Reviewer's report

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

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Reviewer: MARIE M JOHNSTON

Reviewer's report:

1. Is the question posed original, important and well defined?

The logic behind the development of the new BCI was not persuasive. The introduction appeared to lead to a different study from the one reported. The background to the paper indicates that there are evidence-based interventions such as GRASP that have been successful in promoting upper limb recovery and have been implemented rapidly into routine practice, but that the implementations lost key components of the BCI. The authors then argue that a new BCI should be developed which pays attention to changing the behaviour of health professionals during the process of development of the BCI. Why was the more logical approach not to investigate better methods of implementing a published successful intervention?

In addition to the logic of the argument, in terms of both science and practice, surely we should be seeking to improve what has already been shown to be effective either by developing it further or by improving its implementation. For example, the intensive programme that is incorporated in the BCI developed might have been evaluated as a method for ensuring and maintaining implementation of an evidence-based BCI. Instead the authors appear to have started from scratch to develop something new. There was a brief mention of GRASP materials, but no indication of how they were used in the development process.

It was not clear what readers should take from this study that might be applied elsewhere. The BCI was developed and they expect it to be maintained by a group specific to the locality. The rationale was that of optimising the 'potential fit' with the target context which implies that a different BCI would have to be developed and maintained in every new context.

2. Are the data sound and well controlled?

n/a

3. Is the interpretation (discussion and conclusion) well balanced and supported by the data?

The authors appear to think that the developed BCI might be applied elsewhere (with further assessment of generalizability) even though they specifically say the development was designed to ensure the implementation within the same
context. The only barrier to wider implementation of the BCI that is envisaged is the need for a 'highly motivated research team'.

Perhaps there is a confusion about whether the key point of this paper is about the development process or about the BCI which has been developed.

4. Are the methods appropriate and well described, and are sufficient details provided to allow others to evaluate and/or replicate the work?

In Stage 1, the collaboration involved clinicians and researchers. Given the aim of having a BCI that would be faithfully implemented, should there not have been representation from the management of the clinics? As an extreme example, if the BCI developed had required additional time or other resources, managers might have been able to rule out impossible suggestions or propose alternatives.

In Stages 2 and 3, the use of COM-B and BCTTv1 are very appropriate, well-described and explained, successfully implemented and extremely well-reported. My only reservation at these stages is that it is unclear how evidence of previous successful BCIs was incorporated.

In Stage 4, as the authors admit, it is not possible to assess whether fidelity of delivery could be attributed to the BCI development process as the continued monitoring by the development group probably functioned as a set of BCT e.g. defining a goal, monitoring, providing feedback. So it is doubtful if the embedded toolkit for assessing fidelity could actually function as a fidelity check without being a set of BCTs.

5. What are the strengths and weaknesses of the methods?

The strengths are the clarity of description of the process and the use of good methods in identifying target behaviours and components of the BCI. The weaknesses in the methods relate to the construction of the development group, apparently not using previous evidence and seeming to have developed a BCI which requires ongoing maintenance by the full development group. It seems likely that a different BCI (including those that have published evidence of effectiveness) might be effectively implemented and maintained by the monitoring and support process that the development group continue to provide.

6. Can the writing, organization, tables and figures be improved?

Tables etc. look good. In reporting BCTs it would be useful to include the number of the BCI in the BCTTv1.

7. Do the title and abstract accurately convey what has been found?

Both title and abstract are caught in the dilemma about whether the paper reports an implementable BCI, that might be implemented and investigated elsewhere or whether it is about a proposed method of developing interventions.

The title implies that the main thing the paper will deal with is increasing exercise in stroke rehabilitation. If that were the case then more evidence about previous successful BCIs would be necessary.

It is misleading to include in the title 'measuring implementation fidelity' as this is
not 'measured' and could not really be assessed while the process was so heavily monitored by the development group.

8. Is the writing acceptable?
   Yes.