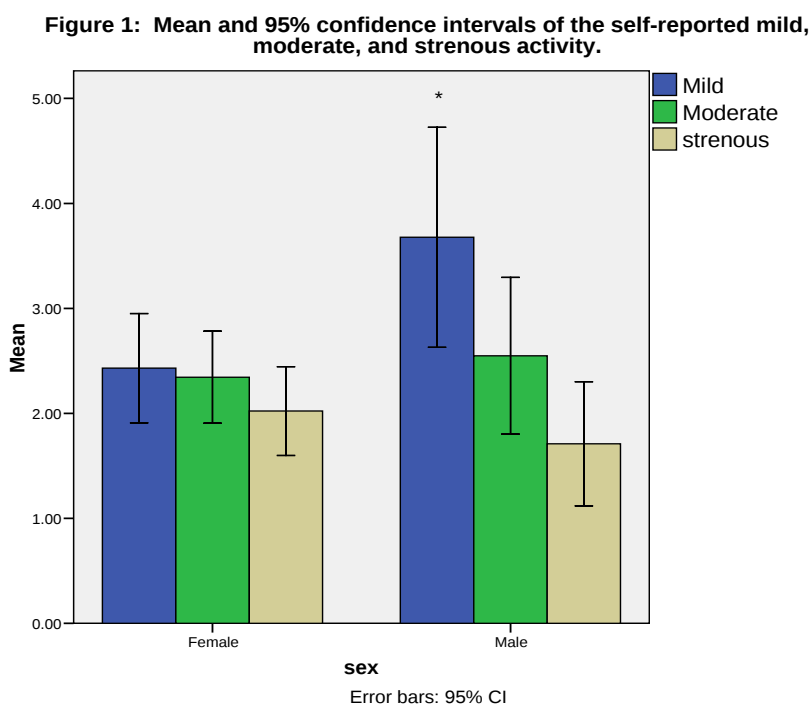
and women on a scatter plot, researchers found no relationship between percent body fat and the total METs per week (Figure 2). These findings were repeated when females were plotted alone (Figure 3). Furthermore, despite the finding that males had significantly less body fat and significantly more mild activity sessions, we found no relationship between METs and percent body fat (Figure 4). The investigators also found no significant relationship between the total self-reported physical activity and percent body fat.

Discussion

Notably was the poor relationship between self-reported physical activity and percent body fat. One possible reason for this lack of relationship is the nature of self-reported physical activity. Individuals may perceive to undergo higher levels of physical exertion when actual caloric expenditure may be low. For example, a male with a percent body fat greater than 50% reported one of the higher levels

of physical activity amongst all subjects (Figure 4). This was also seen with several female subjects (Figure 3). It is possible that those with greater percentages of body fat may perceive their activities to be more strenuous than their more average peers.

The lack of relationship between self-reported physical activity and body composition may be due to the lack of strenuous activity as defined by Godin. More specifically, the Godin Leisure-Time activity survey defines “strenuous” as 15 minutes of “heart beating rapidly.” Those in the physically active community would argue that this definition is considered “traditional”, not “strenuous” exercise. Nevertheless, the subjects of this study reported this level of activity only twice per week. The American College of Sports Medicine recommends three to five, 30-minute sessions per week for physical health. This recommendation is two to three times greater than the average “strenuous”



frequency amongst the subjects in this study. In conclusion, this group failed to meet the baseline requirements recommended for physical health and thus was not active enough to show a relationship between activity and body composition.

Given the fact that researchers collected data at only one university, findings from this study cannot be generalized to African American students at other universities. Future data analyses will include comparisons of pre- and post-test measurements. Moreover, post-test data were collected from students at the end of their freshmen year. Data analyses will also be conducted by group membership – i.e., physical activity class, health class, and freshmen seminar class.

Figure 2: Relationship between self-reported activity level and % fat both genders.

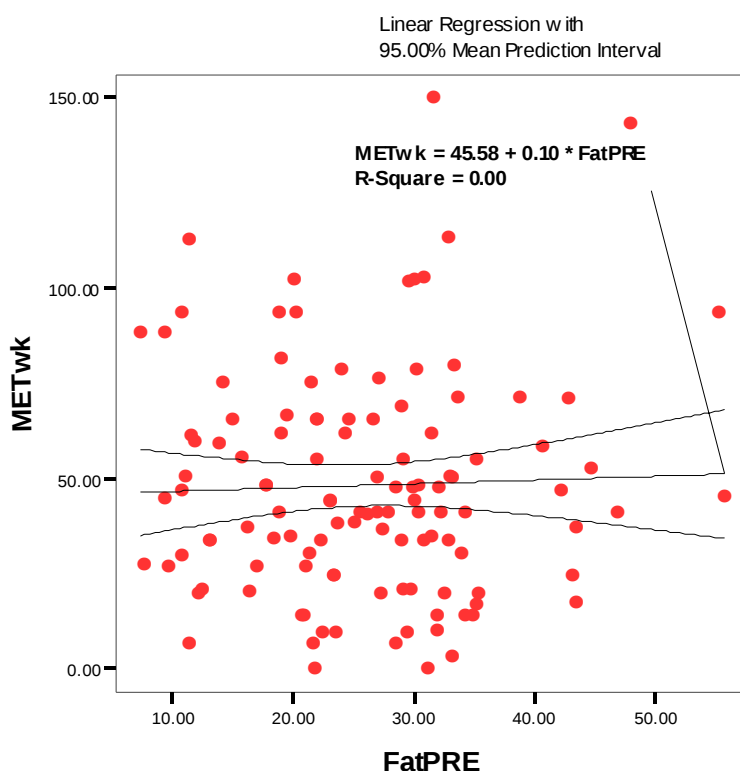


Figure 3: Relationship between self-reported activity level and % fat (Females).

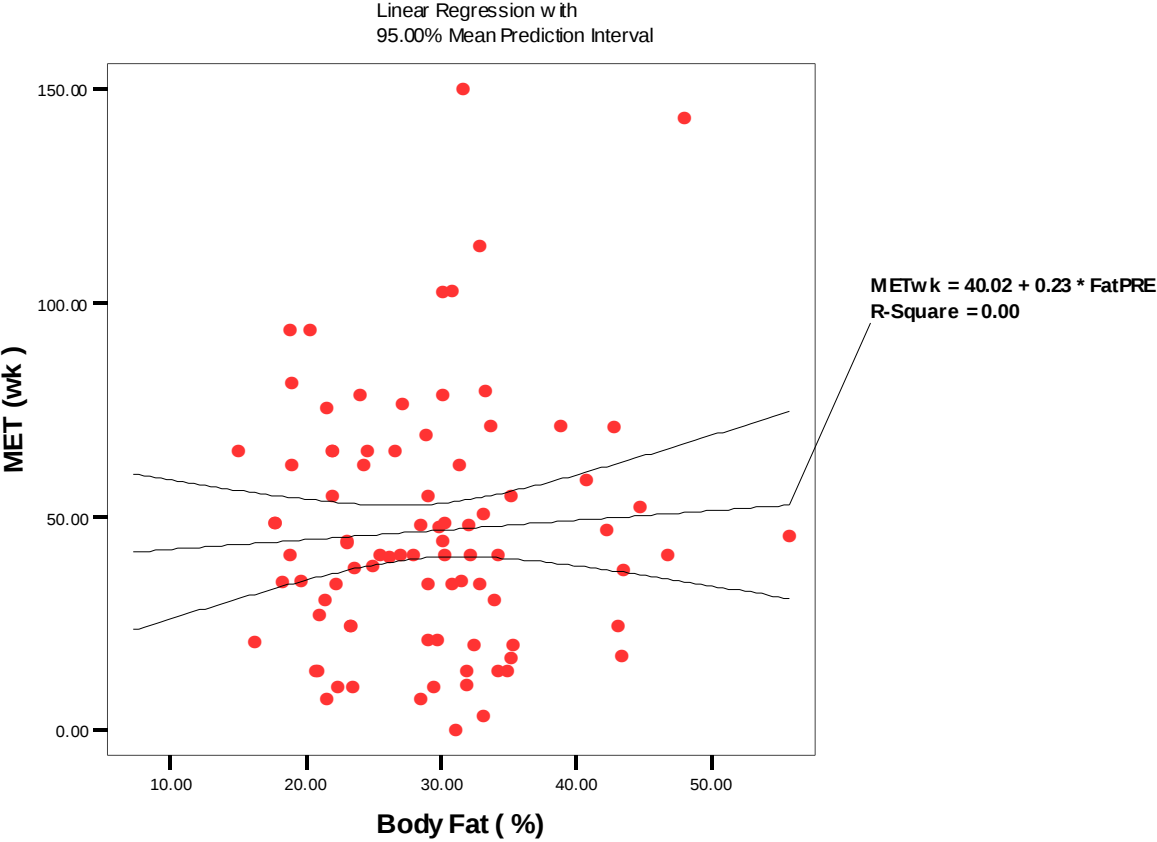
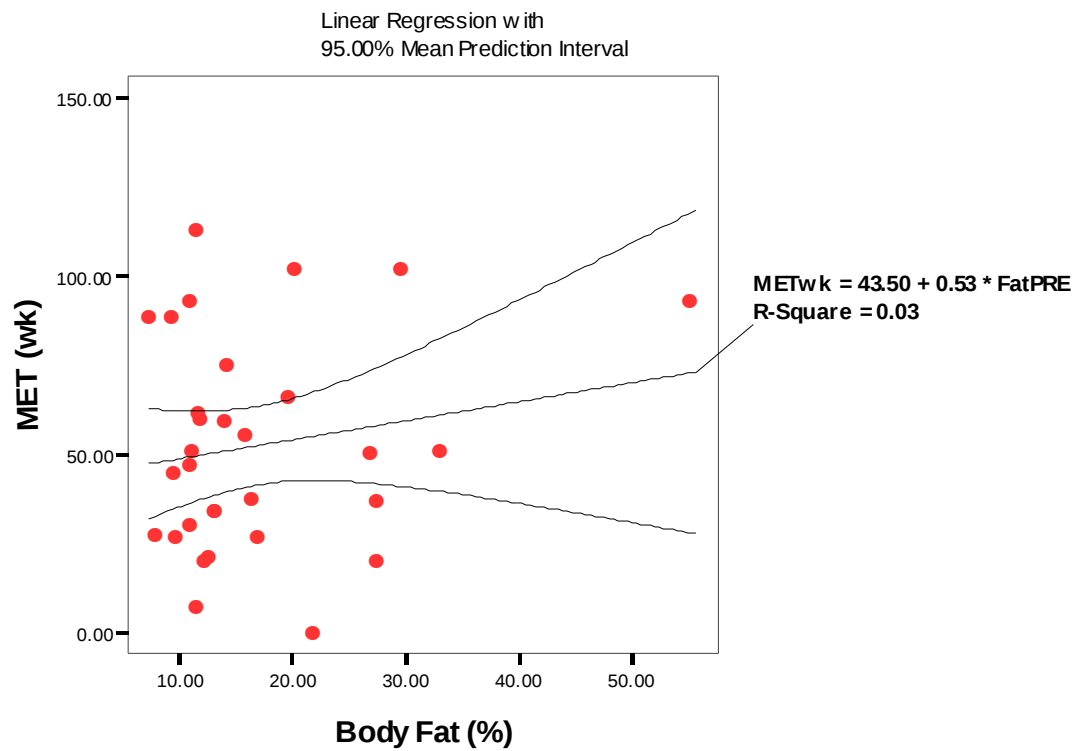


Figure 4: Relationship between self-reported activity level and % fat (males).



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