Reviewer's report

Title: Feasibility of a Combined Aerobic and Cognitive Training Intervention on Cognitive Function in Cancer Survivors: A Pilot Investigation

Version: 1 Date: 21 Aug 2017

Reviewer: Diane Ehlers

Reviewer's report:

Thank you very much for the opportunity to review this manuscript. The present study represents an area of great interest to researchers, practitioners, and survivors and in which little evidence is available. I commend the researchers for their work in this area. However, while research of this nature is needed, a number of methodological limitations inhibit enthusiasm for this manuscript. These concerns should be addressed before this paper is suitable for publication.

Abstract

Please consider adding the length of the intervention. The study is described as 36 sessions, but it would be more informative to know over how long these sessions were conducted - e.g., 12 weeks (line 19).

Please define the group assignments in the abstract by spelling them out and noting that CON refers to flexibility training. Please also note how many subjects were in each group (line 23).

Delete 's' at the end of the word "variables" in line 30.

The conclusion drawn on lines 41-46 seems too assertive. Please modify this interpretation. Given the major limitations in the sample size with a 4-group design, it is difficult to draw such a strong conclusion related to the limited efficacy of AER+COG. At best, the authors might suggest that aerobic training may benefit cognition in cancer survivors; however, larger randomized trials are needed. Please consider noting that the sample was comprised of cancer survivors currently undergoing treatment for cancer. Were all participants currently in treatment? Despite the standard definition of survivor, most studies with survivors include only those who have completed treatment. To avoid confusion, please note the sample included individuals currently undergoing treatment.
Introduction

Introduction is well-written. However, there are some key studies using human models the authors might mention relative to exercise and CRCI and exercise and age-related cognitive decline. Examples for CRCI include: Zimmer et al., 2016; Marinac et al., 2015; Hartman et al., 2014; Mackenzie et al., 2016; Ehlers et al., 2017; Von Ah et al., 2013. Zimmer et al. at the very least should be included in this manuscript, as it reviews exercise interventions aimed at improving cognitive function in cancer survivors. In relation to cognition in healthy adults, while Chuck Hillman has done commendable work with children and adolescents, older adult research by others in this research group may be more appropriate (i.e., work led by Art Kramer and Edward McAuley).

Methods

Please expand Table 1 to include more participant characteristics broken down by group. Despite the small sample, it would be good to know the mean age and months since diagnosis per group and across the whole sample; and the frequencies for diagnosis stage, cancer site, gender, race/ethnicity, education, income, marital status, treatment(s) received, if participant was in treatment, hadn't started treatment, or completed treatment at time of study, etc.

Please describe what the "first physical assessment" was for (page 5, line 13). Physical assessment for cancer rehabilitation? Or physical assessment for the study? The intake of participants into the study is a bit confusing as written.

Similar to the abstract, please note the length of the intervention in weeks or months (page 5, line 18).

When were data collected? What was the data collection schedule? (page 5, lines 20-22). When were data collected relative to participants' treatment for cancer?

To improve the statistical power of this study, the authors might consider using statistical analyses utilized in fractioned factorial designs, which essentially is what the authors have in this study. See work by Linda Collins. Because all participants received flexibility training, the authors may be able to compare ingredients rather than groups (i.e., aerobic v. no aerobic, cognitive v. no cognitive). This would allow them to have larger group sizes without increasing the sample size and would also permit them to better discern the active ingredient(s) contributing to improvements in cognition observed.

Table 2 - should the footnote refer to Table 4 (page 23, line 42).
How long was each session (page 4)?

Please provide citations for the cardiorespiratory fitness and cognitive assessments. The measures section (page 6, lines 4-18) are lacking critical details. Was the treadmill protocol a submaximal or maximal test? How were cognitive data collected? A computer-based battery, paper-pencil, combination? Who administered the physical and cognitive tests? In what type of setting were participants when completing tests? Were physical and cognitive assessments completed in one appointment or separate appointments? If same, which was completed first or was order counter-balanced across participants?

In subsequent studies, the authors might consider using a cycle ergometer protocol to test cardiorespiratory fitness since the aerobic intervention utilized a cycling protocol.

Please include a sentence on the timing and length of flexibility training in the aerobic, cognitive, and combined interventions (page 6)?

Please be clear - participants assigned to COG were seated stationary on the Motion Fitness Brain Bike? Were these sessions 30 minutes as well? Additionally, were the AER + COG sessions 30 minutes also? Table 2 indicates that all participants received flexibility training. Did participants in AER, COG, and AER + COG receive 30 minutes of flexibility training in addition to their assigned protocols?

The Methods section overall is a bit confusing to follow. The specifics of each intervention are not clear, making replicability of this study impossible. Please provide more detail on frequency, length, adherence.

Results

Please present the limitations at the end of the discussion section. If the limitations described in the results were systematically evaluated, then there is a place for them in the results section. However, these data should be presented as a sort-of process evaluation. For example, are data available on the mean %HRR in each group? Is this information available across groups? Are data available on adherence to each protocol?

It may also be helpful to include effect sizes since the study was not adequately powered.
Discussion

Discussion section addresses findings well and provides nice comparisons with previous studies.

The conclusion drawn on page 12, line 4-7 should be toned down, as no group differences were observed in this study. The addition of effect sizes may provide the researchers with more empirical backing of these conclusions amidst the study's limited statistical power.

Level of interest
Please indicate how interesting you found the manuscript:

An article of limited interest

Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

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