

## **The Association between Sleep Efficiency and Physical Performance in Taekwondo Competitors: An Individual Analysis**

PEDRO CARAZO-VARGAS and JOSE MONCADA-JIMENEZ

Human Movement Sciences Research Center; University of Costa Rica; San José, Costa Rica

---

*Category: Doctoral*

*Advisor: Moncada-Jiménez, José (jose.moncada@ucr.ac.cr)*

### **ABSTRACT**

**PURPOSE:** To individually assess the association between sleep efficiency and physical performance in college Taekwondo competitors. **METHODS:** Twelve volunteers (8 men and 4 women) completed a 13-week macrocycle consisting of loading (10 weeks) and tapering (3 weeks) phases. Participants were matched by gender following the loading phase and randomly assigned to either a condition in which they kept the same training volume or a condition where the training volume was reduced by 50%. Sleep efficiency was measured with accelerometry the night before physical testing, and kicking motion time and kicking time response were measured with the "Fitlight Trainer" system. Knee extension force was measured with a dynamometer and a force plate was used to measure squat jump (SJ), counter movement jump (CMJ), countermovement jump with arms (ACMJ) and drop jump (DJ). All dependent variables were recorded 8 times during the training macrocycle; at the beginning of the training macrocycle, at the highest training load following the first mesocycle, and the last 6 measurements were recorded during the last three weeks of the tapering phase. Pearson correlation analysis was computed to detect significant associations between sleep efficiency and physical performance. **RESULTS:** Significant correlations were obtained among those who reduced their training volume by 50%, where one participant increased CMJ performance ( $r = 0.78$ ,  $p = 0.04$ ) and other improved kicking time response ( $r = -0.69$ ,  $p = 0.04$ ) when sleep efficiency was enhanced, while other impaired DJ ( $r = -0.91$ ,  $p = 0.01$ ) and kicking motion time ( $r = 0.91$ ,  $p = 0.01$ ) when sleep efficiency was diminished. Among those who did not reduce their training volume, one participant improved SJ performance ( $r = 0.83$ ,  $p = 0.01$ ), ACMJ ( $r = 0.73$ ,  $p = 0.04$ ) and DJ ( $r = 0.74$ ,  $p = 0.04$ ) when sleep efficiency was enhanced. For the rest of participants no significant correlations were found between sleep efficiency and physical performance variables. **CONCLUSIONS:** For some competitors, sleep efficiency is closely related to physical performance, while for others it is not. Coaches need to monitor sleep quality of their athletes to optimize performance. Experimental studies are needed to determine the causality of these associations.