Author's response to reviews

**Title:** The effect of Baduanjin exercise for physical and psychological well-being of college students: study protocol for a randomized controlled trial

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**Author's response to reviews:** see over
Dear editor and reviewer,

The manuscript entitled “The effect of Baduanjin exercise for physical and psychological well-being of college students: study protocol for a randomized controlled trial” (MS: 4790108531076407) has been revised in accordance with the reviewer’s comments. The newly revised manuscript has been submitted with this letter.

Many thanks for the comments from the reviewer. If there is any problem in our revised manuscript, do not hesitate to contact me. Thank you!

Best Wishes

Moyi Li

The reviewer’s comments and author’s responses with a point-by-point description are following:

Major compulsory revisions
1. Background: there are missing information or literature about the recent educational and behavioral training programme on exercise in adolescents and students and their comparative effects.

2. Again, by the end of the background, it is importance to have some explanation of the rationale for Baduanjin to be appropriate or potentially effective for adolescents, e.g., how to enhance their motivation for this exercise regularly and how this model of exercise address the existing knowledge gaps on exercise training in adolescents.


3. Clarifying the sampling and sample size estimation: (1) more details about the preliminary study done for estimation of sample size in this proposed trial; (2) what is the population size and rationale for only recruiting grades 1 and 2 students and actually what is meant by 'grades 1 and 2'.

Author’s response: (1) In preliminary trial, We measured the lumbar flexion muscle strength of 20 randomly selected college individuals by using Tergumed Work Station, which is produced by Proxomed GmbH, Germany (product type: Flexion Work Station: Tergumed Flexion) at the Evaluation Department of Rehabilitation Hospital Affiliated to FJTCM. Their mean with
the standard deviation was obtained to be 258.25N and 114.19N respectively. Based on the preliminary trial’s results, we expect 20% mean difference on lumbar flexion muscle strength of college students after the Baduanjin exercise intervention for 12 weeks. According to the formula

\[ n_1 = n_2 = 2 \left( \frac{z_{\alpha/2} + z_\beta}{M_\alpha - M_\beta} \right)^2 \delta^2 \]

with \( \alpha = 0.05 \), \( \beta = 0.10 \) and 10% dropout rate, 111 participants were calculated for each group.

(2) ‘grades 1 and 2 students’ means freshmen and sophomores. We only recruit grades 1 and 2 students for following 2 reasons: ① they have experienced college entrance examination lately, and most of them live a sedentary life, so it is more necessary for them to do exercises. ② students in grades 1 and 2 are studying in school, but when they are in grade 3 or 4 or 5, they are off school to another school district of the university or for interning in hospitals.

Minor Essential Revisions
1. Rewrite the statements “12 and 24 weeks post intervention” in a few parts of your proposal; it seems that the post-test are not 12 and 24 weeks after intervention completed but after starting the intervention; it is better to clearly specify the post-test to be immediately and 12 weeks after completion of the intervention.

Author’s response: It has been modified in the revised manuscript. Thanks!

2. By the end of the background, it is better not to use ‘etc.’ but completing the list of outcomes used.

Author’s response: It has been modified in the revised manuscript. Thanks!

3. It is better to re-consider the use of ‘blank’ controls and it appears better to use usual exercise training.

Author’s response: Thanks! Although no special exercise intervention will be performed on the participants of control group in this trial. In fact, we will not
control the participants in control group to do usual exercises such as non-regular basketball sports, ping-pong sports and other physical exercises. So we also think that it is better using usual exercise training than 'blank' controls in the control group. This has been modified in the revised manuscript. Thanks again!

4. Only 10% drop outs expected may be too optimistic in comparison with most exercise training programs; if you would like to use and confirm this rate, please cite references to support this expectation.

Author’s response: Usually, the drop outs and withdraw rate was required to be controlled from 10% to 30% participant numbers in one clinical trial. Only 10% drop outs expected in this trial may be relatively optimistic comparing with other exercise training programs. But we decide the 10% drop outs expected based on following causes: ①All grades 1 and 2 students are in school, and they have enough time to complete the entire exercise programs; ②Baduanjin exercise is a medium intensity sport which includes only eight action, and is easy to learn or train for the college students; ③The participants’ recruitment and training will only be performed at ourselves university. Therefore, the participants will have a good compliance, and 10% drop outs will be expected to be controlled in this trial.

The RCT titled “Evaluation of the mental health benefits of yoga in a secondary school: a preliminary randomized controlled trial” reported 121 students began participation in the study and 12 students dropped out, so the drop-out rate was 10%. Another RCT-- “Promoting healthy lifestyles among adolescent boys: the fitness improvement and lifestyle awareness program RCT” reported 6% drop-out rate. The references have been cited in the revised manuscript.

5. Clarify whether 12 weeks duration of Baduanjin is the standardized practice or not.
Author’s response: The standardized practice of Baduanjin exercise intervention has still not been reported. But we found that most of researches on Baduanjin intervention had been performed 12 weeks practice duration by literatures search. Therefore, we decide to select 12 weeks as intervention duration in this trial.

6. Briefly describe the reliability and validity of all outcome measures used and a bit more details of the scales used, e.g., items and rating method.

Author’s response: More details have been supplemented in the revised manuscript.

7. State the level of statistical significance used, and with or without any adjustment due to multiple comparison tests performed; and state whether any planned or post-hoc comparisons, as well as any subgroup analysis made.

Author’s response: The section of statistical analysis has been revised carefully. The level of statistical significance, adjustment analysis and subgroup analysis plan have been added in the revised manuscript. But we will not plan the analysis of post-hoc comparisons because of two arm trial in this study. Thanks!

8. Lastly, some typo. And grammatical errors noted in text, please check again and correct them.

Author’s response: Typo and grammatical errors have been corrected in the revised manuscript. Thanks a lot for reminding.