PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Unintentional fall related mortality in the elderly: comparing patterns in two countries with different demographic structure
AUTHORS	Majdan, Marek; Mauritz, Walter

VERSION 1 - REVIEW

REVIEWER	Haring, R Sterling Center for Surgery and Public Health Brigham and Women's Hospital Harvard Medical School Boston, MA USA
REVIEW RETURNED	24-Jun-2015

GENERAL COMMENTS	Overall, I felt that this manuscript was an interesting comparative analysis TBI-related mortality in these two countries. The methods appeared to be appropriate and well-executed, and while the article did not mention any approval or exemption from IRB review, the paper did not seem to breach any major ethical guidelines. I commend the authors for their work. My major concerns with this paper were with the conclusions drawn from the data. 1. It does appear as if Slovakia and Austria have notably different rates in TBI mortality, especially when stratified by age. It is also clear that they have significantly different economic environments. What is not clear, however, is that this correlation is causative in nature. While the authors have not outright claimed that there is a causative relationship between the difference in GDP and TBI mortality, such a relationship is implied several times throughout the manuscript, including in the title; to the authors' credit, they do mention this issue in the manuscript's summary, but not in the text of the manuscript. Also, despite the prominence given to this topic both in the title and in the early portions of the paper, it is only briefly mentioned in the discussion. The authors may want to consider either expanding their consideration of economic influence on TBI mortality or restricting this study to an examination of TBI-related mortality between two countries with differing demographic structures. 2. The authors suggest demographic structure as a potential explanation of the mortality disparity between Austria and Slovakia. Specifically, they conclude that "higher life expectancy in Austria translated [into] substantially higher fall related mortality rates compared to Slovakia..." (conclusion). While the authors do indeed establish a disparity between the two countries in terms of TBI mortality, life expectancy, economic output, and demographics, I do

	not believe that these observations support the above conclusion. The authors claim a correlation between wealth and outcome after TBI, and yet present data showing that the wealthier country (Austria) has almost double the TBI-related mortality rate of the poorer country (Slovakia). Similarly, the authors suggest that the mortality rate's disparity may be due to the difference in age structure, and yet present age-adjusted data showing notable differences. Were the disparities restricted primarily to demographic differences, I would expect much of the gap to disappear after age adjustment or age-adjusted rate calculation If the authors used wide age bins for rate calculation, however, these rates may not adequately reflect true demographic differences between the two countries. This should be explored more thoroughly within the manuscript. 3. IRB statement is missing. Minor issues: 1. The second paragraph of the Results section reports "annual average crude mortality rate" for Slovakia and Austria; the reported number for Slovakia is standardized, while the reported number for Austria is crude. 2. The title for Table 4 is somewhat ambiguous; which country is numerator, and which denominator? 3. Perhaps consider adding a 6th "main finding" to the discussion addressing either overall differences between countries or the differences relative to economic status. 4. Perhaps consider adding to the limitations section information regarding potential confounders: urban vs. rural living between the two countries? Are there differences in healthcare financing mechanisms between the countries? Are there significant differences in weather? (ICD10 code W00 is specific to snow- and ice-related falls; are there large differences between the two countries with regard to this code?) 5. More recent references would be appropriate in some cases; the average age of these references is over 8 years old. Overall, I think this is a good look at a notable difference between TBI-related mortality in two otherwise seemingly similar nations. With appropriate revision, I believe this paper would make an interesting contribution to the literature. It was a pleasure to review.

REVIEWER	Cacciatore, Francesco Maugeri Foundation, Department of Cardiovascular Rehabilitation, IRCCs, Institute of Telese - Italy
REVIEW RETURNED	28-Jun-2015

GENERAL COMMENTS	The Authors conducted a study with the aim of analyses data on the patterns and causes of unintentional fall-related mortalities in two European countries: Slovakia and Austria in 2003-2010.They used death certificate data, trends of fall related mortality in elderly over 65 years. They compared data from Austria and Slovakia. They found an annual average crude mortality for Slovakia of 28.22, and

	for Austria 54.19 100,000 person-years. Increasing rates were observed towards higher age in both countries. Males had higher mortality than females (1.18 times higher in Austria, 2.4 higher in Slovakia). In ages over 75 years rates were significantly higher in Austria, compared to Slovakia. Injuries to head (in males) and hip (in females) were most common. The study is purely descriptive. No data were presented on the causes of unintentional fall as they stated in the aim of the study. The analysis was well conducted and the manuscript is clear. I don't understand in this manuscript the relation between economic condition and falls related mortality, the possible relationship is not supported by data.

REVIEWER	Patricia Ayoung-Chee New York University School of Medicine United States of America
REVIEW RETURNED	04-Jul-2015

GENERAL COMMENTS	Congratulations to the authors on a well-written manuscript, looking at an important topic, trauma in the elderly. Analyzing large datasets from different countries and making a comparison is not an easy task, but the authors have managed to find a way to standardize the data, allowing a feasible comparison. I have a couple of minor points to be addressed: 1. There is no mention of IRB approval or ethical considerations. 2. With regards to the patterns of body regions with the most significant injury, there is no mention of Abbreviated Injury Score or any other injury score. Is the assumption that the body region listed in "underlying cause of death" was the body region most severely injured? 3. In 1st paragraph of the Discussion, while head and hip were the most common body regions listed as the "underlying cause of death," they may not be the most commonly injured - based on the description of the databases used, it is unclear how many underlying causes of death were listed. I would suggest rephrasing the 5th main finding to reflect this. 4. In the last paragraph, the authors mention that the two countries (Slovakia and Austria) have "different structures of the elderly population..." They reference the supplemental figures, but one or two sentences summarizing the % of the total population >65 and the rate of growth in each country would be beneficial and add credence to the statement as not everyone looks at supplemental figures. On a separate note: 1. It is not clear to me why Austria was chosen as a comparator country for Slovakia - are they otherwise similar (e.g. health care system) except for the mentioned population age structure and economy? Or was there an element of convenience in access to datasets? Pleas excuse my ignorance regarding these 2 countries. 2. It was also not clear to me the significance of economic productivity and how it explains or is connected to the higher

	mortality rates experienced in Austria - can the authors please comment or suggest a possible explanation.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name R. Sterling Haring
Institution and Country Center for Surgery and Public Health
Brigham and Women's Hospital
Harvard Medical School
Boston, MA USA

Overall, I felt that this manuscript was an interesting comparative analysis TBI-related mortality in these two countries. The methods appeared to be appropriate and well-executed, and while the article did not mention any approval or exemption from IRB review, the paper did not seem to breach any major ethical guidelines. I commend the authors for their work.

Our Response: Thank you for the compliments. We have added an “Ethical considerations” statement to the methods.

My major concerns with this paper were with the conclusions drawn from the data.

1. It does appear as if Slovakia and Austria have notably different rates in TBI mortality, especially when stratified by age. It is also clear that they have significantly different economic environments. What is not clear, however, is that this correlation is causative in nature. While the authors have not outright claimed that there is a causative relationship between the difference in GDP and TBI mortality, such a relationship is implied several times throughout the manuscript, including in the title; to the authors' credit, they do mention this issue in the manuscript's summary, but not in the text of the manuscript. Also, despite the prominence given to this topic both in the title and in the early portions of the paper, it is only briefly mentioned in the discussion. The authors may want to consider either expanding their consideration of economic influence on TBI mortality or restricting this study to an examination of TBI-related mortality between two countries with differing demographic structures.

Our Response: Thank you for pointing this out. We have considered your comment and decided to remove the economy level from the analyses wherever it was mentioned in connection with the mortalities (including title). The paper now focuses only on demographic structure as a possible factor influencing the mortalities. We have rephrased some sentences in the discussion, conclusion, abstract and summary to make clear that no causal evidence is presented. However, we kept in a short paragraph in the methods where we compare the economic productivity of both countries: we believe this helps to put our study in context.

2. The authors suggest demographic structure as a potential explanation of the mortality disparity between Austria and Slovakia. Specifically, they conclude that "higher life expectancy in Austria translated [into] substantially higher fall related mortality rates compared to Slovakia..." (conclusion). While the authors do indeed establish a disparity between the two countries in terms of TBI mortality, life expectancy, economic output, and demographics, I do not believe that these observations support the above conclusion. The authors claim a correlation between wealth and outcome after TBI, and yet present data showing that the wealthier country (Austria) has almost double the TBI-related mortality rate of the poorer country (Slovakia). Similarly, the authors suggest that the mortality rate's disparity may be due to the difference in age structure, and yet present age-adjusted data showing notable

differences. Were the disparities restricted primarily to demographic differences, I would expect much of the gap to disappear after age adjustment or age-adjusted rate calculation If the authors used wide age bins for rate calculation, however, these rates may not adequately reflect true demographic differences between the two countries. This should be explored more thoroughly within the manuscript.

Our Response: Thanks for this observation. We have rephrased the conclusions and added a section in the discussion where we acknowledge these issues and try to discuss them along with possible causes. We agree that this needed more detailed discussion in the paper.

3. IRB statement is missing.

Our Response: This has been added to the methods (“ethical considerations”)

Minor issues:
1. The second paragraph of the Results section reports "annual average crude mortality rate" for Slovakia and Austria; the reported number for Slovakia is standardized, while the reported number for Austria is crude.

Our Response: We have corrected this error.

2. The title for Table 4 is somewhat ambiguous; which country is numerator, and which denominator?

Our Response: We have rephrased the title so that it is clear which country is compared to which.

3. Perhaps consider adding a 6th "main finding" to the discussion addressing either overall differences between countries or the differences relative to economic status.

Our Response: We have added a 6th main finding.

4. Perhaps consider adding to the limitations section information regarding potential confounders: urban vs. rural living between the two countries? Are there differences in healthcare financing mechanisms between the countries? Are there significant differences in weather? (ICD10 code W00 is specific to snow- and ice-related falls; are there large differences between the two countries with regard to this code?)

Our Response: this has been added to the limitations section.

5. More recent references would be appropriate in some cases; the average age of these references is over 8 years old.
Our Response: Yes, we agree. However, our literature review did not bring up more recent official publications in some cases. Therefore we decided to use the most recently published ones. We are aware of this limitation.

Overall, I think this is a good look at a notable difference between TBI-related mortality in two otherwise seemingly similar nations. With appropriate revision, I believe this paper would make an interesting contribution to the literature. It was a pleasure to review.

Our Response: Thanks and we hope that you will find the revised version to be suitable for publication.

Response to reviewer 2

Dear Dr. Cacciatore,

Thank you for reviewing and commenting on our paper. We appreciate your efforts and the time you have invested. We have considered carefully all your comments and observations and did our best to reflect them in the revised version of the manuscript. We hope that you will fnd our answers and the changes we have made to be sufficient. Thank you again for helping to improve this manuscript.

Sincerely Yours,

The team of authors

Reviewer: 2
Reviewer Name CACCIATORE Francesco
Institution and Country Maugeri Foundation, Department of Cardiovascular Rehabilitation, IRCCs, Institute of Telese - Italy

Please leave your comments for the authors below

The Authors conducted a study with the aim of analyses data on the patterns and causes of unintentional fall-related mortalities in two European countries: Slovakia and Austria in 2003-2010.They used death certificate data, trends of fall related mortality in elderly over 65 years. They compared data from Austria and Slovakia. They found an annual average crude mortality for Slovakia of 28.22, and for Austria 54.19 100,000 person-years. Increasing rates were observed towards higher age in both countries. Males had higher mortality than females (1.18 times higher in Austria, 2.4 higher in Slovakia). In ages over 75 years rates were significantly higher in Austria, compared to Slovakia. Injuries to head (in males) and hip (in females) were most common. The study is purely descriptive. No data were presented on the causes of unintentional fall as they stated in the aim of the study. The analysis was well conducted and the manuscript is clear. I don't understand in this manuscript the relation between economic condition and falls related mortality, the possible relationship is not supported by data.

Our Response: Thank you for the comments. In response, we have removed the mention of analysing the causes from the aim and we have rephrased our conclusions and parts of the discussion so that it is clear that no causal evidence is presented. Regarding the relationship between the economy level and the mortalities: we have decided to remove this part of the analyses from the paper, including the title, aims and research question. The paper now solely focuses on evaluation the possible role of differences in demographic structure in relation to the observed differences in mortalities. However, we kept in a short paragraph in the methods where we compare the economic productivity of both countries: we believe this helps to put our study in context.

Response to reviewer 3

Dear Professor Ayoung-Chee,

We would like to express our thanks for your willingness to review our manuscript and for all efforts and time you have invested. Our comments are very valuable to us and pointed our attention to a number of issues that we not clearly described or stated. We made all efforts to reflect your comments in the revised version of the manuscript and hope you will find the revision to be suitable for publication.

Sincerely Yours,

The team of authors

Reviewer: 3
Reviewer Name Patricia Ayoung-Chee
Institution and Country New York University School of Medicine
United States of America

Congratulations to the authors on a well-written manuscript, looking at an important topic, trauma in the elderly. Analyzing large datasets from different countries and making a comparison is not an easy task, but the authors have managed to find a way to standardize the data, allowing a feasible comparison.

Our Response: Thank you!

I have a couple of minor points to be addressed:

1. There is no mention of IRB approval or ethical considerations.

Our Response: We have added an “ethical consideration” section to the methodology.

2. With regards to the patterns of body regions with the most significant injury, there is no mention of Abbreviated Injury Score or any other injury score. Is the assumption that the body region listed in "underlying cause of death" was the body region most severely injured?

3. In 1st paragraph of the Discussion, while head and hip were the most common body regions listed as the "underlying cause of death," they may not be the most commonly injured - based on the description of the databases used, it is unclear how many underlying causes of death were listed. I would suggest rephrasing the 5th main finding to reflect this.

Our Response to points 2 & 3: Thanks for this comment. Yes, this was our assumption. No other information than the underlying cause of death has been disclosed in the datasets we have obtained. To make sure this is clear, we have rephrased parts of the methods, results and discussion (including main finding #5) and corrected the captions for figure 3. Thank you for bringing this to our attention.

4. In the last paragraph, the authors mention that the two countries (Slovakia and Austria) have "different structures of the elderly population..." They reference the supplemental figures, but one or two sentences summarizing the % of the total population >65 and the rate of growth in each country would be beneficial and add credence to the statement as not everyone looks at supplemental

figures.

Our Response: We have added a new paragraph to the results where we elaborate on this in more detail. In addition, we have redone the figure to show the proportion of persons 65 years and older and 80 years and older out of the total population (by sex) along with the dynamics of this proportions over time.

On a separate note:
1. It is not clear to me why Austria was chosen as a comparator country for Slovakia - are they otherwise similar (e.g. health care system) except for the mentioned population age structure and economy? Or was there an element of convenience in access to datasets? Pleas excuse my ignorance regarding these 2 countries.

Our Response: Austria and Slovakia are neighbouring countries, that are historically connected (former Austrian-Hungarian Empire). They have similar health care systems, social systems but differ in terms of wealth, economic performance, life expectancy and other related aspects. This is mainly due to the fact that Slovakia after WWII became part of the communist block (then as Czechoslovakia) and Austria established a democratic regime.
As our goal was to evaluate the possible influence of demographic structure on the fall related elderly mortality these two countries seemed to be a reasonable choice. In addition, one of the authors is from Slovakia and the other one from Austria, so there also was a convenience factor.

2. It was also not clear to me the significance of economic productivity and how it explains or is connected to the higher mortality rates experienced in Austria - can the authors please comment or suggest a possible explanation.

Our Response: Thanks for pointing this out. We have carefully considered this aspect and decided to remove the economic productivity from the analysis (including the title and aim). The paper now solely focuses on the evaluation of the demographic structure in relation to the differences in mortality. However, we kept in a short paragraph in the methods where we compare the economic productivity of both countries: we believe this helps to put our study in context.