Reviewer's report

Title: Risk factors for non-communicable disease and healthcare expenditure in employees with private health insurance presenting for health risk appraisal: A cross-sectional study

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Reviewer: Sanjoti Parekh

Reviewer's report:

This is an interesting cross-sectional study that attempts to establish association between risk factors and health-care expenditure. Overall, the methods are good and data is sound however there are some gaps in conveying the research which need to be filled.

Major

1. The study title needs to convey clustering as major focus of the study as it is listed as main aim of the study.

2. Authors speak about 7 risk behaviours and a score of 0 to 7 however there are only 6 risk behaviours as authors have added fruit and veg intake as one variable. This requires attention.

3. There are two pathways by which PA affects chronic conditions: direct associations (some cancers and PA or CVD and PA) or through risk factors such as high BP, BMI or high cholesterol. Authors do not mention it at all. If the authors are combining these risk behaviours in one scale then this is important issue to add to the discussion.

4. Figure 1 is the only necessary figure and rest of the figures can be deleted as the data is included under results.

5. Figure one does not explain origin of certain numbers: 409 mentioned in the abstract (either remove it or add it to the figure), 2789 from the abstract when it is not in Figure 1, 789 mentioned on page 5 (how does it fit in figure 1?)

6. The number of participants included in each analysis needs to be mentioned clearly. Eg what was the number of participants that was use to calculate prevalence of employees at risk in figure two or first paragraph on page 9?

7. One of the main aims is to test clustering of risk behaviours however the authors have missed on the literature that is available on clustering of health behaviours from the background section. The background needs to reduce information on HRA and missing information on clustering.

8. Discussion requires mention of bias introduced due to large number of participants refusing to participate (46789), self-report data on physical activity, volunteer to participate.

9. In cross-sectional data it is unclear that physical activity is changed after the diagnosis of chronic condition or before, hence this need to be discussed as a
part of discussion with mention of teachable moment in changing health behaviours.

10. Rather than adding a figure for odds ratio, a table would be better with OR, CI, P-values and comparators.

11. A table for health care expenditure with groups (physical activity: at risk/not at risk), risk factors (less than 2/two or more) : with numbers, mean expenditure with (CI) and p values will add value.

Minor

12. Paragraph 2 on page 11 requires precise discussion and “the ability----overall health status” is unnecessary and does not add value to the paper.

13. Paragraph two on page 12 starts with explaining use of health services by participants with higher risk score and then moves on to talking about PA. It is unclear, what point do authors want to convey.

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

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'