TACSM Abstract

Fitness Tracker Comparison of Energy Expenditure in a Healthy Population vs. Type 2 Diabetics

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ABSTRACT

Many are using wearable fitness trackers to assess energy expenditure (EE). Fitness trackers have been demonstrated to overestimate EE. Few studies have investigated EE tracking in the diabetic population. **PURPOSE**: To compare energy expenditure estimation for two fitness trackers and a gold-standard in a type 2 diabetic (T2DM) versus a healthy (H) population. **METHODS**: 24 participants (10 T2DM; 14 H) were recruited and met inclusion criteria. At initial visit, subjects completed treadmill walking while connected to a metabolic cart (gold-standard) with continuous monitoring via face mask and 2 activity trackers standardized in place one on each wrist. Participants walked on a treadmill for two phases: Phase A consisted of a warm-up followed by 10 minutes data collection at a self-selected walking pace (SSWP). Phase B included 10 minutes walking at 40-60% heart rate reserve. Total energy expenditure (EE) was collected from each device during the 10-minute data collection periods. Baseline descriptive data and Pearson correlation were determined. Mann-Whitney U test was performed to compare EE from the gold-standard in both groups for phase A and B. Friedman's followed by Wilcoxon post hoc tests along with Bland-Altman analyses were utilized to explore EE measurements in all devices for groups in phase A and B. **RESULTS**: Results from the gold standard indicated no difference in EE between T2DM and H in phase A or B. (Phase A: T2DM=50.2+/- 10.5 Kcal, H=47.0+/-11.8 Kcal; Phase B: T2DM=74.0+/-20.5 Kcal vs. H=79.9+/-22.6 Kcal). In exploratory comparisons, T2DM and H both demonstrated no significant difference in EE between tracker 1 and 2 (76.21+/-27.3 Kcal vs. 79.4+/-20.5 Kcal) while both trackers showed a significant difference compared to the gold-standard (48.3+/-11.1 Kcal) in phase A. For phase B, all devices were significantly different (Tracker 1: 113.25+/-32.1 Kcal; Tracker 2: 95.1+/-22.12 Kcal; Gold-standard: 77.45+/-21.5 Kcal). **CONCLUSION**: TD2M demonstrated no difference in EE versus healthy individuals during a SSWP or walking at a moderate intensity. Based on exploratory analyses, more variance between groups was noted utilizing activity trackers. Additionally, the trackers demonstrate a tendency to overestimate EE in both groups despite standardization of placement and intensity of walking. Health care professionals should use this knowledge in recommendations during exercise prescription.