Author’s response to reviews

Title: Factors affecting hospital length of stay and hospital charges associated with road traffic-related injuries in Iran

Authors:

Hassan Haghparast-Bidgoli (hassan.haghparast@ki.se)
Soheil Saadat (soheil.saadat@gmail.com)
Lennart Bogg (lennart.bogg@ki.se)
Mohammad H Yarmohammadian (yarmohamadian@mng.mui.ac.ir)
Marie Hasselberg (marie.hasselberg@ki.se)

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Factors affecting hospital length of stay and hospital charges associated with road traffic-related injuries in Iran

Dear Editor

Please find enclosed a revised version of our paper entitled” Factors affecting hospital length of stay and hospital charges associated with road traffic-related injuries in Iran”. Based on the comments of the reviewer, changes have been made (and highlighted) to the manuscript. An outline of modifications is attached.

We hope that, in its revised version, you will find the manuscript acceptable for publication.

Yours sincerely,

Hassan Haghparast-Bidgoli, Soheil Saadat, Lennart Bogg, Mohammad H Yarmohammadian and Marie Hasselberg
Outline of modifications

Reviewer's report:

Authors keep saying: “hospital resource utilization” although they sometimes clarify that this is “in terms of length of stay and hospital charges”. I still do not think that LOS and hospital charges are good proxies of hospital resource utilization in the context of this particular study. Since hospital charges could not reflect actual hospital utilization (due to discounts and exceptions, etc) and the use of hospital resources differs greatly by type of service and not only on the number of days spent at the hospital: LOS (i.e. intensive care versus other services) and in some cases LOS could be due to hospital inefficiencies, induced demand or to administrative-organizational reasons (as authors themselves recognized).

Note: The use of billed charges (as proxy) by studies carried out in settings where billed charges reflect actual hospital utilization is correct.

We agree with the reviewer that (as we mentioned in our previous responses) both total hospital charges and LOS have limitations and may not measure actual resource utilization in the context of the study (Similar limitations have been mentioned in other studies which have used these measures, such as studies done in US). We still believe that these two measures complement each other and can be proxies for resource utilization. However, for more clarification and after taking the reviewer’s concerns under consideration, we have replaced "hospital resource utilization" with "total hospital charges and LOS" throughout the paper. In line with this, we have also revised the method section,

Authors conclude that this study “demonstrated” that hospital resource burden by RTI victims in Iran is substantial when in fact they did not document that.

In line with the comment of the reviewer, our findings implicitly shows a considerable hospital burden of RTIs (in terms of average LOS and, partly hospitals charges, of RTIs), considering total number of deaths and injuries that occur each year in Iran. However, since our main aim in this study was not to measure the magnitude of the resource burden, we have revised our conclusion based on the reviewer’s suggestion.

Authors keep mentioning findings that are actually not statistically significant. Examples of this are:

- “There were no significant differences in LOS and hospital charges between different age groups, although the data indicated that patients above 60 years of age had higher hospital charges compared to other age groups.” If these results
were not statistically different, then it is not correct saying that they had higher hospital charges. Statistically charges were not different.

- “The results indicate that patients who did not use safety helmets stayed longer in hospital and had higher hospital charges compared to patients who used helmets (Table 3), although the difference was not statistically significant...”. This is the same as saying: Regarding LOS and hospital charges, no difference was found between those who used helmets versus those who did not use them.

- “Patients who used a seat-belt had lower hospital charges compared to patients who did not use a seat-belt; however, the difference was not statistically significant...”. Again, no difference was found per seat-belt use.

- “Men had longer LOS (and higher hospitalization charges before adjusting for other variables) than women”. If after adjusting no difference was observed, there is no point to highlight this.

According to the suggestion by the reviewer, now we have revised our results and the text in the discussion section and removed all the above mentioned statements.

I suggested authors should provide a formal definition of RTI in terms of specific ICD-10 codes. They added the following text: “ICD-10 codes V01-V89” on page 5. However, as I pointed out, these codes would include both traffic and non-traffic related events. Although in their response, they clarify that they refer only to traffic, in the text added this is not implicit and thus should be specified.

In line with the comment of the reviewer, we have specified the ICD codes for RTIs in the method section (page 5, footnote).

“ICD-10 codes related to RTIs (fatal and nonfatal) included in the database: V02-V04 (0.1, 0.9), V09 (0.2, 0.3, 0.9), V12-V14 (0.3-0.9), V19.4-V19.6, V20-V28 (0.3-0.9), V29-V79 (0.4-0.9), V80.3-V80.5, V81.1, V82.1, V83-V86 (0-0.3), V87.0-V87.8, V89.2, V89.9.”

I think I was not clear in one of my comments. I did not suggest including the variable road user as a continuous variable (as authors apparently understood and thus made no change). What I recommended was the introduction of the variable as categorical, using one group or category as the reference (and thus compare all categories with the reference one). For example in the hospital charges final model, the implicit reference category is pedestrians & car occupant (categories not included). In the “full model” the category of reference is the “other” road user, although the notes specify this category was not included. Authors also clarify that this categorical variable was mutually exclusive, if this was true, the software would automatically drop one category due to collinearity. Am I missing something? This comment also applies for the LOS models.
According to the suggestions by the reviewer, we have conducted a new analysis with “road users” and “occupation” as categorical variables. The results of the new analysis are presented in Tables 4 and 5.

**Authors claim to have replaced hospital costs by hospital charges. However, one omission was found in second paragraph of discussion (page 9).**

We are thankful for the thoroughness of the reviewer in highlighting this mistake. Now we have corrected this mistake.

Although authors find other potential reasons of the differences identified both in education and in occupational groups in terms of LOS (and agreed with the issue I raised) they substituted the comment by the following sentence: “One potential explanation could be better recovery and earlier discharge among this group of patients since they had generally less severe injuries”. But, again, this could not be the reason since severity of injuries was adjusted in the model.

Authors then say that motorcyclists have higher costs and that this could be due to the severity. Again, the severity was taken into account in the model so this might not be the reason.

In line with the comment from the reviewer, we have revised the potential reasons for the difference in LOS and hospital charges in both education and occupation groups (page 10 paragraphs 2 and 3).

**New comments:**

There seems to be a contradiction with the text inserted for this new version in page 10, in the last but one paragraph. It is not clear for me whether differences exist in blue versus white-collar workers in terms of hospital charges.

We regret the way this sentence was formulated. In the previous version blue-collar workers had higher total hospital charges and longer LOS, but white-collar had only longer LOS. The sentence has now been revised according to the new analysis.

In table 4 and 5 authors present unstandardized vs standardized. I would recommend that authors specify this and provide more details in the methods section.

We thank the reviewer for his detailed review. Based on our new analysis, the items reported in Tables 4 and 5 have changed and this comment is not applicable to the new results.