TACSM Abstract

Sex Impacts Regression Models Predicting Upper-Body Muscular Endurance

MACDONELL CHRISTINA[1], FUKUSHIMA TAKASHI[2], HULDIN FRANCES[2], MORGAN GRANT[3], STAMATIS ANDREAS[2], and PAPADAKIS ZACHARIAS[1]

Human Performance Laboratory, Sport and Exercise Sciences, Barry University, Miami Shores, FL[1]; Sport and Wellness, SUNY, Plattsburgh, NY[2]; Baylor University, Waco, TX[3]

Category: Masters

Advisor / Mentor: Papadakis, Zacharias (zpapadakis@barry.edu)

ABSTRACT

According to Centers for Disease Control and Prevention (CDC) data and the well-established overall benefits of physical activity (PA), only one out of three adults meet the American College of Sports Medicine (ACSM) muscle strengthening guidelines in the US. PA and obesity levels, cardiovascular endurance, psychological factors, and sex disparities have been suggested as possible predictors of this statistic. Minimum levels of muscular endurance are required to perform activities of daily living (ADL), maintain functional independence during aging, and to participate in leisure and PA without undue fatigue or risk of injury. Upper-body muscular endurance is commonly measured directly using the push-up test. Males are more likely than females to meet the muscle-strengthening physical activity guidelines. Regression analysis is often used in exercise prescription in an effort to provide answers to a phenomenon and make predictions of future behavior. **PURPOSE**: To examine whether a prediction model for upper-body muscular endurance using predicted *oxygen consumption* (VO_2max), *physical activity* (PA) level, age, *body mass index* (BMI) and *mental toughness index* (MTI) scores during a push-up endurance test is subjected to sex. **METHODS**: In total, 162 participants agreed to participate (M_{age}= 23, SD=5.7). A calibrated Monark 828E cycle ergometer, an electronic HR monitor with a chest strap were used for the VO2max test prediction based on the heart rate termination. A standardized push-up test was chosen to measure muscular endurance. BMI was calculated based on height and body weight. PA and all of the aforementioned assessments were collected and calculated according to ACSM 10th ed. guidelines. The statistical analysis involved a multiple regression of the variables described above using R and p level was set at 0.05. **RESULTS**: The regression model for females was: y=.7+.04*x; $F_{5,47}$=5.6, p=.00, R^2=.373 and for males was: y=.73+.02*x; $F_{5,78}$=1.9, p=.11, R^2=.108. Comparing the regression models factored for sex revealed significant difference between males and females: $x^2(15)$= 38.67, p=.00072. **CONCLUSION**: Muscular endurance is associated with improvements in cardiovascular and respiratory function, reduction in cardiovascular risk factors, decreased morbidity and mortality, and other benefits, such as decreased anxiety and enhanced performance. Our prediction model for upper-body muscular endurance was significantly different based on sex. Health care professionals may need to consider sex when using models for prescribing exercise to increase North Americans' upper-body muscular endurance. Future studies on muscular endurance should focus on creating models examining the contribution of other factors in order to investigate the unexplained variance of our modeling. However, the authors believe that sex needs to be investigated further in any future regression modeling. Limitations may include self-reported data of physical activity and mental toughness scores.