**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
Response to Reviewers

We would like to thank the reviewers for their insightful questions and comments. We have addressed each query of reviewers below in red and have made changes in the word document using track changes.

Reviewer: Carlos Jaramillo

Synopsis: This study aims to investigate the different features and outcomes of older adults with brain injuries. The authors have used a retrospective cohort study design to perform a comparative analysis between patient’s over 65 who have suffered traumatic vs. non-traumatic brain injuries. The authors have described differences and trends between three different age ranges over 65 with much detail focused on mechanisms and disposition. This type of population-based data on brain injury is important for understanding the impact of these injuries on different age groups and health care systems. This is a particularly important public health concern for the elderly who have been shown to be susceptible to these injuries and have poorer outcomes. This study could potentially contribute to our broad understanding of the causes, associated problems, trends and outcomes of brain injuries in older adults in a health system with universal access to hospital care. This later point is a strength of this article.

Major compulsory revisions

1. Abstract: The wording in the “Background” section is confusing as to the designations of brain injury type. The authors can address this with a defining statement that ABI includes TBI and non-TBI and not leave this to be inferred by BMC Geriatrics readers who do not have brain injury research backgrounds. Please list abbreviations early in the text.

   The first sentence in the “background” section was changed to include the abbreviation of acquired brain injury (ABI). It also clarifies that ABI includes traumatic and non-traumatic brain injury.

2. Conclusions in the abstract do not describe the conclusions of the study, but instead are general statements about the need for geriatric services. The authors should summarize the most significant aspects of this work and data – and specifically those appropriate for BMC geriatrics reader.

   This has been changed in the conclusion of the abstract. It now reads “This study provides an overview of the large number of older adults at risk for cognitive disability from a broad range of causes that have implications for community based hospitals and other institutionalized care. Findings on the mechanism of injury and discharge destination indicate an increased need for falls prevention that also take into account potential persistent effects of brain injury in subsequent care. Older adults are the
fastest growing segment of the population and thus, education about prevention, screening and treatment for ABI should be part of educational programs addressing older adults.”

3. The results section describes “rate of TBI”, but should use “rate of hospitalized ABI episodes” to be more accurate. The later could reflect changes in diagnosis and post brain injury care standards that have changed in the 6 years as opposed to increasing numbers of CNS injuries.

“Rate of TBI” has been changed to “rate of hospitalized TBI episodes” throughout the paper, including the abstract. Similarly, “rate of nTBI” has been changed to “rate of hospitalized nTBI episodes”. We have stated in the discussion that changes in diagnosis could have affected the reporting of these diagnoses (please see discussion, paragraph 1, line 12).

Minor essential revisions

1. Table 7 repeats the data presented in Tables 3 and 6. This is unnecessary and cumbersome for the reader to work through. The comparisons made in Table 7 are interesting, but should be presented in a different format or simply referred to in the text.

Table 7 is removed from the paper and is only referred to in the text (results, “traumatic vs. non-traumatic brain injury” section).

2. The first sentence of the discussion section is not completely accurate given the overlap in data published from this same group in reference 15 (Chen et al. in 2012) and should be modified to highlight how this study is unique.

This sentence now reads “This paper is the first, to our knowledge, to focus on older adults with ABI”. This study is unique in that other published results from this group examined all individuals aged 19 years and over. However, this paper focuses specifically on the older adult population aged 65 years and over.

3. Abstract: There are no indications within the abstract about the specific age ranges for their cohort. The findings that “…both TBI and nTBI increased with age” is non-descript for an audience interested in geriatric research and care. This could be addressed by including descriptive statements about the effect on the different age ranges.

The age of this cohort was first stated in the background – “The objective of this study is to examine the trends, characteristics, cause of brain injury, and discharge destination of hospitalized older adults aged 65 years and older with an ABI diagnosis in a population with universal access to hospital care”.

The sentence regarding the increasing rate of TBI and nTBI has been changed to “Overall, the rate of hospitalized TBI and nTBI episodes increased with older age groups”.

4. Discussion: third paragraph, third sentence is missing a subject component. “Further, important to note is that while TBI overall is more common in males, the gender distribution among this hospitalized cohort is fairly equitable.”

This sentence has been changed to “Further, it is important to note is that while TBI overall is more common in males, the gender distribution among this hospitalized cohort is fairly equitable”

**Reviewer:** Carmelo Pelegrin

**Reviewer’s report:**
This is a retrospective work with a large sample of patients over 65 years old who required acute medical care. As note the authors acquired traumatic and not traumatic brain injury is a public health problem which services rehabilitation have a very important role. Perhaps although is well collected in table 6, mechanisms of fall are 69.8 percent of traumatic brain injury, but neuropsychiatric problems can develop falls are not explain (unless there is dementia, but not specific problems like delusions, hallucinations, agitation,...), and the same with neurological problems (epilepsy, syncope), drugs administration (specially sedative and other psychopharmacs), carers (quality of care and caregivers) and enviromental (houses, context...). Is a pity, probably consequence of a restrospective study, but I think authors would argue why these aspects are not explain. Because knowing this causes can help us to prevent falls involving the majority of traumatic brain injury. Regarding acquired injury not traumatic it is remarkable that cause more prevalent are neoplastic and not vascular, as expected. Authors, perhaps, sould explain this results.

This suggestion that additional factors such as substance use and dementia can lead to falls is acknowledged in the discussion section (paragraph 2). Also, as stated in the methods, we excluded stroke patients in the nTBI group when it was in the most responsible diagnosis field and anywhere in the TBI diagnosis fields.