

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Effects of exergames training on Postural Balance in chronic stroke patients: study protocol for a randomized controlled trial
<b>AUTHORS</b>	Bessa, Nathalia; Lima Filho, Bartolomeu; Medeiros, Candice; Ribeiro, Tatiana; Campos, Tânia; Cavalcanti, Fabrícia

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Jerome Iruthayarajah Parkwood Institute, Canada
<b>REVIEW RETURNED</b>	09-Apr-2020

<b>GENERAL COMMENTS</b>	Well thought out study protocol
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<b>REVIEWER</b>	Imre Cikajlo University rehabilitation institute
<b>REVIEW RETURNED</b>	30-Apr-2020

<b>GENERAL COMMENTS</b>	<p>The proposed manuscript describes a protocol of the randomized control trial comparing several clinical and non-clinical outcomes of two popular rehabilitation approaches in postural and balance training of chronic stroke patients; conventional (traditional manual approach) and using commercial games of Nintendo Wii.</p> <p>Major concerns:</p> <ul style="list-style-type: none"><li>- The abstract reports that the major problem is the insufficient evidence about the effectiveness of exergames regarding the gait speed, balance, and the quality of life compared to conventional rehabilitation in stroke population. This is the major motivation for conducting the study. The authors should be aware that in the last decade more than 100 of papers with RCTs and reviews were published on using VR, exergames, also as an alternative to the conventional therapy. Additional study with "only 42" chronic stroke participant could hardly contribute to the mindset that exergaming is superior to the conventional rehabilitation. The authors should rewrite the objectives that technology is a valuable tool in rehabilitation and not a competitive approach. The abstract lacks of information on HOW (what kind of instruments) the authors will measure the primary and secondary outcomes.</li></ul> <p>The proposed manuscript should clearly define the objectives of the study and explain their expectations – what hypothesis the authors would like to confirm or drop?</p> <p>Specific issues:</p>
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	<p>inclusion criteria: What is the " good cognitive status based on the Mini-Mental State Examination" ? 24+, 25+ score? Should be also reported in inclusion criteria.</p> <p>Does the protocol take in consideration that any of the 42 participants may leave the study, refuse to cooperate, etc. ?</p> <p>It is not clear which bio-mechanical parameters will be measured in the control group and which in the test group. CoP in both groups?</p> <p>Do the authors expect that the participant can handle the dynamics of the commercial Nintendo Wii games?</p>
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<b>REVIEWER</b>	Augusto Garcia-Agundez TU Darmstadt, Germany
<b>REVIEW RETURNED</b>	29-Jul-2020

<b>GENERAL COMMENTS</b>	<p>The authors present a study protocol to evaluate the effect of exergame-based therapy in chronic stroke patients. The protocol is well designed, the article is well structured and all aspects are clearly defined. My observations are as follows:</p> <ul style="list-style-type: none"> <li>- Authors mention the use of "Virtual Reality" several times, but the only intervention uses Wii Balance Boards and conventional exergames. I would remove all mentions of virtual reality.</li> <li>- The authors plan to commence the study in October 2020, is this realistic with the COVID situation?</li> <li>- Although the authors do describe an appropriate randomization procedure, I do not see any methods to ensure that the randomized groups are comparable in assessment methods (no differences between groups prior to intervention). This should be mentioned.</li> <li>- Please include a measure of effect size when analyzing the results (e.g. cohens d)</li> <li>- Although the risk of bias seems low, and most of them are mentioned in different sections of the article, I would add a paragraph explicitly listing these biases</li> <li>- The authors should also add a paragraph describing the limitations of the study</li> <li>- And finally, my biggest remark, I have seen many grammar errors in the article, e.g.: page 3 line 17 "clinical trial that aim is" page 4 line 50 "study will be explore" page 6 line 76 "these changes promote high risk of falling"</li> </ul> <p>and several others. I strongly suggest to let a native english speaker take a look at the article.</p>
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## VERSION 1 – AUTHOR RESPONSE

### Reviewer: 1

Well thought out study protocol

Thank you for considering my study.

**Reviewer: 2**

The proposed manuscript describes a protocol of the randomized control trial comparing several clinical and non-clinical outcomes of two popular rehabilitation approaches in postural and balance training of chronic stroke patients; conventional (traditional manual approach) and using commercial games of Nintendo Wii.

Major concerns:

- The abstract reports that the major problem is the insufficient evidence about the effectiveness of exergames regarding the gait speed, balance, and the quality of life compared to conventional rehabilitation in stroke population. This is the major motivation for conducting the study. The authors should be aware that in the last decade more than 100 of papers with RCTs and reviews were published on using VR, exergames, also as an alternative to the conventional therapy. Additional study with "only 42" chronic stroke participant could hardly contribute to the mindset that exergaming is superior to the conventional rehabilitation. The authors should rewrite the objectives that technology is a valuable tool in rehabilitation and not a competitive approach.

Following the recommendations of the reviewer, adjustments were made to the introduction, objectives and abstract.

The abstract lacks of information on HOW (what kind of instruments) the authors will measure the primary and secondary outcomes.

The instruments used to assess each of the outcomes were added to the abstract.

The proposed manuscript should clearly define the objectives of the study and explain their expectations – what hypothesis the authors would like to confirm or drop?

The hypothesis that the authors want to confirm has been added to the end of the introduction.

Specific issues:

Inclusion criteria: What is the " good cognitive status based on the Mini-Mental State Examination" ? 24+, 25+ score? Should be also reported in inclusion criteria.

The cut-off point of the Mini-Mental State Examination used for illiterate and literate people was added to the inclusion criteria.

Does the protocol take in consideration that any of the 42 participants may leave the study, refuse to cooperate, etc. ?

This protocol takes in consideration the participants' withdrawal and lack of cooperation. These points are present in the manuscript in the items "Ethics and Dissemination" and "Adherence" within the described non-adherence criteria. In addition, all participants will be informed about these aspects in the consent form.

It is not clear which bio-mechanical parameters will be measured in the control group and which in the test group. CoP in both groups?

In the item "outcome measure", information was added that all the outcomes used will be evaluated in both groups, this includes measures related to the center of pressure.

Do the authors expect that the participant can handle the dynamics of the commercial Nintendo Wii games?

Experimental group participants will be introduced to the Nintendo Wii and games to allow adaptation. Those who do not adapt to the proposed protocol will enter the non-adherence criteria. Adjustments were made to the text in the item "Experimental Group" to make the information clearer.

**Reviewer: 3**

The authors present a study protocol to evaluate the effect of exergame-based therapy in chronic stroke patients. The protocol is well designed, the article is well structured and all aspects are clearly defined.

Thank you for the considerations.

My observations are as follows:

- Authors mention the use of "Virtual Reality" several times, but the only intervention uses Wii Balance Boards and conventional exergames. I would remove all mentions of virtual reality.

The terms "Virtual Reality" have been replaced by "exergames" or "video games".

- The authors plan to commence the study in October 2020, is this realistic with the COVID situation?

Due to the COVID-19 pandemic, following WHO guidelines and guidelines determined by the Federal University of Rio Grande do Norte (where the study is being conducted), the study schedule needed to be modified, and recruitment will be carried out by January 2021. Such changes were made to the protocol and were also to the trial registry.

- Although the authors do describe an appropriate randomization procedure, I do not see any methods to ensure that the randomized groups are comparable in assessment methods (no differences between groups prior to intervention). This should be mentioned. Adjustments were made so that the requested information was clarified and the statistical analysis underwent minor changes.

- Please include a measure of effect size when analyzing the results (e.g. cohens d)

Following the reviewer's recommendations, the appropriate effect size measure was added to the "statistical analysis" topic.

- Although the risk of bias seems low, and most of them are mentioned in different sections of the article, I would add a paragraph explicitly listing these biases; - The authors should also add a paragraph describing the limitations of the study.

The topic "Risk of Bias and Study Limitation" was added to the study, where the biases and limitations of the study were described.

- And finally, my biggest remark, I have seen many grammar errors in the article, e.g.:

"page 3 line 17 "clinical trial that aim is"

"page 4 line 50 "study will be explore"

"page 6 line 76 "these changes promote high risk of falling"

and several others. I strongly suggest to let a native english speaker take a look at the article.

After the changes, the entire manuscript was revised again by a specialized company (editage.com). The English revision certificate is attached.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Augusto Garcia-Agundez TU Darmstadt, Germany
<b>REVIEW RETURNED</b>	22-Aug-2020
<b>GENERAL COMMENTS</b>	The authors have addressed all comments and observation. I have no further changes to suggest.