Author’s response to reviews

Title: Factors Associated with Prolonged Length of Stay for Elective Hepatobiliary and Neurosurgery Patients: A Retrospective Medical Record Review

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Responses to Editor and Reviewers

BHSR-D-17-00090R1

Factors Associated with Prolonged Length of Stay for Elective Hepatobiliary and Neurosurgery Patients: A Retrospective Medical Record Review

Comments by and Responses to Editor:

1. “Your manuscript "Factors Associated with Prolonged Length of Stay for Elective Hepatobiliary and Neurosurgery Patients: A Retrospective Medical Record Review" (BHSR-D-17-00090R1) has been assessed by our reviewers. Based on these reports, and my own assessment as Editor, I am pleased to inform you that it is potentially acceptable for publication
in BMC Health Services Research, once you have carried out some essential revisions suggested by our reviewers.”

Response: Thank you very much for the positive response by you and the Reviewers of our revised paper. We are very encouraged. We have carried out the essential revisions suggested by you and the reviewers. We hope that these changes have met your expectations. Thank you very much.

2. “We request that a point-by-point response letter accompanies your revised manuscript. This letter must provide a detailed response to each reviewer/editorial point raised, describing what amendments have been made to the manuscript text and where these can be found (e.g. Methods section, line 12, page 5). If you disagree with any comments raised, please provide a detailed rebuttal to help explain and justify your decision. Please also ensure that your revised manuscript conforms to the journal style, which can be found in the Instructions for Authors on the journal homepage.”

Response: We have provided a point-by-point response to the comments made describing the amendments we made and indicated where these changes can be found in the manuscript. We have also ensured that the revised manuscript confirms to this journal’s requirements. We hope you are pleased with our changes. Thank you very much for the opportunity to revise this paper for publication in BMC Health Services Research.

3. “Please include a separate Conclusion section, which should state clearly the main conclusions of the research article and give a clear explanation of their importance and relevance. You can use the last paragraph(s) of your Discussion section if relevant.”

Response: Thank you very much for your instruction to include a Conclusion section. We have done so as shown on page 14. Thank you very much for your guidance.

4. “Please use author initials for the Author contributions section. Please also confirm that all authors read and approved the final manuscript. Please also ensure that all authors are included in the list - currently Alfred Kow and Sein Lwin are missing.”

Response: Thank you for your instructions pertaining to issues about authors. We have done so as seen on page 15 & 16. Thank you for highlighting our oversight and we have now included Professors Alfred Kow and Sein Lwin in the list of author contributions. All authors have read and approved the final manuscript.
5. “In your Declarations section:

Please ensure that your manuscript contains a Declarations section, with all of the following subsections:

* List of abbreviations
* Ethics approval and consent to participate
* Consent to publish
* Availability of data and materials
* Competing interests
* Funding
* Authors' contributions
* Acknowledgements.

Please see http://bmchealthservres.biomedcentral.com/submission-guidelines/preparing-your-manuscript/research-article for more information. Please note we require all of these sections even if they are not applicable to your study. Returning your manuscript without a Declarations section, or missing any of the subsections, will result in your manuscript being returned to you for further revision.”

Response: Thank you for your clear instructions. We have done as requested. Thank you very much for allowing us to revise the paper and your positive response to it.

Comments by and Responses to Reviewer 1:

1. “I would like to congratulate the authors as they did a great job in revising their manuscript. I feel the current manuscript much improved and is easy to read as compared with the previous version. I especially admire the authors efforts on introducing the factors in Background section and their efforts on re-defining LOS which lead to a major revision of statistical analysis. However, there are some minor but essential points should be further revised. I hope that the following comments will be helpful.”

Response: Thank you very much for your strong endorsement of our revised paper. We are very encouraged and appreciate your comments to further strengthen this paper.
2. “As for limitation, I think that the cross-sectional study design is another limitation because we cannot conclude any causal effect.”

Response: We agree with your observation about the cross-sectional study design. We have included this limitation in the manuscript on page 14 in the second paragraph as follows: “A second limitation is the cross-sectional design, which restricts a determination of a causal relationship among variables. This limitation presents a future research opportunity with longitudinal studies.” Thank you for pointing this out.

3. “What is High BMI in Tables 1 and 2? The authors should define it as the Tables should stand alone.”

Response: Thank you for highlighting this oversight. We have changed the term to ‘Unhealthy BMI’ and defined the term at the bottom of Tables 1 and 2 on pages 21 and 22 respectively as “Unhealthy BMI = BMI outside the 18.5-23 range”. We hope this was the information that you were looking for.

4. “Tables 3 and 4:
(1) When we interpret the logistic regression results, the beta information is quite indirect. Please report the exp (B).”

Response: Thank you for your suggestion. We have included the Exp(B) values in Tables 3 and 4 on pages 23 and 24 respectively.

5. “(2) Also, the authors should provide the reference group in the predictors if any (e.g., in the admissions after 5pm, does after 5 pm being a reference group or before 5 pm a reference group).”

Response: Thank you for your question. All dichotomous variables such as Male, Admissions after 5pm, Referral to OT, Referral to PT, and Discharged after 5pm are the reference group as described in Appendix Supplemental 2 but we have made it clear again in Tables 3 and 4 on pages 23 and 24 with a superscript. We hope that this information meets with your expectation.

6. “(3) Please use <0.001 to replace the 0.00 value in p-value.”
Response: Thank you very much for your suggestion. We have replaced all these values to <0.001 in Tables 1-4 as shown in pages 21-24.

7. “(4) Please define the abbreviations in the Tables.”

Response: Thank you for your suggestion. We have defined the following abbreviations at the bottom of Tables 1-4 on pages 21-24 where applicable as follows: “LOS = length of stay”, “HPB = hepatobiliary”, “NS = neurosurgery”, “TSP = table of surgical procedure”, “BMI = body-mass index”, “OT = occupational therapy”, “PT = physiotherapy”, and “HAI = hospital-acquired infections”.

8. “(5) I personally feel that reporting R square in the logistic regression means nothing. But I have no objection if the authors want to report it; however, please indicate which R square they are using in the logistic regression.”

Response: Thank you for your observation. We agree and have eliminated our reporting of the R square values in Tables 3 and 4 on pages 23 and 24.

9. “Finally, I appreciate the contribution from the authors, and hope that they will continue their good work for patients' health.”

Response: Thank you very much for your careful reading of our revision and for your suggestions. We believe that they have significantly improved this paper. We appreciate your endorsement of the importance of this study and are encouraged by your positive response to our revision.

Comments by and Responses to Reviewer 2:

1. “Thank you for inviting me to review this revised version. It is appreciated that the authors revised this manuscript heavily with reference to the reviewers' comments. Literature review is richer than before.”
Response: Thank you very much for your endorsement of our revision. We are very encouraged and thank you for your insightful comments and suggestions in the previous version.

2. “Statistical analysis. A stepwise logistic regression was used to derive the predictive model. Is it a common practice to use a backward logistic regression for verification.”

Response: Thank you for your question. We report the backward logistic regression to ensure that our results are stable to the specification of the estimation model (i.e., to check the robustness of our estimates). We acknowledge that using backward logistic regression for verification is a judgment call made by authors, reviewers, editors, and specific journals. We are happy to remove it if requested. However, if you think that this is a minor point, we would like to keep it.

3. “Discussion and conclusion. As mentioned before, the results deserve a lot of discussion to justify and communicate with the literature. However, currently, the discussion is only expanded in some extended.”

Response: Thank you for your suggestion. We have attempted to link our discussion back to the literature review as seen on pages 12-14 as follows: “…In line with Chang’s [23] study on aortic surgery, age was related to prolonged LOS. Elderly patients face physiological dysfunctions from major surgeries that may slow recovery and delay hospital discharge [24]. … Similar to Partridge’s [28] study on arterial vascular surgery, our data showed that low functional status and frail patients who needed OT had prolonged LOS. Our results may suggest that physiologically vulnerable patients may need additional care plans to improve their walking capacity, muscle strength, flexibility, balance, or endurance, thus prolonging LOS. The implications of knowing that age, functional status, and frailty needing OT may be associated with prolonged LOS for HPB and NS patients are that hospitals could implement evidence-based policies to prepare such patients for surgery to increase patient safety and reduce LOS… among systems factors, admission after 5pm was associated with prolonged LOS, in line with Earnest’s [37] study. … Admission after 5pm not only added another day of hospital stay but patients also face delays in diagnostic tests as well as limited inpatient care due to the diminished availability of staff and expertise at night. This finding may suggest that hospitals could consider establishing a policy of not admitting patients for elective surgeries after 5pm to avoid an additional day at the hospital and preventing delays. … the number of HAI, a postoperative factor, predicted prolonged LOS for the NS sample. This result suggests the importance of reducing surgical site infections and other complications after surgery. Specifically, post-surgical care should focus on wound support and better monitoring by the team for pneumonia and nosocomial infections. Perhaps, hospitals could consider postoperative procedures such as Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) to improve teamwork in patient monitoring
among the inpatient care team. Evidence suggests that such protocols can reduce HAI to improve patient safety [56]... .” Thank you for this comment. It helps us anchor our findings in the literature more generally and therefore strengthen the contribution.

4. “Page 13, line 19-22. "Among system factors, reducing admission after 5pm will minimize periods when a skeletal night crew must care for patients at a time they are most vulnerable and need optimal care…". The system factors "admission of surgery after 5pm" seems a kind of administrative issues affecting both patients. However, it is very unclear why this factor was predictor and more elaboration is needed.”

Response: Thank you for your question. On page 6, we presented 2 types of factors that have been associated with LOS, namely “patient and systems level” factors. On page 7, we indicated that “preoperative hospital administrative system factors” include “time of admission [37]” and explained that hospitals that allow patients to be admitted “after 5pm often face delays in the initial physical examination and diagnostic tests due to diminished availability of staff and expertise. In general, perioperative patient care after office hours is limited by a reduced clinical crew. Consequently, the day and time of admission have been associated with increased LOS, preventable adverse events, and mortality of patients with pulmonary embolism and myocardial infarction [37, 38].” We hope that the discussion at the beginning of the paper in the literature provides the context for our discussion on page 13 and why ‘admission after 5pm” would be a predictor variable for LOS. Admission after 5pm showed significant differences between below and above median LOS for both HPB and NS samples in Tables 1 and 2. We could only speculate that it wasn’t a significant predictor for prolonged LOS in the logistic regression for the NS sample because clinical factors such as the patients’ functional status, frailty needing OT and number of HAI were more influential. More generally, your comment made us think about the general implications of our findings. We believe that this additional discussion closed the loop between the front and back end of the paper.

Thank you again for your careful reading of our revised paper. We believe that your comments and suggestions further strengthened the clarity and contributions of the paper, while making the limitations more transparent.