students have a higher prevalence of mental health disorders like anxiety and depression, and university athletes may be even more susceptible.
Objectives: This study aimed to analyze the relationship between biopsychosocial factors and functional performance in university handball athletes.
Methods: Participants included male and female university handball players aged 18 to 40 years, with at least one year of training. A cross-sectional analytical design was used, consisting of two assessment phases. Initially, a semi-structured questionnaire incorporating validated instruments evaluated biopsychosocial aspects (Disabilities of the Arm, Shoulder, and Hand; Athlete's Quality of Life Questionnaire; Athlete Burnout Questionnaire - ABQ; Perceived Motivational Climate in Sport Questionnaire-2; and Competitive Trait Anxiety Scale). Functional performance was assessed using the Seated Medicine Ball Throw (MBT) and Unilateral Seated Shot-Put Test (USSPT), followed by isokinetic strength assessment of shoulder rotators, elbow flexors and extensors, and wrist muscles using the BIODEX Multi-Joint System 4. Grip strength was measured with the Lafayette hydraulic dynamometer. In the second phase, 7-meter throw performance was evaluated. Correlation tests were applied according to data distribution ($p = 0.05$).
Results: A total of 36 university handball athletes were assessed. Strong positive correlations were found between biomechanical variables and performance in the MBT ($r = 0.7$, $p = 0.01$) and USSPT ($r = 0.7$, $p = 0.01$). Mean throwing velocity showed a strong correlation ($r = 0.7$, $p = 0.01$) with concentric strength of external shoulder rotators and a moderate correlation ($r = 0.4$, $p = 0.01$) with other biomechanical variables. The Physical/Emotional Exhaustion domain of the ABQ showed a moderate correlation ($r = 0.4$, $p = 0.01$) with MBT, a moderate correlation ($r = 0.7$, $p = 0.05$) with USSPT, and a weak correlation ($r = 0.2$, $p = 0.05$) with mean 7-meter throw velocity. The Reduced Personal Accomplishment domain showed a moderate negative correlation ($r = -0.4$, $p = 0.01$) with both performance tests. No significant correlation was found between target accuracy and any biomechanical or psychosocial variable.
Conclusion: Biomechanical variables were correlated with performance. Psychosocial factors had a low association with sports performance, with burnout symptoms showing only a low to moderate impact. Further studies with larger samples are needed to better understand the biopsychosocial dynamics of Brazilian university handball athletes.
Implications: This study demonstrated that biomechanical variables have a strong correlation with throwing performance, reinforcing the importance of strength and power training for university handball athletes. Psychosocial factors, particularly burnout symptoms, showed moderate correlations with performance, suggesting that emotional exhaustion may impact sports performance.
Keywords: Handball, university, performance, function, muscle strength

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ASSOCIATIONS BETWEEN PERFORMANCE IN THE FREQUENCY SPEED KICK TEST, HEART RATE VARIABILITY, AND BODY COMPOSITION IN AMATEUR MUAY THAI FIGHTERS

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Background: In martial arts, heart rate variability (HRV) measurements can be used to assess injury risk and susceptibility to fatigue. In Muay Thai, the frequency speed of kick test (FSKT) is used to measure kick speed, which may be influenced by autonomic modulation.
Objectives: We aimed to evaluate the correlations between FSKT, HRV, and body composition measures in amateur Muay Thai fighters.
Methods: This is a cross-sectional study with 37 Muay Thai fighters. They underwent FSKT-10 and multiple FSKT to measure the kick fatigue index (KFI). In addition, body composition was assessed using bioimpedance analysis and HRV using a heart rate monitor before and during the FSKT-10s. Inferential analysis consisted of the following methods: (1) the variation between the two moments (before and during the FSKT) was evaluated using the Wilcoxon signed rank test, and (2) correlations between the FSKT-10s or KFI derived from the FSKT-mult and all other variables were evaluated using Spearman's coefficient.
Results: The mean age was 27.9 ± 7.7 years, and all participants were male. Based on body mass index (BMI), 15 (44%) were eutrophic, 12 (35%) were overweight and 7 (21%) were obese. The median number of kicks in the FSKT-10 and the KFI were 20 (17—26) and 20 (14—29) %, respectively. When comparing the values before and during the FSKT-10s, there was a decrease in the percentage of interval differences of consecutive successive NN intervals greater than 50 ms (pNN50), approximate entropy, and parasympathetic nervous system (PNS) index, with an increase in the sympathetic nervous system (SNS) index. The number of kicks assessed in the FSKT-10s correlated positively with fat-free mass (FFM) and low frequency range (LF). The KFI correlated negatively with the FFM and PNS index, and positively with the LF and SNS index.
Conclusion: When amateur Muay Thai fighters perform the FSKT-10s, there is an acute effect on autonomic modulation with increased sympathetic activation, vagal withdrawal, and decreased system complexity. There are relationships between FFM and sympathetic activation with performance and susceptibility to fatigue.
Implications: The ability to generate force in the lower limbs with the least amount of fatigue is critical to the success of many sporting events, including amateur Muay Thai fights. In this sense, we used the FSKT-10s technique and its multiple version, as they are among the most used techniques during an official competition. Thus, the results of this study can be used by coaches as guidelines for developing strength and conditioning programs for their Muay Thai athletes in preparation for martial arts competitions.
Keywords: Exercise, Autonomic nervous system, Body composition

Conflict of interest: The authors declare no conflict of interest.
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