Reviewer's report

Title: The factorial structure of the mini mental state examination (MMSE) in Japanese dementia patients

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Reviewer: Guk-Hee Kee Suh

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This factor analysis provides three factors of MMSE, Japanese version using very large sample size of 30895 dementia patients. In spite of excellence and long-lasting efforts of researchers for this study, it is still necessary to improve quality by answering basic questions following and revising this manuscript accordingly.

1. Abstracts: Results - please describe more accurately without using 'approximately 85% ~', which seems different from main text. The sentence 'The first factor was a simple index.' looks unusual and difficult to understand. Further, each factor should have a representing name (i.e., immediate memory, orientation and delayed recall, working memory). It is very similar to another abstract for published paper;


2. In spite of very large sample size, authors failed to provide sufficient descriptions on the study population and method for data collection, which would be essential to judge appropriateness of study methods.

3. It is difficult to estimate whether the data are sound at this moment. Please describe methods section more precisely.

4. It is also helpful to show a table of MMSE instead of full description about the MMSE at page 5.

5. Data distribution at page 6.

   It is not usual way to transform data for the factor analysis to make them normally distributed, even though it would be better to use data with normal distribution. If authors need normal distribution, data should be collection among normal population.

6. Result

   Classification of severity of dementia looks arbitrary and uncommon, which has not been used in this field. For example, ‘Slight dementia’ is defined for dementia
patients with MMSE score between 24 - 29. If authors want to apply the MMSE score for scale to define dementia, cutoff of 24 has been widely used to define dementia caseness. Or authors should use rational nomenclature.

7. Table 1.

Table 1 shows that almost all dementia patients with MMSE score under 23 show disorientation in time and space and calculation in serial 7 for attention/concentration, while 75.3% of dementia patients with MMSE score over 24 show problem in delayed recall and more than half of them could not succeed in serial 7. Authors should explain this observations in the Discussion section, which would be related to characteristics of study population.

8. Recommendation for Names for three factors are as follows; immediate response(factor 1), delayed recall and orientation (factor 2), working memory (factor 3).

9. Many misspelt words are being found, which should be corrected by authors.

10. Authors forgot to include limitations of their own study in the Discussion section. It should be clearly and critically stated.


12. Authors should remember to revise abstracts finally after full revision of main text.

13. It is also recommended that factor analysis should be reiterated using only subpopulation of Alzheimer's disease, if authors have sufficient data of subtype diagnoses of dementia.[Title; The factorial structure of Japanese version of the mini mental state examination (MMSE) in Alzheimer's disease]. If not, it should be clearly stated as a limitation of this study.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**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.