Reviewer’s report

Title: The General Health Questionnaire-28 (GHQ-28) as an outcome measurement in a randomized controlled trial in a Norwegian stroke population

Version: 0 Date: 15 Sep 2018

Reviewer: Reviewer 2

Reviewer’s report:

PEER REVIEWER COMMENTS: To view the full report from the academic peer reviewer, please see the attached file.

REVIEWER COMMENTS FROM REPORT: Overall this is a useful contribution to the literature: the manuscript addresses the consistent application of GHQ-28 to Norwegian patients with mild or moderate stroke, and in particular confirms measurement invariance over time. The authors make a good point that this is especially relevant to stroke patients where recover is tracked over time. Good practice has been followed with respect to use of Horn's parallel analysis with other methods to determine the number of factors.

REQUESTED REVISIONS:

The authors need to better justify that there is need for investigation of Norwegian stroke patients in particular. There have been wider investigations, especially among stroke patients. So why do we need to look specifically at Norwegian stroke patients?

The authors note that the 322 patients come from 11 hospitals. Should clustering effects be considered? Should the analysis be multilevel? It would be useful to show that clustering can be ignored before progressing to EFA.

There is discussion that GHQ-28 was designed to be self-administered, but it appears (not exactly clear) that for this trial, GHQ-28 is completed by an interviewer. This is common for stroke studies and should be made clear. It might help explain differences from the general setting.

The assumption of MAR needs to be justified. I have doubts that it can hold for this this trial, although it is difficult to progress without MAR. Single imputation, which was employed has the issue that it suppresses variation and uncertainty. The method of imputation needs to be more detailed. Was a PMM routine used? That would be preferred to regression for example.

This next point is one of major concern. The original GHQ-28 domains were constructed by EFA with varimax rotation. Here the authors have used oblimin. This will give different results for the domains. Hence there is no surprise that the authors report differences to the original
factor structure. As much of the manuscript concerns this, it is a serious issue that needs correction.

As with other stroke studies that authors observe that symptoms reported through GHQ-28 reduce over time as the patient recovers. It is important to note that the factor structure remains the same. On the other hand, the authors have performed CFA (at T2) with the same patients for which they undertook EFA (at T1). So this is not an independent dataset and claims of confirmation should be 'muted': at least the non-independence should be emphasized. Note that it is most unlikely that patients missing at T2 at not MAR - there is high mortality due to stroke, so that non-participation at T2 could be due to death and this is more likely to occur to those patients who are more unwell and report more severe symptoms at T1. This will result in an improvement in GHQ-28 over time for the cohort as a whole.

ADDITIONAL REQUESTS/SUGGESTIONS:

The authors should:

justify the study of Norwegian stroke patients as a population differing from others previously studied check if clustering within hospital can be ignored perhaps by fitting a simple variance components model for total GHQ-28

Undertake multiple imputation rather than single imputation

Explain in more detail the imputation method (PMM - I assume)

Use varimax rotation rather than oblimin to enable comparison with original domains

Explain that CFA population is not independent of EFA population but this enables measurement invariance over time to be explored

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No
Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review? If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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