

Feasibility and acceptability of high intensity interval training and moderate intensity continuous training in renal transplant recipients: The PACE-KD study

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Introduction: Cardiovascular disease (CVD) is a major cause of morbidity and mortality in renal transplant recipients (RTRs)(1). General CVD risk scores underestimate the risk in RTRs who also exhibit elevated inflammation and impaired immune function. Exercise has a positive impact on these unique factors in patients with chronic kidney disease (2) but there is limited rigorous research in RTRs, particularly surrounding the feasibility and acceptability of high intensity interval training (HIIT) versus moderate intensity continuous training (MICT).

Method: 24 RTRs (eGFR 55 ml/min/1.73 m² [26-90]; age 48 years [27-76]) were randomised to: HIITA (n=8; 4, 2 and 1 min intervals; 80-90% of watts at peak oxygen uptake ($\dot{V}O_2$ peak)), HIITB (n=8, 4x4 min intervals; 80-90% $\dot{V}O_2$ peak) or MICT (n=8, ~35.5 min; 50-60% $\dot{V}O_2$ peak) for 24 supervised sessions on a stationary bike (approx. 3x/week over 8 weeks). Assessments were completed at baseline, mid-training, and immediate and 3 months post-training (3). Specific criteria for progressing to a larger efficacy trial were co-produced between researchers, clinicians, and patients (Table 1) using a condensed version of a previously reported method (4).

Results: There is a population of 400-420 RTRs registered with University Hospitals of Leicester NHS Trust's outpatient clinics. There were 111 eligible participants following screening of 185 RTRs (60%), 26 of whom were recruited (23%).

Twenty participants completed the intervention, 8 of whom reached the required intensity (HIIT A, 0/6 [0%]; HIITB, 3/8 [38%]; MICT, 5/6 [83%]). Although participants completed 92% (average) of the 24 sessions, there were 105 cancelled/rearranged sessions (illness 68, other commitments 33, investigator illness 4) and an average duration of 10 weeks to complete the intervention. Outcome completion was 'green' for $\dot{V}O_2$ and physical function and 'amber' for survey pack completion. Fifteen participants completed the 3 month follow-up visit (5 were lost to follow-up).

Discussion: This is the first study to report the feasibility of HIIT in RTRs. Although fewer RTRs met the required intensity for the HIIT protocols than MICT, there were no serious adverse events reported. There were a large number of sessions cancelled due to illness which could be attributed to the immunosuppressed state of these participants. We would recommend further exploration into the feasibility of different HIIT protocols potentially with shorter intervals and less intense recovery periods in order to facilitate the achievement of the required intensity.