Reviewer’s report

Title: To what extent is multi-morbidity associated with new onset depression in patients attending cardiac rehabilitation?

Version: 1 Date: 11 Sep 2019

Reviewer: Angela Rao

Reviewer's report:

Thank you for the opportunity to review your manuscript. The size of the dataset is impressive, and it is good to see that the authors have added regression modelling to strengthen the quality of the paper. It is also great to see the inclusion of psychosocial factors associated with depression and quality of life being highlighted in this paper, including the IMD index which has implications for CR service delivery. Please address the following comments below in your next revision:

Abstract

Methods: Binary logistic regression - what tests were used to run the binary regression model? For example, a likelihood ratio test?

Results: Odds ratios would be better reported as 'significant predictors' or 'independent predictors' rather than 'significant correlates' to reflect the additional analyses undertaken.

Conclusion: What is meant by individual characteristics in this context? Does this solely refer to people 'from areas with higher levels of social deprivation'? This term could imply personality factors, acute or chronic stress for example. However, from this data it seems to refer to psychosocial factors or cardiovascular risk factors. Please consider modifying this term for clarity. The authors may consider the ESC position paper on psychosocial aspects in cardiac rehabilitation (Pogosova et al. 2015) helpful. The Fava and Sonino 2010 paper 'Psychosomatic medicine' may also be helpful to clarifying terminology regarding individual factors or vulnerability.
Manuscript

Methods:
The type of observational study needs to be specified in the methods. E.g was this a cross-sectional study?

Measures: There are a few minor grammatical errors that could be fixed in this section. E.g. Please try not to use the same word twice in a single sentence. E.g 'population' and 'patients'. Lines 92 and 100 also require attention.

Statistical analysis: Please change 'associations' to 'statistically significant predictors' in this section to accurately reflect the binary regression undertaken. It would also be helpful to add the (HADS ≥ 8) cut-off score in this section for clarity in defining those with new onset depressive symptoms who were included in the model.

Tables: It would be beneficial to the reader to include the numbers included in each analyses as well as the percentages. The total number of included participants should also be included in table 2 and 3 as reported in table 1. The regression coefficient and probabilities could be removed from the table for the benefit of the reader.

The number of people who answered the HADS adds up to 109056 rather than 109055. Please check the total represented in the text with the tables and flow diagram. The flow diagram is quite helpful in this section. It could also be helpful to report the proportion/percentage of the NACR population who answered the HADS in the participants section as it is of significance to CR service delivery.

The non-parametric effect size calculations were a great addition to the manuscript.

Results:

Line 154-156. The results should only report the findings rather than how the analyses were completed. There is no need to repeat the use of chi squared tests and independent t tests and what variables these were applied to. Please delete or move this information to the methods section of your paper. This also applies to line 173.
Discussion:

Please do not re-report the statistical details in the discussion (i.e. the confidence intervals and p values), as this is data is included in the results section of the paper.

Now that the paper has added the regression model, it would be better to highlight the factors that predict early onset depressive symptoms, as this is a stronger analyses when compared with the factors associated with the new onset of depressive symptoms. This will also tighten your discussion, which could be better synthesised. The key implications for cardiac rehabilitation research and practice need to be better highlighted by omitting some of the text that repeats the results.

The implications of addressing psychosocial factors as classified by the IMD for cardiac rehabilitation service delivery need to be better discussed. It could be worthwhile discussing how your findings relate to the ESC position paper on psychosocial aspects in cardiac rehabilitation (Pogosova et al. 2015).

Limitations: Please do not re-report results in the discussion section of the paper. Rather, please include the data reporting the characteristics of the sample as a whole in the results section where you report the study population.

Conclusion: Given that adjustments were made to the manuscript, the conclusion should reflect the factors generated from multivariate analyses of new onset depression in cardiac rehabilitation, rather than focusing on the associations generated from univariate analyses. The objectives also do not to be restated, so I would recommend deleting the first sentence. The conclusion states that "CR programmes need to raise awareness to patients" but does not make the link to what patients should be made more aware of. Do you mean their increased risk of future cardiovascular events due to their increased psychosocial risk and the presence of multiple comorbidities?
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

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

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:

Acceptable

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