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

The study is aimed to investigate the protective effect of helmet use during motorcycle and bicycle accidents by using a propensity score-matched study based on trauma registry system data collected from a trauma center of Taiwan. Data were collected on adult patients hospitalized for motorcycle or bicycle accidents between January 1, 2009 and December 31, 2015. These included 7,735 motorcyclists with helmet use, 863 motorcyclists without helmet use, 76 bicyclists with helmet use, and 647 bicyclists without helmet use. The primary outcome measurement was in-hospital mortality. Secondary outcomes were the hospital length of stay (LOS), intensive care unit (ICU) admission rate, and ICU LOS.

The mortality rate for motorcyclists with helmet use (1.1%) was significantly lower than for motorcyclists without helmet use (4.2%; odds ratio [OR] 0.2; 95% confidence interval [CI]: 0.17-0.37; p < 0.001). Among bicyclists, there was no significant difference in mortality rates between those with helmet use (5.3%) and those without helmet use (3.7%; OR 1.4; 95% CI: 0.49-4.27; p = 0.524). After propensity-score matching for covariates, including sex, age, and comorbidities, 119 well-balanced pairs of motorcyclists and 28 pairs of bicyclists were identified for outcome comparison, showing that helmet use among motorcyclists was associated with lower mortality rates (OR 0.2; 95% CI: 0.11-0.49; p < 0.0010). In contrast, helmet use among bicyclists was not associated with a reduction in mortality (OR 4.5; 95% CI:0.47-43.1; p = 0.192). The hospital LOS was also significantly shorter for motorcyclists with helmet use than for those without (9.5 days vs. 12.0 days, respectively, p < 0.001) although for bicyclists, helmet use was not associated with hospital LOS. Fewer motorcyclists with helmet use were admitted to the ICU, regardless of the severity of injury; however, only bicyclists using helmets with an injury severity score (ISS) of 16-24 had lower ICU admission rates.

The study has been done following the standard scientific method and the findings were obvious. However, the followings questions may be raised:

a. Is there any difference between single user and double users of a motor bike?

b. Is there any difference between user and nonuser of helmet by the riders who were riding the bike together?
c. Is there any data on the speed of the motor bike by types of accidents and its health hazard?

d. This is a recorded data reported from the hospital. What happens to them those who are not going to that kind of hospital?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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