

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Effects of a 12-week, seated, virtual, home-based tele-exercise program compared with a pre-recorded video-based exercise program in people with chronic neurological impairments: protocol for a randomized controlled trial
<b>AUTHORS</b>	Divecha, Ayushi A.; Bialek, Amy; Kumar, Devina S.; Garn, Rachel; Currie, Lydia; Campos, Talita; Friel, Kathleen M.

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Markus Wirz Zurich University of Applied Sciences, Institute of Physiotherapy
<b>REVIEW RETURNED</b>	01-Sep-2022

<b>GENERAL COMMENTS</b>	<p>The authors of the study address a highly relevant topic. Physical activity for the prevention of relapses or secondary complications is effective and low-risk. In general, no type of online training (synchronous or asynchronous) seems to be established yet. It would therefore be appropriate to add a qualitative part to the study in order to collect aspects that are not covered by the questionnaires. Patients with chronic neurological conditions have very different residual functions to which training should be tailored to be effective. Training for different diagnoses is suggested here. It would be highly advisable to conduct feasibility studies for each entity in advance to define appropriate exercises and endpoints. Please consider the following feedback:</p> <p>Abstract: Consider shifting '12-weeks' to the 'Methods and Analysis' section and add information about session frequency and/or total number of sessions.</p> <p>Abstract: In the 'Introduction', all specific outcomes could be omitted, they appear in the 'Methods and Analysis' section.</p> <p>P4, L18: It is unclear to what extent COVID-19 is relevant.</p> <p>P5, L20: Please add reference.</p> <p>P6, L9: The purpose of this study (investigating two types of online exercise courses) does not correspond to the problem described in the introduction (access problems). The introduction should provide more background information about synchronous and asynchronous delivery of exercise courses and why the difference should be investigated.</p> <p>P7,L6: replace 'chronic neurological impairments' with the abbreviated form which was introduced on P5. Also on P8, L53</p> <p>P7, L43: In the restrictions on P4, the authors also mention the use of blood pressure monitors. This is not mentioned here. The use of a blood pressure monitor seems more complex compared to a heart rate monitor.</p> <p>P8, L30: it is unclear what is meant with 'mean heart rate' (during a test, during a rest-period). Also later in the manuscript it remains unclear.</p>
-------------------------	--

	<p>P8, L32: Based on the statement 'in each group, separately' it seems that the authors only want to investigate the within-group change in heart rate. Then the design of the study does not seem appropriate.</p> <p>P8, L35: The undirected statistical hypothesis does not fit to the directed research hypothesis.</p> <p>P8, L47: Please add information on the intended sampling strategy (e.g. random, consecutive, snow-ball, ...).</p> <p>P8, L53: explain abbreviation (BNI).</p> <p>P9, L14: Randomization should be performed by a person not otherwise involved in the study. If, for example, 3 participants of a block have already been randomised, it is defined in which group the fourth participant will come. Therefore, independent randomisation is appropriate.</p> <p>P9, L34: Consider having the analyses done by a person who is blind to the group allocation.</p> <p>P9, L52: It seems that not all exercises can be performed by all patient groups, e.g. boxing might be difficult for people with SCI or hemiparesis. It could also be assumed that motor deficit is a limiting factor and sufficient cardio-pulmonary effort cannot be achieved. Have the authors conducted a feasibility study?</p> <p>P13, L37: The section on outcome measures lacks information on how adherence is to be recorded. It is of interest whether adherence refers to a training session as a whole or even to details, e.g. individual exercises. In addition it is advisable to collect information about the level of functioning in order to describe the sample and to better understand for whom such training is most appropriate.</p> <p>P13, L39: The outcomes should be stated more clearly. What will be measured and how?</p> <p>P13, L48: it is unclear how the heart rate recordings will be synchronised with the events during the training, i.e. the single exercises.</p> <p>P17, L19: Here, the clinical characteristics are mentioned but not described in the outcome section.</p> <p>P17, L31: Did the study authors perhaps mean the difference between the first and the last training session?</p> <p>P18, L54: The recording of blood pressure is not described in the methods section.</p>
--	---

<b>REVIEWER</b>	Danúbia Sá-Caputo Universidade do Estado do Rio de Janeiro, Biofísica e Biometria
<b>REVIEW RETURNED</b>	06-Sep-2022

<b>GENERAL COMMENTS</b>	The subject of the manuscript is very interesting. The author followed a specific guideline (SPIRIT). To improve the quality of the study I suggest that the author clarify the information about the protocol of exercise. It is possible to use figure, pictures or similar.
-------------------------	--

### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Markus Wirz, Zurich University of Applied Sciences

Comments to the Author:

The authors of the study address a highly relevant topic. Physical activity for the prevention of relapses or secondary complications is effective and low-risk. In general, no type of online training (synchronous or asynchronous) seems to be established yet. It would therefore be appropriate to add a qualitative part to the study in order to collect aspects that are not covered by the questionnaires. Patients with chronic neurological conditions have very different residual functions to which training

should be tailored to be effective. Training for different diagnoses is suggested here. It would be highly advisable to conduct feasibility studies for each entity in advance to define appropriate exercises and endpoints.

Please consider the following feedback:

Abstract: Consider shifting '12-weeks' to the 'Methods and Analysis' section and add information about session frequency and/or total number of sessions.

*Thank you for the suggestion, this has been updated on page 2.*

Abstract: In the 'Introduction', all specific outcomes could be omitted, they appear in the 'Methods and Analysis' section.

*Thank you for the suggestion, we've deleted the repetitions.*

P4, L18: It is unclear to what extent COVID-19 is relevant.

*This study was created in response to the closure of many exercise and therapy centers during COVID-19. Even as the pandemic wanes, there remain many barriers to exercise for people with chronic disabilities. We have removed the mention of COVID-19 in the title and parts of the introduction. We kept the point in the introduction that the COVID-19 pandemic resulted in the emergence of many virtual ways to remain connected, including Zoom-based exercise programs.*

P5, L20: Please add reference.

Thank you for the suggestion, references have been added on page 4.

P6, L9: The purpose of this study (investigating two types of online exercise courses) does not correspond to the problem described in the introduction (access problems). The introduction should provide more background information about synchronous and asynchronous delivery of exercise courses and why the difference should be investigated.

*We have updated the introduction to discuss the different exercise delivery models, on pages 5-6.*

P7,L6: replace 'chronic neurological impairments' with the abbreviated form which was introduced on P5. Also on P8, L53

*These changes have been made.*

P7, L43: In the restrictions on P4, the authors also mention the use of blood pressure monitors. This is not mentioned here. The use of a blood pressure monitor seems more complex compared to a heart rate monitor.

*Information about the blood pressure monitor, and how we will train participants to use it correctly, has been added to pages 11-12.*

P8, L30: it is unclear what is meant with 'mean heart rate' (during a test, during a rest-period). Also later in the manuscript it remains unclear.

*We have clarified this in the text. We will be comparing peak heart rate during exercise as our primary outcome and the basis for our sample size calculation on page 8.*

P8, L32: Based on the statement 'in each group, separately' it seems that the authors only want to investigate the within-group change in heart rate. Then the design of the study does not seem appropriate.

*Our intention is to study both the within-group and between-groups changes. We have changed our wording of the sample size (page 8) and the statistical analysis plan on page 18. We clarified that we will only use ANCOVA and regression analyses to study the effects of this intervention.*

P8, L35: The undirected statistical hypothesis does not fit to the directed research hypothesis.

*It is our understanding that statistical hypotheses should not be directional (such as: two-tailed rather than one tailed) for robustness of the findings. Thus, we believe it is best to keep the statistical hypothesis as undirected.*

P8, L47: Please add information on the intended sampling strategy (e.g. random, consecutive, snow-ball, ...).

*We will randomize in blocks of 4. We added this on page 8.*

P8, L53: explain abbreviation (BNI).

*This has been done.*

P9, L14: Randomization should be performed by a person not otherwise involved in the study. If, for example, 3 participants of a block have already been randomised, it is defined in which group the

fourth participant will come. Therefore, independent randomisation is appropriate.

*Yes, randomization will be done independently. This has been clarified on page 8. A person not affiliated with the study will perform the randomization.*

P9, L34: Consider having the analyses done by a person who is blind to the group allocation.

*Yes, this will be done. This has been clarified on page 20.*

P9, L52: It seems that not all exercises can be performed by all patient groups, e.g. boxing might be difficult for people with SCI or hemiparesis. It could also be assumed that motor deficit is a limiting factor and sufficient cardio-pulmonary effort cannot be achieved. Have the authors conducted a feasibility study?

*We did conduct a feasibility study, which is now mentioned on page 22. Our instructor founded an adaptive gym of his own, and has extensive experience adapting exercise to the abilities of participants. Our Inclusion criteria include receiving medical clearance from each participant's physician. This will exclude people for whom our exercise intervention is not safe or tenable. Our instructor has experience training people with a wide range of diagnoses and impairments, including SCI and hemiparesis. The founder of the organization that funds our work (Sabrina Cohen Foundation) has SCI and began this virtual exercise program before we partnered with them. It was begun for people with SCI and other disabilities.*

P13, L37: The section on outcome measures lacks information on how adherence is to be recorded. It is of interest whether adherence refers to a training session as a whole or even to details, e.g. individual exercises. In addition it is advisable to collect information about the level of functioning in order to describe the sample and to better understand for whom such training is most appropriate.

*Thank you, we have expanded the section about adherence on page 14, and in the secondary outcomes section on page 15.*

P13, L39: The outcomes should be stated more clearly. What will be measured and how?

*We have clarified the outcomes section on pp 14-19, and have added a table of outcome measures (Table 1).*

P13, L48: it is unclear how the heart rate recordings will be synchronised with the events during the training, i.e. the single exercises.

*The synchronization occurs via the Polar app on a participant's smart phone. This has been further explained on page 12, regarding how participants will be trained to use the technology, and on page 16, regarding how and when data will be recorded during an exercise session.*

P17, L19: Here, the clinical characteristics are mentioned but not described in the outcome section.

*We have added these to the outcome session on page 16.*

P17, L31: Did the study authors perhaps mean the difference between the first and the last training session?

*Yes, thank you, we have reworded this to be as follows: "...from the first session to the final session." Page 20.*

P18, L54: The recording of blood pressure is not described in the methods section.

*Thank you, we have added this in the text on pages 12-13.*

Reviewer: 2

Dr. Danúbia Sá-Caputo, Universidade do Estado do Rio de Janeiro

Comments to the Author:

The subject of the manuscript is very interesting. The author followed a specific guideline (SPIRIT). To improve the quality of the study I suggest that the author clarify the information about the protocol of exercise. It is possible to use figure, pictures or similar.

*Thank you, we have edited the text on pages 9-10 to better describe the exercises. We also added a table (Table 2) to visualize the contents of each exercise session.*

#### **VERSION 2 – REVIEW**

<b>REVIEWER</b>	Markus Wirz Zurich University of Applied Sciences, Institute of Physiotherapy
<b>REVIEW RETURNED</b>	28-Nov-2022
<b>GENERAL COMMENTS</b>	The authors have processed the feedback satisfactorily. However not all revisions are marked (Abstract) and the revised version lacks page and line numbering which made the review somehow cumbersome. One point was probably misunderstood. It was about the recruitment strategy and not about the method of randomized group allocation. This point could still be clarified in the manuscript e.g. randomized sampling, stratified sampling or else.

#### **VERSION 2 – AUTHOR RESPONSE**

Authors' response: Thank you for the clarification. We will not prioritize any method of recruitment over another. We have added this to page 8: "We will also post our recruitment flier on our website,

social media, and will mail it to neurological patient advocacy groups. We will send the study flier to all above mentioned entities, without prioritizing any database or group over another.”