

## 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>	Acceptability of a perturbation-based balance training program for falls prevention in older adults: a qualitative study
<b>AUTHORS</b>	Gerards, Marissa; Sieben, Judith; Marcellis, Rik; de Bie, Rob; Meijer, Kenneth; Lenssen, Antoine

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Hewitt , Jennifer The University of Sydney
<b>REVIEW RETURNED</b>	15-Oct-2021

<b>GENERAL COMMENTS</b>	<p>The paper is very well written, data are presented clearly, and the discussion is thoughtful and thorough.</p> <p>I have made some specific comments below – one important fact regarding sample selection is included:</p> <p>Abstract introduction: Line 8 The term “daily life falls” is unusual, please consider using the term “falls in daily life” or just “falls”.</p> <p>Page 4 line 46 Please address punctuation –“nts;[9].”</p> <p>Methods: Page 5 Line 15 Can you please give more detail on how participants were selected to be approached? It appears that 16 of the 83 participants from the main RCT were approached and all agreed to participate. For example, who determined the typical case status? If it was the same researcher that conducted the PBT sessions and most of the interviews this needs to be stated. It is important that the reader understands why this particular group was approached, to help form an opinion on how representative this group was. It would also be interesting to understand the adherence of this group compared to the wider group – eg. were these also the ones that attended most sessions?</p> <p>Strengths and limitations: Page 13: Line 26 It should be stated again in the limitations that one researcher conducted most of the interviews as well as the PBT sessions. If this was due to limited (or no) funding, this could be acknowledged, and it could be recommended that future research includes an interviewer separate to the intervention team.</p> <p>Likewise, if the participants that were included in this study were the ones that were most “agreeable” eg, had the best attendance, this needs to be acknowledged and a recommendation made to include those that did not attend regularly (or dropped out) in order to get a fuller understanding in future studies. I also recommend amending the title of the paper (if this was the case) to include that it is a qualitative study of adherers to the PTB training. Of course,</p>
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	if the attendance in the wider group matched this sub-group, this point is nullified.
<b>REVIEWER</b>	Finnegan, Susanne University of Warwick, Warwick Clinical Trials Unit
<b>REVIEW RETURNED</b>	27-Oct-2021
<b>GENERAL COMMENTS</b>	<p>Congratulations on this interesting and important piece of qualitative work.</p> <p>I think your paper should be accepted for publication but have a couple of comments/suggestions that you may want to consider in your discussion:</p> <p>Page 12, line 18 - 21: I found this sentence a little confusing and had to re-read it on numerous occasions to understand what you meant because of the use of the word balance in a different context - you may want to consider re-writing this sentence.</p> <p>Page 12, lines 29 - 35: Have you considered that the lack of perceived physical effects may have also been due to the very short duration of the intervention i.e. three sessions - is this actually enough to expect to see any physical benefits?</p> <p>Page 12, line 42: an additional up to date reference to support your suggestion that people think that falls are bad luck - Finnegan et al. BMC Geriatrics (2021) 21:91 <a href="https://doi.org/10.1186/s12877-021-02037-9">https://doi.org/10.1186/s12877-021-02037-9</a></p>

### VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Jennifer Hewitt , The University of Sydney

Comments to the Author:

The paper is very well written, data are presented clearly, and the discussion is thoughtful and thorough.

I have made some specific comments below – one important fact regarding sample selection is included:

Abstract introduction:

Line 8 The term “daily life falls” is unusual, please consider using the term “falls in daily life” or just “falls”.

The term ‘daily-life falls’ has been adjusted to ‘falls’.

Page 4 line 46 Please address punctuation –“nts;[9].”

Punctuation has been adjusted.

Methods:

Page 5 Line 15 Can you please give more detail on how participants were selected to be approached? It appears that 16 of the 83 participants from the main RCT were approached and all agreed to participate. For example, who determined the typical case status? If it was the same researcher that conducted the PBT sessions and most of the interviews this needs to be stated. It is important that the reader understands why this particular group was approached, to help form an opinion on how representative this group was. It would also be interesting to understand the

adherence of this group compared to the wider group – eg. were these also the ones that attended most sessions?

Thank you for your suggestions; we agree that this should be clarified. To address your first point, we have made adjustments on page 5 line 22 and on page 7 under 'reflexivity and triangulation' to clarify that MG was involved in PBT training, as well as sampling and some of the interviews. To address your second point, we have adjusted the text on page 7 under 'participant description' to clarify how many participants from the full RCT were in the PBT group, and to provide characteristics of the full PBT group in comparison to the group that was interviewed. Additional information was provided on training adherence; as you can see this was similar in the full PBT group (93,7%, average attendance 2.8 out of 3 training sessions) compared to the interviewed participants (98,3%, average attendance 2.9 out of 3 sessions).

Strengths and limitations:

Page 13: Line 26

It should be stated again in the limitations that one researcher conducted most of the interviews as well as the PBT sessions. If this was due to limited (or no) funding, this could be acknowledged, and it could be recommended that future research includes an interviewer separate to the intervention team. We have added this remark in the discussion section (strengths and limitations, page 13).

Likewise, if the participants that were included in this study were the ones that were most "agreeable" eg, had the best attendance, this needs to be acknowledged and a recommendation made to include those that did not attend regularly (or dropped out) in order to get a fuller understanding in future studies. I also recommend amending the title of the paper (if this was the case) to include that it is a qualitative study of adherers to the PTB training. Of course, if the attendance in the wider group matched this sub-group, this point is nullified.

We agree that this is a fair point, and acknowledge that this was not sufficiently clear from the original manuscript. We believe that these points have been addressed in reply to your previous comments, where we have added information to the methods and results sections to clarify that adherence to the PBT training was similar in the full PBT group (93,7%, average 2.8 out of 3 training sessions) compared to the participants that were interviewed (98,3%, average 2.9 out of 3 training sessions).

Reviewer: 2

Miss Susanne Finnegan, University of Warwick

Comments to the Author:

Congratulations on this interesting and important piece of qualitative work.

I think your paper should be accepted for publication but have a couple of comments/suggestions that you may want to consider in your discussion:

Page 12, line 18 - 21: I found this sentence a little confusing and had to re-read it on numerous occasions to understand what you meant because of the use of the word balance in a different context - you may want to consider re-writing this sentence.

We have changed the sentence to no longer include the word 'balance' to avoid confusion.

Page 12, lines 29 - 35: Have you considered that the lack of perceived physical effects may have also been due to the very short duration of the intervention i.e. three sessions - is this actually enough to expect to see any physical benefits?

We agree that the duration of three training sessions would indeed be very short to measure perceived physical effects for other balance training interventions. However, previous studies have shown that PBT has the potential to be effective with a low training dose. For example, studies found

a significant reduction in laboratory induced falls<sup>1,2</sup> and falls in daily life<sup>1</sup>, as well as improved measures of proactive and reactive balance control during perturbed walking<sup>2</sup> after one training session of 24 perturbations in older adults. Another study found a retention of reactive gait adaptations over several months in healthy middle-aged older adults after a single dose of 8 perturbations<sup>3</sup>. While more research is needed to determine the extent to which these effects transfer to daily life, based on these and other studies at least some physical benefits of PBT can be expected after three training sessions.

References: 1. Pai YC, Bhatt T, Yang F, Wang E. Perturbation training can reduce community-dwelling older adults' annual fall risk: a randomized controlled trial. *J Gerontol A Biol Sci Med Sci*. 2014 Dec;69(12):1586-94. doi: 10.1093/gerona/glu087.

2. Wang Y, Wang S, Bolton R, Kaur T, Bhatt T. Effects of task-specific obstacle-induced trip-perturbation training: proactive and reactive adaptation to reduce fall-risk in community-dwelling older adults. *Aging Clin Exp Res*. 2020 May;32(5):893-905. doi: 10.1007/s40520-019-01268-6.

3. König M, Epro G, Seeley J, Catalá-Lehnen P, Potthast W, Karamanidis K. Retention of improvement in gait stability over 14 weeks due to trip-perturbation training is dependent on perturbation dose. *J Biomech*. 2019 Feb 14;84:243-246. doi: 10.1016/j.jbiomech.2018.12.011.

Page 12, line 42: an additional up to date reference to support your suggestion that people think that falls are bad luck - Finnegan et al. *BMC Geriatrics* (2021) 21:91 <https://doi.org/10.1186/s12877-021-02037-9>

Thank you for bringing this to our attention; we have added the reference.

Reviewer: 1

Competing interests of Reviewer: I have no competing interests to declare

Reviewer: 2

Competing interests of Reviewer: I have no competing interests.