Reviewer’s report

Title: Multimorbidity as a predictor of health service utilization in Primary Care: a registry-based study of the Catalan population

Version: 0 Date: 14 Aug 2018

Reviewer: Amaia Calderón-Larrañaga

Reviewer's report:

This paper aims to compare the predictive capacity of three different morbidity measures in terms of medical and social care services use. While the paper is easy to follow, it provides little novelty and there are some technical aspects that reduce its soundness. Below are some specific comments:

- There are several other studies, and even systematic reviews, that have aimed to answer the same research question as the one stated in this paper. The authors should summarize the available evidence in this area already in the introduction, emphasizing how their study adds to what is already known. For example, some studies have concluded that the simple count of chronic diseases or of prescribed medications is almost as effective at predicting health care use as more sophisticated indices. Related to this, the comparative performance of such a simple measure is lacking in the paper, and would be of high interest.

- The three measures of morbidity burden used in the study should be better described in the methods, in terms of the information required for their calculation (especially in the case of the CRG), whether they are privately owned, and the number and type of categories they lead to (for the GMA, 31 groups are described in the methods but only 7 groups are shown in Table 2). Related to this, I was somewhat puzzled with the fact that the GMA score is based on mortality and healthcare use data. This implies circularity between this index and the outcome that could explain the better performance of the former with respect to the other two measures.

- Given that the main focus of the paper is on comparing the predictive power of different measures, the parameters used for such an assessment should be better described. That is, while Nagelkerke's R2 is used to measure overall model performance, the discriminative ability is usually appraised through the AUC parameter, and the AIC values tend to inform about the relative quality of the statistical model. Related to this, it may be more pertinent to show AUC rather than R2 values in the abstract.

- In the discussion, the authors state that additional data should be integrated into risk predictive models in order to enhance and optimize the assessment. Any ideas on which other variables of dimensions should be considered? Along these lines, there is emerging evidence that functional parameters (e.g. mobility, strength, cognitive status) decisively interact with chronic conditions shaping people's patterns of use and access to healthcare services. Some reflection along these lines would be much appreciated.

Additional minor comments:

- The authors should also clarify how the different threshold for frequent attenders and polypharmacy were decided.

- In Table 2, the distribution of the different morbidity measures by socioeconomic status should be added, given that the latter is also an essential determinant of medical and social services use.

- The fact that the variable "social support" was only available for part of the sample needs to be stated in the methods, rather than in the limitations.

- The article would benefit from general editing by a native speaker. For example, the background section of the abstract is now poorly understandable.
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.

Yes

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

Yes

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