Author's response to reviews

Title: Older Adults with Acquired Brain Injury: A Population Based Study

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Author's response to reviews: see over
Editor's comment:

- Abstract, Methods: Authors noted that the study design is retrospective, yet author never described it in details how the retrospective data were collected. Furthermore, this statement is inconsistent with the description on Page 6 (refer to Point 7). If this research is a retrospective cohort study, then the rate of hospitalization with nTBI and nTBI may be biased (due to death or drops before the recruitment). Authors need to note that.

We apologize for the inconsistent information in the abstract and the description on page 6. This study is a population based retrospective cohort study using healthcare administrative databases. Data were obtained from the Discharge Abstract Database. This was based on the entire population which is publicly insured for hospital visits - patients were not formally recruited for this study and as such, biases due to dropouts are not applicable to this study. Also, from a previous study from Dr. Colantonio and colleagues, 0.1% of patients with TBI and 1.2% of patients with nTBI die in the emergency department and thus, biases due to deaths prior to hospitalizations are minimal. We do not have information about the number of individuals with TBI/nTBI that never have emergency room visits or hospitalizations. Deaths outside hospitals are not captured in our databases used for this study. We do not believe it to be a large number however. Indeed, the fact that our cohort is based on every emergency room and/or acute care visit with an ABI diagnostic code is an incredible strength of the study. Please see revised methods section in the abstract as well as a revised description on page 6.

Abstract: Conclusions part is not well written. It should be major findings of the study. In Abstract, the authors may present at most one implication derived from their findings in conclusion part. The last sentence is not supportive from the study.

The conclusion of the abstract has been revised – “This study shows that an increased rate of acute care admissions for both TBI and nTBI with age. It also provides additional support for fall prevention strategies to prevent injury leading to cognitive disability with costly human and economic consequences. Implications for increased number of people with ABI are discussed.”

Given the range of results presented, it was a challenge reducing the messages.

Page 6, Line 4: should be "2.73 times as likely as to be discharged to..."

This has been changed – please see Page 6, Line 4.

Page 6: "non differential access" should be "non-differential access;"

This has been changed – please see Page 6.

"cross sectional study design" should be "cross-sectional study design."

Cross-sectional study design was changed to retrospective cohort design. Please see Page 6.

Page 6, 2nd paragraph: The first sentence should have a geographic location (e.g., Canada). If it is for a general statement, then it should have some citations.
References have been added to the first sentence – “Currently, there are few population based studies on older adults with TBI and even fewer that specifically examine older adults with nTBI [6,7,12,15,16]”. Please see Page 6.

References 6, 7, 12, and 15 are population based studies in Canada, however, these studies did not exclusively focus on older adults. While reference 16 by Coronado and colleagues focused specifically only older adults, it is not a population based study.

Page 6: "Specifically, using a cross-sectional study design from April 1, 2003 to March 31, 2010..." needs more descriptions on the new patients recruited in each year and how the episodes of each patient were analyzed.

This has been changed to “Specifically, a population based retrospective cohort design of all older adults aged 65 years and older with TBI and nTBI in Ontario, Canada, from April 1, 2003 to March 31, 2010 was used”. The descriptions of how patients with ABI were identified in this study and how episodes of each patient were analyzed are provided in the Methods section, page 8 (first paragraph) and page 10 (analyses section).

Page 7: "Each record" means "each admission" or "each patient?"

Each record is each admission. The Discharge Abstract Database provides record level information and for this study, records were grouped into episodes of care using a 24 hour rule, such that admissions that occurred within 24 hours of a previous discharge were considered part of the same episode of care. Please see page 10, analyses section, for further explanation.

Pages 8-9: "Older adults aged 65 years and older were examined as one group when comparing TBI and nTBI patients" is methodologically incorrect. In order to have correct results, authors either should use age-sex standardized rates or multivariate results.

The objective of this study is to describe the profile and discharge destinations of hospitalized older adults with ABI in Ontario, Canada and describe any differences between older adults with TBI and nTBI. As such, these are initial analyses and are standard procedures for examining data at this stage. This background information forms the foundation for more detailed comparisons between these two populations, to be carried out in the near future. We agree that multivariate analyses are desirable but more detailed modeling is beyond the scope of this paper.

Page 10: Chi-square tests and univariate odds ratios were not robust methods to compare the samples. Why not use multivariate approaches?

Multivariate modeling was beyond the scope of this paper. The objective of this paper is to describe this population. Future research objectives will include multivariate approaches to compare populations, which will control for confounders, etc.

We are confused about the use of the term “robust methods”. In statistics, the technical term, robust methods refer to methods that guard against outliers (e.g., Wilcoxon versus T-Tests etc.). Because we have large counts in all our cells, this problem does not apply.
Since this is a patient level analysis, why did authors only use the first ABI episode? To me, all episodes of a patient should be used after adjusting the intra-patient correlation. Age or some previous episodes should be treated as time-varying covariates. I assume that there are other major demographics recorded in the each admissions. How about patients' health insurance, caregiver availability, economic status/income that are closely related to hospital admission?

Only the first ABI episode was used instead of all episodes of the patient, as we did not want to include readmissions. It is important to capture the first episode rather than readmissions, as patients that are readmitted may have different profiles and outcomes as the first admission. The current paper presented extensive information on the profiles and outcomes of older adults with ABI and as such, information on readmissions is beyond the scope of this paper. We hope to characterize readmissions in later work.

Information on patients in this sample is limited to the information that is available in the Discharge Abstract Database (DAD), which is a healthcare administrative database from the Ministry of Health Long Term Care and maintained by the Canadian Institute for Health Information. Information on the patients' health insurance, caregiver availability, and economic stats/income are not available in the DAD and as such, we are unable to include these in our study.

Discussion: It should be largely revised. There are many repeated sentences that have been presented in introduction. They should not be repeated in the Discussion.

Revisions for the discussion section have been made in track changes.

Discussion: According to the authors, ABI includes both TBI and nTBI. It is my understanding that references 6 and 7 have already studied TBI in older adults in Ontario. Therefore, it may not be correct for the authors to state as "This paper is the first ....." (the very first sentence in Discussion). The authors may state that their study is the first to include nTBI among older adults in Ontario.

While references 6 and 7 included older adults in the study (the sample in these studies are patients 0+ ages), this manuscript is the first to specifically focus on the older adult population (aged 65+ years) in Ontario, Canada. Please see Discussion section, first line, on page 16.

References: Some references are web links. Please provide the exact dates that you accessed to. Furthermore, Some references have a different format from others. Please use the consistent format.

All references followed the format provided on the BMC Geriatrics web page (http://www.biomedcentral.com/bmcgeriatr/authors/instructions/researcharticle#style-and-language).

Table 1 has different N for the overall sample size as compared to Table 2 (TBI) and Table 3 (nTBI)? The authors need to have the consistent Ns. Also nTBI N should be "17,794" in Table 3.

Thank you – the N for Table 3 was revised. The sample sizes for the tables vary due to the type of analyses conducted (i.e., record level vs. patient level vs. episode level).
Table 1, which examines the prevalence of Charlson Comorbidities, is a record level analysis and included records where Charlson Comorbidities were indicated. As such, records of ABI patients without a Charlson Comorbidity would not be included in the total N.

Tables 2 and 3 describe the characteristics of TBI and nTBI patients. This is a patient level analysis, as indicated on page 10, third sentence from the bottom. As such, the N for these two tables would be different from the Ns for Table 1, which was a record level analysis and only included records with Charlson Comorbidities.

Because tables 1 to 3 address characteristics and injuries for patients in acute care units from 2007/08 to 2009/10, the table titles should be explicitly stated it.

The years of analyses were included in all Table titles.

The total sample from 2007/08 to 2009/10 for TBI and nTBI are not consistent with Tables 1 to 3. Table 5 has different numbers for N as compared to those in Tables 1 to 4. Again, keep in mind, the same sample should have the identical size in all tables throughout the paper.

Inconsistent samples with Tables 1 to 3 is explained above (please see 2 comments above this comment).

Table 4 presents the rates of hospitalized ABI episodes from 2003/04 to 2009/10 and is an episode level analysis. As such, the N would be different from Tables 1 to 3 as well as Table 5, due to the different level of analysis as well as the inclusion of earlier fiscal years (2003/04 to 2006/07).

Table 5 presents the mechanisms of injury among TBI patients. This is a record level analysis and included ALL records with a TBI and nTBI diagnostic code, as defined in the methods section (page 8). Although Table 1 is also a record level analysis and examined the same years (2007/08 – 2009/10), the N for this table would be higher than the N for Table 5 because it included ALL records, whereas Table 1 only included records with Charlson Comorbidities.

Due to the different levels of analyses that best describes the data, the Ns for the tables would be different, according to the level of analysis. A note has been added below all the tables, which states the level of analysis.

Significance notation in Tables 3 and 5: "***p<0.001" may be sufficient since all significant levels are at p<0.001.

This has been changed – please see Tables 3 and 5.

Please highlight all changes in your next revised version so that I can identify your changes easily.

All changes are highlighted in track changes. Thank you for your insightful comments and suggestions.