Reviewer’s report

Title: Developing an Adapted Charlson Comorbidity Index for Ischemic Stroke Outcome Studies

Version: 0 Date: 06 Aug 2019

Reviewer: Amit Kumar

Reviewer's report:

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This paper is validating previous research. However just comparing Charlson with modified version is not adding new information. The C statistics almost the same for both versions.

Comorbidities increase the risk of developing medical complications and negatively impact functional discharge status, length of stay, discharge destination, 30-day hospital readmission, and mortality. Several standardized comorbidity indexes (Charlson, Elixhauser) have been developed to predict mortality, and other health outcomes but limited research have been done to test these comorbidity indexes for patient-centered outcomes.

1. There are several confusing sentences throughout the paper. It will better to revise and have a proof read before submission.

2. Line 127: What was the reason for adjusting three comorbidity indices in logistic regression to model for three outcomes. May be wording is not correct. Do you mean adding comorbidity indexes in the different model?

3. Line 148: The most frequently reported hemi or paraplegia (17%). This is wrong since the study sample includes stroke. ICD-10 codes for hemiplegia may capture a large number of stroke patients.

4. Line 176: What is modified stroke score, never mentioned earlier.

5. What is the reason behind categorizing age? The continuous form will capture more granularity.

6. There is inconsistent use of ISCISS (Ischemic Stroke Charlson index summary score) and ISCCI (Ischemic stroke Charlson comorbidity index) throughout the paper. It is confusing.
7. In past research in developing weights for comorbidity indexes, Beta coefficient were used to derive weights. I am not sure the Hazard ratio is the right way to calculate weights. What is the reason to use HR of 1.2 as a cutoff value?

8. Why Peripheral vascular disease and Renal disease have 0 weights in Table 2, if HR is higher than 1.2.

9. Title for table 2 is confusing- Author can make something easier like -- Hazard ratios and comorbidity weights compared with weights of original Charlson comorbidity index.

10. Title of table 3 is also confusing - Author can make something easier like -- Comparison of Model performance among ischemic stroke patients in the validation cohort.

11. There is no information regarding derivation of study sample (exclusion and inclusion criteria). Good to have flowchart.

12. There is no information regarding case-mix/severity such as NIH stroke severity or modified Rankin Scale which is a commonly used scale for measuring the degree of disability after stroke. This is major limitation while using administrative data in the US. In the US, administrative claims data don't report NIH stroke severity or Rankin score. If Ontario Stroke Registry's provincial acute stroke audit and Discharge Abstract database (DAD) have any information regarding case-mix or functional status/disability, then please include in model.

13. Patients with ischemic stroke receiving TPA would have different outcome. Can you please add that in the model?

**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.

Yes

**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.
I recommend additional statistical review

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

Not suitable for publication unless extensively edited

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