Author’s response to reviews

Title: Effect of an exercise-based cardiac rehabilitation program 'Baduanjin eight silken movement with self-efficacy building' for heart failure (BESMILE-HF study): study protocol for a randomized controlled trial

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Author’s response to reviews:

Reviewer #1:

An interesting and contextually relevant study; the inclusion of a qualitative component is promising for understanding patient perspectives on acceptability of the program.

Answer:

Thank you for your positive and encouraging comments. You have given us valuable comments that we have addressed below.

(Qualitative Component) Line 396: Acceptability of BESMILE-HF program: What are the specific aims of the in-depth interviews? Would be good to elaborate a bit on what areas of program acceptability you are seeking to understand - content? delivery method? patient perceptions of their personal outcomes? challenges to uptake?

Answer:

Thank you for raising an important issue and suggestions.
The specific aim of the semi-structure interviews is “individual experiences and acceptability following the BESMILE-HF program” which we have mentioned in the Background session (line 132 in the final version of manuscript).

As suggested, we have elaborated on what areas we are seeking to understand in the main text:

“During the interviews, participants will be encouraged to speak freely about their experiences with and perspectives on the entire BESMILE-HF program, motivating and inhibiting influences of the program, and suggestions for improvement. Subsequently, they will primarily be asked about their preferences, attitudes, use, abilities, and challenges regarding Baduanjin. All questions will be open-ended, and follow-up questions will be used to gain a deeper understanding of areas that appear essential for each individual.” (line 432-438 in the final version of manuscript)

What is the sampling strategy for the qualitative component? Is there a proposed number of interviews and how will you determine when you've reached data saturation?

Answer:

Thank you for raising good questions. A purposive sampling strategy will be used based on maximum variation principals. Participants will be recruited until saturation is reached, and the sample size is expected to be 15 to 20. Data saturation is defined as no new information being obtained from further interviews.

We have rearranged the qualitative data collection session and described the sampling issue in more detail in the main text:

“A purposive sampling strategy will be used based on maximum variation principals regarding age, gender, severity of CHF, education level, working status, having grandchildren, and the preliminary results of the pilot study. Participants will be recruited until saturation is reached, and the sample size is expected to be between 15 and 20. Data saturation is defined as no new information having been obtained from further interview.” (line 418-422 in the final version of manuscript)

If possible mention who will be conducting the interview and explain any qualitative training or experience they will have.
Thank you for your helpful reminder and suggestions. We have described the interviewers in more detail.

Please refer to the main text (line 424-428 in the final version of manuscript): “Two female research assistants will conduct the interviews: one a nurse in the department of cardiology, and a resident physician with a background in cardiology. Both assistants will receive education and training in conducting interviews. They will not be part of the BESMILE-HF research team, however the BESMILE-HF study research staff will inform them of the purposes of this qualitative study.”

Also would be useful to mention in this section the proposed analysis plan (including proposed analysis type and proposed analysis software, if applicable) and to what end the data will be used - recommendations? program modifications?

Thank you for your suggestions. Limited studies have emphasized the importance of individualizing exercise interventions. However, patients’ experience in CHF exercise interventions have not previously been investigated in the Chinese population. Results of the qualitative study would help clinicians and researchers in China to gain a context-specific understanding of adherence issues and how the BESMILE-HF program can be adjusted to fit individual needs, capacities, and circumstances.

We have added “Qualitative data analysis” to the “Statistical methods” session (line 476 in the final version of manuscript), where we have described the analysis plan for qualitative data (including proposed analysis type and proposed analysis software).

Please refer to the main text (line 477 - 489 in the final version of manuscript): “For qualitative data, content analysis based on an inductive approach will be conducted and assisted by NVivo11. Categories and themes will be identified inductively. Analysis will be conducted by three researchers (RA, RB, RC) in three steps. In the first step, RA and RB have independently created two coding structures by reading 3 to 4 of the transcribed interviews and extracting meaningful units from the text; RA and RB will then meet to compare the coding structures, discuss differences and agree on a final version. Preliminary findings will be discussed with RC,
and feedback will be incorporated into the coding structure. RA and RB will then apply the final coding structure to all transcripts. In the second step, categories will be created from the codes. The structure of the categories will be discussed among the research team. In the final step, categories with similar content will be grouped together into themes. To ensure the reliability of the findings: (1) the interviews will be read repeatedly to obtain an overall understanding of the project, and there will also be a constant comparison between the parts of the analysis and the full text of the interview; and (2) awareness of preconceptions will be emphasized throughout the study.”

Additional comments from rereviewer1: Quality of written English-Needs some language corrections before being published.

Answer:

The manuscript has been checked and revised with the help of a native English speaker.

Additional comments from Editor: Please justify the selection of co-primary outcomes, and use of p value <0.05 for significance rather than being more conservative? How would the outcomes be dealt with sequentially?

Answer:

Thank you for raising an important issue and good questions.

a. Selection of co-primary outcomes:

Exercise intolerance is a primary symptom among patients with chronic heart failure. Therefore, exercise capacity is the main target of an exercise-based cardiac rehabilitation program designed for chronic heart failure. In addition, as the objectives of cardiac rehabilitation are to positively influence disease progression and prognosis and to improve patients’ overall quality of life[1], quality of life is also an important domain of interest in cardiac rehabilitation research. Moreover, it has been suggested that “rehabilitation research uses primary measures that come from different domains and, more importantly, will usually study more than one major outcome” [2]. In our study, two co-primary outcomes are the change of exercise capacity measured as peak VO2 (mL/kg/min) and disease-specific quality of life measured as the MLHFQ total scores between baseline and 12 weeks. The peak VO2 is the gold standard to assess exercise capacity and an important predictor of prognosis in CHF patients; and the MLHFQ which covers
physical, psychological, and socioeconomic dimensions, is a validated and commonly employed disease-specific quality of life instrument in chronic heart failure.

b. Dealing with co-primary outcomes and p value

We agree with editor that we should be more conservative for the use of p value <0.05. Therefore, for the two co-primary outcomes, the significance level will be Bonferroni-corrected ($\alpha = 0.05/2 = 0.025$). Please referred to the main text (line 460 - 461 in the final version of manuscript).

Because each primary endpoint can characterize a clinically meaningful benefit of the intervention on its own, we use the “or decision rule,” meaning that the study is regarded as successful in the event that one of the two primary endpoints improves significantly in the intervention group. Please refer to the main text (line 447 - 450 in the final version of manuscript).

Additional changes:

1. We have replaced Figure 1 with a new version.

References
