

Gender Difference in the Relationship of Fatigue Index, Anaerobic Power and Capacity to Body Composition and Bone Mineral Status in Non-Athletes

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ABSTRACT

The fatigue index is considered an important indicator of anaerobic fitness. The lower the fatigue index, the greater the ability of the body to maintain its power output through an anaerobic performance. The Wingate test is widely used by coaches, athletes, and researchers to measure lower body power, anaerobic capacity, and fatigue index. Body composition is considered an important component of anaerobic fitness, it is not clear how gender may influence the relationship between body composition and anaerobic fitness. **PURPOSE:** The purpose of this study was to understand how gender may impact the relationship between body composition and anaerobic fitness in a non-athlete population. **METHODS:** Fourteen non-athletes (M=7/F=7, age 27.31 ± 6.8 years; BMI 25.5 ± 5.4 kg/m²) volunteered to participate in this study. Peak power, anaerobic capacity, and fatigue index were assessed by the Wingate test. Following a three-minute warm-up, the participant began to pedal as fast as possible for fifteen seconds without any resistance, then a calculated resistance of $0.092 \text{ kg} \times \text{kg}^{-1}$ body mass for males and $0.075 \text{ kg} \times \text{kg}^{-1}$ body mass for females were applied to the flywheel and the participant continued to pedal for the duration of the test (30s). Body composition including bone mineral density (BMD) and bone mineral content (BMC) was assessed by dual-energy x-ray absorptiometry (DXA). General characteristics of the participants were presented as means and standard deviation (SD). Unpaired t-test was used for statistical comparison between the female and male groups. Pearson correlation coefficients were used to express the relationships between anaerobic test parameters and body composition parameters. **RESULTS:** Body weight and body mass index (BMI) were not significantly different between females and males ($p=0.73$ and $p=0.94$ respectively). Fatigue index positively correlated with BMI ($r=0.89$, $p=0.02$) and negatively correlated with percent lean mass ($r=-0.86$, $p=0.03$) and bone mineral content (BMC, %) ($r=-0.84$, $p=0.04$) in females whereas no correlation between fatigue index and body composition parameters was found in males. Peak power was significantly correlated with BMI ($r=0.83$, $p=0.04$) and BMD ($r=0.93$, $p=0.01$) in females but not in males. Likewise, Anaerobic capacity was also significantly correlated to BMI ($r=0.94$, $p=0.01$) and BMD ($r=0.86$, $p=0.03$) in females. But not in males. **CONCLUSION:** Anaerobic fitness parameters are associated with BMI and BMC in females but not in males. Our study suggested body composition components could be a reliable predictor of the ability to maintain anaerobic power in females and it could be an indicator of anaerobic performance in this population.