Reviewer's report

Title: Increasing upper-limb exercise provision in stroke rehabilitation: development of a behaviour change intervention and measuring implementation fidelity

Version: 1 Date: 29 October 2014

Reviewer: Heather Gainforth

I commend the authors for undertaking a necessary and admirable task of developing a theory-informed and evidence-based intervention for increasing upper-limb exercise in stroke rehabilitation. The authors argue for the importance of using theory to develop an intervention and seek to apply the Behaviour Change Wheel to develop an intervention for therapists who treat stroke patients.

While the authors have used aspects of the BCW to develop their intervention, I have several concerns about their application of the BCW to develop their intervention. In several cases, the authors do not apply the methods outlined in the original BCW paper or the recently published guide ‘Michie, S., Atkins, L., & West, R. (2014). The Behaviour Change Wheel: A Guide to Designing Interventions. Great Britain: Silverback Publishing’. Furthermore, their description of the intervention development process lacks sufficient detail to adequately adjudicate their efforts and seems to lack the systematic method outlined by the original authors of the BCW.

I recognise that this is likely an important intervention for stroke rehabilitation and I want to encourage the authors to carefully review previous application of the BCW to develop interventions (and the guide) and supplement both this paper and their intervention development process as necessary. Therefore, I have taken the time to provide specific comments and feedback to not only improve their application of the BCW but also to help strengthen the paper. In my opinion these are all major compulsory revisions before the paper can be considered for publication.

I hope the authors find these comments helpful and I wish them the best of luck with their intervention.


MAJOR COMPULSARY REVISIONS

Background

1. Page 1: Is there guidance that outlines how many minutes/repetitions should be performed when treating the upper limb in therapy sessions? This would be
helpful for contextualize the frequencies provided to the reader.

2. Page 1: Please provide further details regarding the uptake of GRASP. In terms of uptake, who has rapidly taken up the program, clinics? therapists? patients? And who is failing to adhere to key components? It is my understanding that dose and documentation of repetitions could be recorded by either the patient or the therapist. The target population for the intervention needs to be clarified.

3. Page 3: Please provide further detail of the TRACS trial.

4. Page 3: Please use the term mechanisms of action rather than ‘active mechanisms’

5. The Behaviour Change Wheel needs to be introduced as a method for developing interventions within the introduction. The authors should reference the BCW and accompanying guide. The authors should also outline the steps to intervention development outlined by the authors of the BCW.

6. Building on my previous critique, stating that the actual methods of ‘how to develop interventions remain elusive’ misguides the readers as the purpose of the BCW is to address this barrier to intervention development. Please address this point by provided a description of the BCW and its application to date.

Methods:

1. The authors need to clarify that the Behaviour Change Wheel is a framework for developing and designing interventions. At its hub is the COM-B model which is a behaviour change theory. The behaviour change wheel itself it not a theory.

2. Please provide further details regarding the development of the intervention development group and the expertise of the group for developing and designing behaviour change interventions.

3. The authors approach to using the COM-B model to determine factors that need to change (i.e. a behavioural analysis) in order for the behaviour to occur is not typical. In previous research studies applying the BCW to design an intervention, researchers have used interviews and questionnaires with the target group to identify factors that need to change in order for behaviour to occur. For example, please see the following resources:


While I commend the authors for establishing an intervention development group,
I question their rationale for using this group to determine which factors in the COM-B model need to change. The authors need to provide strong rationale for this choice. In particular, the authors need to provide rationale as to why they did not use the target group to identify factors that need to change and then use the intervention development group to decide which behaviour change techniques, intervention functions and policy categories were feasible in this context. Furthermore, the authors need to provide the framework (interview schedule, etc.) for how the discussions were facilitated and structured according to the BCW. As is, the paper reads as inappropriate application of the BCW methods.

4. Building on my previous point regarding the methods used to conduct a behavioural analysis, it seems that the primary source of evidence used to develop the intervention is practitioners perceptions of 1) behaviours most amenable to change and 2) factors that would lead to behaviour change. In addition to providing rationale for this point, the authors should also aim to provide the frequencies by which each behaviour and COM-B factor was nominated by therapists/intervention development group.

5. One of the primary goals of the BCW is to ensure that intervention developers consider all intervention options before designing their intervention. When selecting modes of delivery, the authors state that the intervention development group brainstormed ideals relating to delivery of the techniques. This is not consistent with the BCW approach which would consider intervention developers to consider all options by using a taxonomy of delivery methods.

6. The authors do not link their behavioural analysis (results of COM-B) to the intervention functions or policy categories within the BCW. This step should have been done before selecting BCTs or modes of delivery. The authors should take this step (even post-hoc) to determine whether the BCTs and modes of delivery are appropriate for their behavioural diagnosis, identification of intervention functions and policy categories. The paper as is does not seem to indicate the authors used this systematic approach.

The following paper and the guide provide good instruction as to how the authors should improve these steps and descriptions: Atkins, L., & Michie, S. (2013). Changing eating behaviour: What can we learn from behavioural science?. Nutrition Bulletin, 38(1), 30-35

7. The authors should provide further detail regarding the methods used to pilot the intervention and collect data from end-users. As written, the reader has no indication as to how this was completed nor what results would be expected from this step.

Results

1. The authors state that structured discussions were used to ascertain the amount of upper limb exercise stroke survivors are doing. This is likely not a valid or reliable measure of behaviour. The authors should have a baseline measure of behaviour and should cite these results in their paper.

2. The results section currently reads as a repetition of the methods section. I suggest the authors read previous papers that have applied the BCW to develop
interventions, this will help to structure their findings. The results section should primarily focus on the results of the structured discussions (i.e. the behavioural diagnosis - key factors identified) and linking these intervention functions and policy categories. The results of the behavioural analysis (using COM-B) should be presented similar to findings qualitative interview research by identifying salient factors and the frequency that these were mentioned or reported to be important by the group.

3. The authors need to identify how they systematically linked their behavioural diagnosis to intervention functions, policy categories, BCTs and modes of delivery that will be used in the intervention. Matrices for systematically linking each of these pieces of intervention development using the BCW are provided in the book Michie, S., Atkins, L., & West, R. (2014). The Behaviour Change Wheel: A Guide to Designing Interventions. Great Britain: Silverback Publishing. Once this long list has been produced, the authors need to outline why certain intervention functions, policy categories, BCTs and modes of delivery were seen to be inappropriate or appropriate by the intervention development team.

4. The description of the rationale pilot testing should be placed in the methods section. The results of the pilot testing and relate to specific methods (need to be outlined) should be placed in the results section.

5. The authors should also avoid interpretation of the data in the results section. This information should be placed in the discussion. There seems to be several examples in the text where the authors need to carefully consider which section the information should be presented in. For example, the authors state ‘The toolkit components were inexpensive, acceptable to the therapy team, fitted well with current methods of documentation, and were practical for therapists and patients/families’. For this statement, the methods provide details as to how the authors found this information/asked the questions. The results section should provide specific quantitative or qualitative findings that support this statement. The specific statement should likely remain in the discussion and should be discussed in further detail.

6. The authors do not use terms consistent with the BCW to present their findings. For example, ‘intervention components’ is not an aspect of BCW and is specifically avoided by the BCW authors. The authors do not use the terms ‘behavioural analysis’ or ‘diagnosis’ even though they seek to conduct one. The authors also do not use the terms ‘intervention functions’ or ‘policy categories’. This needs to be corrected.

Discussion

1. The discussion needs to begin with a citable statement outlining the specific components of the intervention.

2. The authors state that it is unclear when ‘enough is enough’ in terms of intervention development. I think the authors should review the current guide for applying the BCW. I think they will find this helpful for reporting their intervention and steps to intervention development.

3. The authors should avoid discuss the limitations of the intervention (as it has
yet to be tested) and rather focus on the strengths and limitations of using the BCW to develop their intervention. In particular, the challenges they faced in its application. Likewise the authors should comment on the intervention functions, policy categories, BCTs and modes of delivery that the BCW helped them to consider. In particular, how the BCW helped the intervention developers avoid creating an intervention that was not efficacious or acceptable to the target population.

MINOR REVISIONS
1. Page 2: In the abstract, there is a bracket missing from the third stage of development.

Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.

I do work under Professor Susan Michie who developed the Behaviour Change Wheel. Therefore, I have specific comments relating to its application for the authors.