Author’s response to reviews

Title: Fit 4 Surgery, a bespoke app with biofeedback delivers rehabilitation at home before and after elective lung resection

Authors:

Salma Kadiri (salma.kadiri@heartofengland.nhs.uk)
Amy Kerr (amy.kerr@heartofengland.nhs.uk)
Nicola Oswald (nicola.oswald@heartofengland.nhs.uk)
Alina-Maria Budacan (alina.budacan@nhs.net)
Sarah Flanagan (s.m.flanagan@bham.ac.uk)
Christopher Golby (chrisgolby@evolyst.com)
Stuart Lightfoot (stuart.lightfoot@heartofengland.nhs.uk)
Babu Naidu (b.naidu@bham.ac.uk;alice.wareham@aspire-scientific.com)

Version: 1 Date: 30 May 2019

Author’s response to reviews:

Dear Vipin Zamvar

RE: JCTS-D-19-00062

Please find our reply to the reviewers’ comments for our manuscript, ‘Fit 4 Surgery, a bespoke app with biofeedback delivers rehabilitation at home before and after elective lung resection.’ which has been considered for publication following revision in the Journal of Cardiothoracic Surgery. We thank the reviewers for their time and have addressed each point in turn with reference to amended manuscript. We have also highlighted the changes and submitted the amended manuscript.
Reviewer 1

Point 1. I congratulate the Author for this interesting paper and their results. Still I wonder if pre and postoperative rehab is indicated in all patients needing lung resection and maybe few words about the subject should be added in the paper. Would you also spend some words about costs of the app including dedicated physicians, nurses and technicians.

Response 1. Many thanks for your comments. We have amended the manuscript to include current literature information on the usefulness of pre- and post-operative rehabilitation in patients requiring lung resection and added a paragraph on the costs.

Amended in background (line 74-78): ‘The evidence on pre- and post-operative rehabilitation in lung resection surgery is poor, mainly due to the heterogeneity of patient population, interventions and outcomes. Recently published ERAS guidelines recommend use of prehabilitation for patients with borderline lung function or exercise capacity.’

Amended in discussion (line 333-339): ‘Should further studies demonstrate this app makes a difference in clinical outcomes, we plan to make it freely available. The cost of implementation when this intervention is at the stage of being locally tailored and scaled up relates mainly to the extra amount of time a lung cancer nurse or physiotherapist would have to spend with the patient. From experience with our pilot study, we estimate that a total of 60 minutes allied health care professional contact time is required during the whole programme per patient. In a UK based system that would equate to a cost of between £16 to £34 per patient.’

Reviewer 2

Point 1. In this study, the patients were instructed to exercise for at least 3 minutes, and the patients performed an average of 9 sessions (is there any reference of at least 3 minutes exercise? Do you think 3 minutes of rehabilitation will work to improve exercise ability?) On the other hand, in the conventional pulmonary rehabilitation group, one session was 90 minutes.

Response 1. We thank the reviewer for their comment and have clarified in the manuscript that the patients were instructed to exercise for at least 3 minutes per exercise. A complete session consisted of ten exercises, which would add up to 30 minutes of exercise (the minimum duration of exercise per session recommended by most pulmonary rehabilitation programmes to observe benefit (1)) and patients had the option to exercise every day, at their own pace, rather than limiting them to two 90 minutes sessions per week.

Amended in Methods (line 123): ‘The patients were instructed to exercise for at least three minutes per exercise.’

Point 2. Table 2B is an important table to evaluate the feasibility of 'Fit 4 surgery' app. Total exercise time before surgery was 158 (3-1226) mins, and after surgery only 22 mins. It's hard to think that 2 and half hours of exercise would have improved the patient's condition. As a feasibility study, these results would rather be interpreted as not-feasible of the use of home-based rehabilitation app before and after surgery. I think we should focus on solving the motivation problem to use app-based rehabilitation programme.

Response 2. As this is a feasibility study, we cannot draw conclusions on whether this intervention improves outcomes and we will need to test this hypothesis in a randomised controlled trial. The fact that patients in the app group managed more sessions during the pre- and post-op period compared with the rehabilitation group, demonstrates that it is feasible to deliver the intervention and is acceptable and compliant to patients. If we exclude the 3 poorly compliant patients with an exercise time of less than 10 minutes, the median rises to 194 minutes. In addition we have not assessed in this study the effect of using the app on overall activity beyond the session. There is a growing body of evidence that suggest that using an exercise app improves overall physical activity which may be beneficial. To address these points we have amended the discussion section as detailed below.

We agree with the reviewer that solving the motivation problem should be our future focus especially compliance post operatively. From the qualitative feedback provided by the patients, another reason for not continuing with exercises was that the app was not tailored enough to match the change in exercise capacity after having surgery. This is an area for improvement in further refinements of the Fit 4 Surgery app.

Amended in Discussion (line 278-281): ‘The fact that patients in the app group managed more sessions during the pre- and post-op period compared with the rehabilitation group, demonstrates that it is feasible to deliver the intervention and is acceptable and compliant to patients.'
Amended in Discussion (line 287-289): ‘Furthermore, if we exclude the 3 poorly compliant patients with an exercise time of less than 10 minutes, the median total exercise time before surgery rises from 158 to 194 minutes.’

Small questions

Small question 1. There is any reason why app patients had a shorter wait time before surgery compared with the patients attending rehabilitation classes?

Response 1: There is no reason per say this is a random effect as wait times for surgery vary. The difference reported of 24 days in app group and 45 days in community group is within acceptable pre-operative waits for surgery in the UK. App and community rehabilitation patients were recruited at the time of the surgical clinic appointment before the operation. Patients who were to attend pulmonary rehabilitation classes were then referred by the lung cancer nurses but App patients were seen by the research team as soon as convenient to patient and Team.

Small question 2. As the feasibility test, is not too small that only 13 interviews were possible among 31 patients? Because the person who participated in the interview may be a person who is more compliant to use of app, more patients need to be interviewed.

Response 2. There is no pre-defined sample size for interviews in qualitative research (2)(3). We interviewed enough people to achieve thematic saturation- until the information provided by patients became repetitive and didn’t contained new ideas. Although one can argue that the more compliant patients were interviewed, the semi-structured telephone interviews contained the same framework of themes for all patients, therefore they all provided both positive and negative feedback.


Small question 3. In results section, it is contained explanations or arguments that should be written in methods or discussions.

Response 3. We have re-read the results and are not sure which section the reviewer requires us to move.

Final comments from authors: We have amended the list of authors to include Miss Alina-Maria Budacan MRCSEd, in recognition for her contribution to the final version of this manuscript. We hope following these major amendments that this article will be suitable for publication in the Journal of Cardiothoracic Surgery.

Yours sincerely,

Mr Babu Naidu
Honorary Consultant Thoracic Surgeon,
Department of Thoracic Surgery,
Heart of England NHS Foundation Trust,
Bordesley Green East,
Birmingham, B9 5SS
United Kingdom
Email: b.naidu@bham.ac.uk