Author's response to reviews

Title: Use of routine hospital morbidity data together with weight and height of patients to predict in-hospital complications following total joint replacement

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Response to Reviewers

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BMC Health Services Research

Dear Editor and Reviewers,

We are grateful for the comments and suggestions. The manuscript has been revised and in the following document we provide explanations to each of the raised questions and comments.

Response to the comments of Reviewer 1

Point 1: “This manuscript describes an attempt to validate the Hospital Morbidity Data (HMD) and to judge whether there is room for improvement by adding extra variables. The primary research question is important since more and more large studies are based on these types of database structures, and because of the large numbers in these reports, they may have important political implications.”

Response to Point 1: Thank you.

In an earlier analysis (published in J Clin Epidemiol, reference 9), we have validated a selected number of major co-morbidities and procedures as recorded in the Western Australia HMD. Our previous analysis has shown that this database correctly detects major co-morbidities and procedures, but it fails to detect those of a less serious nature. In this current analysis, we validated the HMD-recorded diagnosis of obesity and we demonstrated
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how to improve the ability of these routinely collected data in predicting a major health outcome following a total joint replacement (TJR) procedure.

Point 2: “This study clearly shows that the information in the tested HMD is not reliable, of the obese patients only 64/216 (30%) are marked as obese, meaning that a total of 70% is not documented.”

Response to Point 2:
As suggested, we have stressed this finding throughout our manuscript including Abstract, Results, and Discussion.

Point 3: “This is important information, which reflects all studies performed with these databases structures. However, in the current results and discussion this important point is not that clearly discussed and disappears in the remarks of possible improvement. I would like to see this article re-written, focussed on the primary research question and discussing the lack of validity of the HMD and its implications on past and current research.”

Response to Point 3: As suggested, we have re-written a major part of the Discussion and we have improved the Introduction that starts the argument of this analysis. This analysis, however, did not validate the whole HMD but just focused on one recorded diagnosis: “obesity”. The main research question was whether the addition of minimal information (actual weight and height) to HMD could make the latter a better tool to predict a major health outcome in elderly men who undergo TJR. We have demonstrated that augmenting the HMD with these two variables can improve the model fit when predicting major in-hospital complications that have been classified as life-threatening by 13 independent surgeons. This was the main focus of this study and this was discussed throughout the paper. In our previously published manuscript (reference 9), we have discussed the validity of HMD more
generally and its implications on research. In that analysis (ref 9), we have also demonstrated that co-morbidity as recorded in HMD, irrespective of method used to measure it, independently increased risk of adverse outcomes and that the WA hospital morbidity database was a valid tool for epidemiological research.

Our current study highlights the lack of validity of the recorded diagnosis of obesity and, as suggested, we stressed this point and discussed its implications on research.

Point 4: “Needs some language corrections before being published”

Response to point 4: As suggested, we corrected detected English language errors.

Response to the comments of Reviewer 2

Point 1: “Throughout the paper, P values greater than 0.01 can be rounded to the nearest 0.01.”

Response to point 1: As suggested, P values greater than 0.01 were rounded to the nearest 0.01.

Point 2: “Methods, weight change over 5-yr interval, page 7. If change in weight is the variable of interest, please report the average change in weight rather than weight at baseline and then 5 yrs later.”

Response to point 2: As suggested, the mean change in weight was reported. In addition, we cited our recently published manuscript (ref 18) where we assessed the agreement between the weights at baseline and 5 years later by the Bland-Altman plot which supports our assumption of relatively constant weight over a period of 5 years in our cohort of older men.
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**Point 3:** “Methods, weight, page 8. Why was the weight as quintiles used in the logistic regression? A continuous variable provides more power. A brief explanation will be useful.”

**Response to point 3:** In this revised study, we used weight both as a continuous variable and as quintiles. We clarified this in the Methods. Using weight as a continuous variable did provide a better model discrimination as compared with weight quintiles. However, this improvement was not statistically significant (Areas under ROC curve: 0.75 (for model that included weight quintiles) versus 0.7568 (for model that included weight as a continuous variable), P=NS. We used weight quintiles in order to investigate a possible dose-response relationship between our outcome and the increase in the weight categories. As suggested, this has been clarified in the manuscript.

**Point 4:** “Throughout the paper, percentages can be rounded to the nearest percent. Does anyone really care about 0.1%? The numbers will also be easier to read.”

**Response to point 4:** As suggested, percentages were rounded to the nearest percent.

**Point 5:** “Results, page 10, top. It will help to include the labels “model 1” and “model 2” in the text rather than force the reader to remember or refer to somewhere else.”

**Response to point 5:** As suggested, the labels “Model 1” and “Model 2” were added.

**Point 6:** “The figure is rather clunky. Can it be improved?”

**Response to point 6:** In this revised version, we submitted the figure as a TIFF file which significantly improved its quality.
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**Point 7:** “Appendix 2; the right hand columns need to be labelled. I assume they are number and percentages. Some of my calculations differ: for example, for 17 thromboemboli, I calculate 17/857=2.0 rather than 1.9.”

**Response to point 7:** As suggested, we corrected the labelling in Appendix 2 and we reviewed all reported calculations correcting the following:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thromboembolism / deep vein thrombosis</td>
<td>17</td>
<td>2.0</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>15</td>
<td>1.8</td>
</tr>
<tr>
<td>Hip abscess/septic arthritis/acute osteomyelitis</td>
<td>3</td>
<td>0.4</td>
</tr>
<tr>
<td>Bacteraemia</td>
<td>15</td>
<td>1.8</td>
</tr>
<tr>
<td>Post operative infection / sepsis</td>
<td>21</td>
<td>2.5</td>
</tr>
</tbody>
</table>

The introduced changes in the manuscript are highlighted in red font.

Yours sincerely,

George Mnatzaganian

*Corresponding author*