Reviewer’s report

Title: Effects of simultaneous cognitive and aerobic exercise training on dual-task walking performance in healthy older adults: Results from a pilot randomized controlled trial

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Reviewer: Amanda K Buttery

Reviewer's report:

Overall this small pilot trial on dual-task performance is interesting and potentially adds to the emerging literature in this field.

However, some further details about the methods of this trial e.g. recruitment strategy, invitation process and staff who undertook assessments in this trial are needed. There are many ways in which bias can occur in a pilot RCT and this manuscript would benefit from greater detail in describing how efforts to reduce bias were undertaken (in the methods, the analysis of results and in the limitations of this study).

Throughout the manuscript the authors refer to healthy adults (which are included in this trial) and disease populations (e.g. Parkinson's, Alzheimers etc). This is confusing as the evidence for aerobic exercise, cognitive training and dual task interventions varies between healthy adults and disease populations. It would be preferable for the authors to focus on healthy adults and limit their points about disease populations. The authors attempt to extrapolate their findings to disease populations is not always appropriate in this manuscript. It is unclear whether the authors plan to undertake a future trial on healthy individuals (which would be appropriate given their selection criteria and study findings) or a disease population?

A clearer conclusion, based on the study findings, would improve this manuscript.

Abstract:

The conclusion should include the finding that no group improved their dual task walking score at 12 weeks. This is important. Also, the last sentence of the conclusion should be removed and a more appropriate conclusion should be made e.g. Despite no change DTWT gait measures, significant results in cognitive measures indicate that further investigation in a larger RCT may be warranted with the appropriate outcome measures.

Introduction:

It would be good to include some evidence of negative trials of dual task performance for a more balanced view of the literature.

There is limited evidence that aerobic exercise and dual task training may be beneficial to improve QOL among those with mild to moderate dementia. See https://www.ncbi.nlm.nih.gov/pubmed/29848412
See https://www.ncbi.nlm.nih.gov/pubmed/25444575
Greater justification for selecting aerobic exercise over other types of exercise e.g. resistance and HITT training would be beneficial in the introduction section to this study.

Methods:
See comments above:
Was a protocol published for this trial?
How were patients recruited/advert/self-selected?
Who performed all outcome measures? Were they blinded? Inter-rater and intra-rater reliability? Why was there no follow-up assessment period?
Were patients exposed to other patient groups in the exercise areas?
Who supervised the exercise and was the intervention delivered as intended - both the exercise cognitive intervention intensity and duration? Did anyone stop cycling when they were doing the cognitive tasks? This type of data should be summarised in the results to understand the intervention adherence and whether it is worthwhile undertaking a larger trial.
The drop out rates were much higher in the cog task groups compared to the exercise group? What impacts does this have on the findings? What implications does this have for a future RCT?

Discussion:
The last sentence in the first paragraph of the discussion would be better placed earlier in the manuscript for e.g. in initially outlining the methods "In the intervention, training occurred on a stationary bicycle and the cognitive challenges were different from those used in the dual-task test that served as our primary outcome, which required serial-subtractions while walking."
The paper lacks a concluding paragraph about the findings of this study and whether a further larger-scale RCT is warranted.
The last sentence of this paper should be removed as this suggestion is not warranted from the findings of this study that focussed on healthy individuals.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No
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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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