

**Is high-intensity interval cycling feasible and more beneficial than continuous cycling for knee osteoarthritic patients: Results of a randomised control feasibility trial?**

**From Justin W Keogh, Josephine Grigg, Christopher J Vertullo**

**GENERAL COMMENTS:** I found this as an interesting work from the authors have a good rationale, and a good structure. However, in order to be more clear, I consider that the author must improve the 'clarity' of the findings consider So clear the: AIMS, RESULTS obtained and to make also a more shorted and clear conclusion. I am positive with this study, and I consider that can be candidate for publication after these improvements.

**Background.** Knee osteoarthritis (OA) patients often suffer joint pain and stiffness, which contributes to negative changes in body composition, strength, physical performance (function), physical activity and health-related quality of life. To reduce these symptoms and side effects of knee OA, moderate intensity continuous cycling (MICT) is often recommended. While resistance training is considered the optimal form of training to improve sarcopenic outcomes, it imposes higher joint loads and requires supervision, either initially or continuously by trained exercise professionals. Therefore, this pilot study sought to gain some insight into the feasibility and potential benefits of high intensity interval training (HIIT) cycling as an alternative exercise option to MICT cycling for individuals with knee OA.

**REVIEWER:** Why resistant training implies higher joint load? As far as I concern, when osteoarthritis patients have been involved in resistant training programs, patients could joint loads of low to moderate intensity. Please to avoid the work high, or simply explain in the INTRODUCTION section why high-intensity resistant training was used.

**REVIEWER:** Are there some more specifics words in order to clarify more the aims? For example..to compare....Why not to compare no more than... quality of life, physical function and body composition?

**Methods.** Twenty-seven middle-aged and older adults with knee OA were randomly allocated to either MICT or HIIT, with both programs involving 4 unsupervised home-based cycling sessions (~25 minutes per session) each week for 8 weeks. Feasibility was assessed by enrolment rate, withdrawal rate, exercise adherence and number of adverse effects. Efficacy was assessed by

health-related quality of life (WOMAC and Lequesne index), physical function (Timed Up-and-go (TUG), Sit-to-stand (STS) and preferred gait speed) and body composition (body mass, BMI, body fat percentage and muscle mass).

**REVIEWER:** Are there statistical analysis for both middle-aged and older adults? Depending on the baseline parameters, there can be different threshold of adaptability in cycling 'watts' load for both populations.

**Results.** Twenty-seven of the interested 50 potential participants (54%) enrolled in the study, with 17 of the 27 participants completing the trial (withdrawal rate of 37%); with the primary withdrawal reasons being unrelated injuries or illness or family related issues. Of the 17 participants who completed the trial, exercise adherence was very high (HIIT 94%; MICT 88%). While only three individuals (one in the MICT and two in the HIIT group) reported adverse events, a total of 28 adverse events were reported, with 24 of these attributed to one HIIT participant. Pre-post test analyses indicated both groups significantly improved their WOMAC scores, with the HIIT group also significantly improving in the TUG and STS. The only significant between-group difference was observed in the TUG, whereby the HIIT group improved significantly more than the MICT group. No significant changes were observed in the Lequesne index, gait speed or body composition for either group.

**REVIEWER:** There is an important amount of information related to the adherence. This can be avoided and simply declared in the methods section. In results, preferently to include more information regarding with the aims and results.

**Discussion.** An unsupervised home-based HIIT cycle program appears somewhat feasible for middle aged and older adults with knee OA and may produce similar improvements in health-related quality of life but greater improvements in physical function than MICT. These results need to be confirmed in larger randomised controlled trials to better elucidate the potential for HIIT to improve outcomes for those with knee OA. Additional research needs to identify and modify the potential barriers affecting the initiation and adherence to home-based HIIT cycling exercise programs by individuals with knee OA.

**REVIEWER:** I strongly recommend to conclude in order to the aims of the study. Why not to consider conclude according with the HIIT vs MICT in order to quality of life, physical function and body composition?

## **INTRODUCTION**

**Line 67:** to clarify sedentary...as how many hours? May be the author can add the word “highly sedentary (more than xx hours of sedentary behaviour”) following the authors.

**Line 95:** There is a more minimum time of HIIT work (~8 s, and until 60 s) that are more used Please to see (Boutcher et al, and Gibala et al).

**Line 92 to 93:** “...*We propose that the utilisation of high intensity interval training (HIIT) may be an exercise approach that simultaneously improves sarcopenic and cardiovascular outcomes in the OA patients...*”. There is previous HIIT literature that have reported that HIIT can be useful improving the muscle mass and cardiovascular outcomes. (Alvarez, Ramirez-Campillo et al. 2017), where the 1RM in leg-extension exercise was increased.

**Line 97 to 100:** Please to link each reference with the correct one idea just ....xxxxxx (xx e al, xx), kajjdnsj (xxx et al, xxx), and....In order to understand what idea is sustained by which author/reference.

**Are there some statistic software used?**

**CONCLUSION:** This section need to be improved, avoiding quotation, and strictly conclude in order to the AIMS of the study, taking into account the RESULTS of the study and finally in no more that 3 more importants points, but need to be shortened in order to be more clear.

**TABLE 1:** It can be include some naseline Pvalue comparisons.

**TABLE 3.** The title words are more high. The author need to see previous PeerJ format for tables.

Alvarez, C., R. Ramirez-Campillo, R. Ramírez-Velez and M. Izquierdo (2017). "Prevalence of Non-Responders In Glucose Control Markers After 10-Weeks of High-Intensity Interval Training in Higher and Lower Insulin Resistant Adult Women." Frontiers in Physiology 8: 1-12.