Cardiac rehabilitation and physical activity levels in heart failure

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Abstract

Background

Physical activity (PA) is recommended as a key target in cardiac rehabilitation (CR) and lifestyle recommendations for people with heart failure (HF), with evidence supporting PA having associations with exercise capacity and prognosis. Increasingly, clinical trials are relying on accelerometers to objectively measure PA, however there is yet to be consensus on the most appropriate way to convert raw acceleration data into behaviourally relevant metrics (e.g. moderate-to-vigorous PA (MVPA) minutes), particularly in chronic disease populations.

Aim

To contribute to the further knowledge and understanding of PA in people with HF, and how exercise-based cardiac rehabilitation can impact this.

Methods

A systematic review was conducted to assess the evidence as to whether participation in exercise-based CR increases PA levels of cardiac patients, including HF. An accelerometer calibration study was undertaken to develop HF specific accelerometer intensity thresholds for inactivity and MVPA. HF specific accelerometer intensity thresholds were applied to baseline and follow up trial data of a home-based CR intervention, to examine how these impact estimations of time spent in MVPA compared to previously published thresholds based on healthy adults. Univariate and multivariable regression analysis was performed to determine which patient sociodemographic, exercise capacity, and health status factors are related to both baseline PA levels, and with a change in PA after home-based CR intervention.

Results

The systematic review included 40 RCTs (6480 patients: 5825 CHD, 655 HF) were included with 26% PA results showing a statistically significant improvement in PA levels with CR compared with control. Accelerometer values corresponding with intensity thresholds for inactivity (<1.5METs) and MVPA (≥3.0METs) were >50% lower than previously published intensity thresholds for both wrists and waist accelerometers. Application of HF specific accelerometer thresholds resulted in significantly higher absolute PA values, but no difference was found between intervention effects with the two threshold methods. Multivariable analysis identified factors which are strongly associated with baseline PA level, and with a change in PA with home-based CR intervention.

Conclusions

Moderate evidence was found of an improvement in PA with exercise based CR, however limitations in PA measurement methods were identified. HF specific accelerometer intensity thresholds were substantially lower than previously published thresholds based on healthy adults, suggesting that PA may be misclassified in HF patients. Factors associated with baseline PA and change in PA may be important to identify CR intervention features or subgroups of patients for whom most improvement in PA may be expected.