Author's response to reviews

Title: The protective effect of helmet use in motorcycle and bicycle accidents: a propensity score-matched study based on a trauma registry system

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Dear Reviewer

Thank you for your time, effort and professional comments in regard to our manuscript entitled “The protective effect of helmet use in motorcycle and bicycle accidents: a propensity score-matched study based on a trauma registry system” to BMC Public Health. This article has been further revised according to your kind suggestions. The revised areas are highlighted in yellow color.

1. The authors clarified that the propensity score calculation used mortality as a dependent variable - why was that? Propensity scores are calculated by regressing the key independent variable of interest in the study (helmet use) and not the outcome of interest on the potential confounders. The whole concept of propensity scores is predicated on estimating the probability of being in one or the other intervention group given the potential confounders not the probability of the outcome. re-calculate the propensity score correctly.

Answer: Yes, we appreciate your understanding and agree your opinion regarding the propensity scores calculation. To avoid confusion, we had deleted the results that calculated according to the outcome (the Table 2 and 3 in the original manuscript) that classified according to death or survival. Under your kind suggestion, we have re-calculated the propensity scores according the condition of helmet use and shown the data as new Tables 2 and 3 in the revised manuscript. The related results and description in the article has also been revised accordingly.
2. Accordingly one would expect supplementary table 2 to compare the standardized difference (categorical variables) and covariance ratios (continuous variables) between helmet users and non-helmet users in each group of road users to check that they are balanced across those groups. Comparing mortality is not informative and is based on incorrect propensity score estimation method. The tables with the potential confounders should use the standardized difference or measures for continuous variables and not the OR or p-value.

Answer: Yes, we had revised Table 2 and 3 of this 2nd revised manuscript to compared the standardized difference of continuous variables (Age) between helmet users and non-helmet users to confirm a balanced approach between these two groups. We hope the revision of the Tables would also get a better illustration for the readers. Thank you for your kind recommendation.

3. I understand how it would be difficult to use one comorbidity as a referent category (because they are not mutually exclusive) and it is reasonable to have separate yes/no variables for each comorbidity but for the other variables with mutually exclusive categories (e.g. gender), the information is redundant and in effect, you are presenting data from different models with different intercepts and probably also running into multiple testing problem. It would be great if you could share examples of publications where this was done (where variables have mutually exclusive categories like the gender variable).

Answer: Yes, to response to your concern, Pearson’s correlation coefficient (r) was used for bivariate correlation to analyze the relationships between items of co-morbidity, including DM, HTN, CAD, CHF, CVA, and ESRD, before the use of them as a variable into the propensity score calculation. The results had been provided in the Supplementary Table 1 and the description in this 2nd revised manuscript had been added accordingly (Page 7/Lines 12-14).

4. Regarding the definition of the cases as primary trauma-related injury: Someone can still be discharged and get re-admitted into hospital and die from a complication directly related to the trauma. Those might not be frequent but they are still suffering the primary consequences of the trauma. Their exclusion is still a limitation albeit hard to assess how important.

Answer: Yes, although extremely infrequent, this group of patients might present as a bias in the outcome assessment in this study. Therefore, we had added this as a limitation (Page 16/lines 6-8). Thank you for your kind recommendation.

This article had revised under your kind suggestion and we hope that will satisfy your standard. If required, we are very delighted to make further change or revision.

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