

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	The effect of lowering the legal blood alcohol concentration limit on driving under the influence (DUI) in southern Taiwan – a cross-sectional retrospective analysis
<b>AUTHORS</b>	Tsai, Yu-Chin; Wu, Shao-Chun; Huang, Jin-Fu; Kuo, Spencer C.H.; Rau, Cheng-Shyuan; Chien, Peng-Chen; Hsieh, Hsiao-Yun; Hsieh, Ching-Hua

### VERSION 1 - REVIEW

<b>REVIEWER</b>	James C. Fell NORC at the University of Chicago, USA
<b>REVIEW RETURNED</b>	21-Sep-2018

<b>GENERAL COMMENTS</b>	<p>Very nice study, but I have some issues you need to address:</p> <ol style="list-style-type: none"><li>(1) Please avoid using the term "accident." These are "crashes" not accidents with no causes.</li><li>(2) For BAC, please use mg/dL throughout the manuscript.</li><li>(3) Page 6, PATIENTS AND METHODS, line 16: How many patients with incomplete data were excluded? Any reason to believe those excluded were DUI?</li><li>(4) Page 6, line 36: Why were BAC tests not performed on all patients? Why just those with clinical suspicion? Explain.</li><li>(5) Page 7, line 46: What does "Patients and or public were not involved please state this" A note to yourselves. Change it or delete it.</li><li>(6) Page 8, line 3: Only 8.6% of the patients with clinical suspicion of DUI were actually DUI? Why so low? If police in other parts of the world test the drivers they suspect of drinking at least 80% have alcohol on board. With the 8.6% it looks like most patients were tested for BAC. Is that correct? Give the numbers of total patients and the numbers tested for BAC. Also, only 3% involved car drivers and 97% involved motorcycles?</li><li>(7) Page 9, lines 3-22: Why did you not give the numbers of single vehicle crashes and the number of multiple vehicle crashes? Another measure of alcohol involvement is the ratio of single vehicle nighttime (SVN) crashes to multiple vehicle daytime (MVD) crashes. Please calculate those ratios before and after the BAC change. It will serve as a validation of your study.</li><li>(8) Page 10, lines 10-14: The lower helmet uses post law could be the reason for the mortality rate being higher. Please discuss.</li><li>(9) Page 11, DISCUSSION: The use of airbags going down is due to the model year of car driven. DUI drivers tend to drive older vehicles.</li><li>(10) Page 11, lines 50-53: Drivers in alcohol-involved crashes also tend to not wear a safety belt or drive a late model vehicle. They also speed.</li><li>(11) Page 14, lines 3-10: What covariates did you use in your analyses? It was not clear. Did you control for population pre-</li></ol>
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	<p>post? Vehicle miles travelled pre-post? Alcohol consumption per capita pre-post? Vehicles and motorcycles registered pre-post? You must control for some of these factors or your findings will not be considered as valid.</p> <p>(12) You certainly did your homework on the background and the list of References.</p> <p>(13) Table 1: It looks like the DUI % (10.99% vs. 6.64%, pre-post, was not statistically significant. Correct? Yet that was your main outcome measure. Please explain.</p>
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<b>REVIEWER</b>	Ali Behnood Purdue University, USA
<b>REVIEW RETURNED</b>	17-Oct-2018

<b>GENERAL COMMENTS</b>	<p>1. DUI increases the risk of accident but it has complicated effects on the severity of the accidents. It would be suggested to revise the paper accordingly. Previous studies have shown that statistically significant differences exist in the injury severity of road users in the presence/absence of alcohol/drug impairment. The following papers provide a discussion for this topic:</p> <ul style="list-style-type: none"> <li>• Ali Behnood, Arash M. Roshandeh, Fred L. Mannering, 2014. Latent class analysis of the effects of age, gender, and alcohol consumption on driver-injury severities, <i>Analytic Methods in Accident Research</i>, 3–4, 56-91.</li> <li>• Ali Behnood &amp; Fred L. Mannering, 2017. The effects of drug and alcohol consumption on driver injury severities in single-vehicle crashes, <i>Traffic Injury Prevention</i>, 18:5, 456-462.</li> </ul> <p>2. How did you make sure that the patients were drivers and not passengers?</p> <p>3. Why did you use logistic regression in your study? This method does not account for the potential unobserved heterogeneity in the dataset. Please note that unobserved heterogeneity is a part of almost every crash-related dataset. I understand that logistic regression has been widely used to analyze crash-related data. However, with the recent advancement in methodological approaches, this method would not be suggested for the analysis of crash-related data. Some examples of the models that could account for the unobserved heterogeneity are mixed logit models, markov switching model, latent class model, mixed logit models with heterogeneity in mean and/or variances.</p> <p>4. Page 7, line 55: this value does not represent the mean value; it represents mean value plus minus std. Correct?? Please clarify that.</p> <p>5. In Figure, data is so scattered and there is not trend in the data points. The statement about the declining trend of monthly DUI patients after sanction change should be justified by statistical analysis.</p> <p>6. In this study, it has been claimed that females accounts for less DUI patients compared to their male counterparts. This claim should be based on the proportion of the gender-based drivers to the total number of drivers. In total, is there less female drivers than male drivers in the region of study?</p> <p>7. Gender has a complex effect on the injury severities. Higher number of male drivers in motorcycle accidents compared to female drivers does not an indication of a higher risk.</p>
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## VERSION 1 – AUTHOR RESPONSE

Dear James C. Fell

Thank you for your time, effort and professional comments in regard to our manuscript entitled “The effect of lowering the legal blood alcohol concentration limit on driving under the influence (DUI) in southern Taiwan – a cross-sectional retrospective analysis” to BMJ open. I have revised the document according to your kind recommendation and highlighted those areas with tracking function of the Word.

I have some issues you need to address:

1. Please avoid using the term "accident." These are "crashes" not accidents with no causes.

**Answer:** According to your suggestion, we had changed the terms “accidents” to “crashes” throughout this article. Thank you for your recommendation.

2. For BAC, please use mg/dL throughout the manuscript.

**Answer:** Yes, we had used mg/dL for BAC and deleted all the description about BrAC (breathing) throughout the manuscript.

3. Page 6, PATIENTS AND METHODS, line 16: How many patients with incomplete data were excluded? Any reason to believe those excluded were DUI?

**Answer:** We had indicated that 23 patients who had incomplete data were excluded. Those incomplete data included those features of demographic characteristics and were not belong to the data of alcohol level. In addition, we had indicated in the limitation of the original article that “Fourth, patients seeking medical care due to traffic accident did not routinely receive a blood alcohol test unless they showed symptoms of being alcohol-impaired or unconsciousness. This may underestimate the effect of DUI in our analysis.” (Page 14)

4. Page 6, line 36: Why were BAC tests not performed on all patients? Why just those with clinical suspicion? Explain.

**Answer:** In our emergency room, the BAC tests would be performed upon the request of policeman or there is suspicion that his/her conscious change or poor response maybe owing to an alcohol effect. By law in Taiwan, in order not to violate the human rights, it is not allowed to do BAC tests for the patients without any reason.

5. Page 7, line 46: What does "Patients and or public were not involved please state this" A note to yourselves. Change it or delete it.

**Answer:** Yes, we had deleted it in the revised manuscript.

6. Page 8, line 3: Only 8.6% of the patients with clinical suspicion of DUI were actually DUI? Why so low? If police in other parts of the world test the drivers they suspect of drinking at least 80% have alcohol on board. With the 8.6% it looks like most patients were tested for BAC. Is that correct? Give the numbers of total patients and the numbers tested for BAC. Also, only 3% involved car drivers and 97% involved motorcycles?

**Answer:** The data is correct, albeit a little low. We had performed BAC as possible if there is suspicion that his/her conscious change or poor response was related to the alcohol level. The DUI data from police is depend on what circumstance they perform the measurement. For example, the data would be much lower in the checkpoint examination executed routinely for the pass-through vehicles. In addition, the percentages of car and motorcycle accidents were correct. As we had presented in some of our prior studies, most of the traffic accident in Taiwan involved in motorcycle accident. (please also see Alcohol-related hospitalizations of adult motorcycle riders. *World J Emerg Surg.* 2015 Jan 7;10(1):2.; Motorcycle-related hospitalization of adolescents in a Level I trauma center in southern Taiwan: a cross-sectional study. *BMC Pediatr.* 2015 Aug 28;15:105.; & Motorcycle-related hospitalizations of the elderly. *Biomed J.* 2017 Apr;40(2):121-128.)

7. Page 9, lines 3-22: Why did you not give the numbers of single vehicle crashes and the number of multiple vehicle crashes? Another measure of alcohol involvement is the ratio of single vehicle nighttime (SVN) crashes to multiple vehicle daytime (MVD) crashes. Please calculate those ratios before and after the BAC change. It will serve as a validation of your study.

**Answer:** According to your kind recommendation, we check the SVN and MVD as your suggestion and found similar numbers over SVNs pre- and post-sanction change. Post-sanction SVN/MVD ratio

significant drop to 0.48 from pre-sanction SVN/MVD ratio with 0.60. We had indicated these data in the revised manuscript accordingly (Page 7 and Page 13). Thank you for your professional opinions.

	SVN	MVD	SVN/MVD ratio
Pre-sanction change	1269	2126	0.60
Post-sanction change	1305	2747	0.48

8. Page 10, lines 10-14: The lower helmet uses post law could be the reason for the mortality rate being higher. Please discuss.

**Answer:** Yes, the mortality and airbag use did not reach the significance level in the comparing pre- and post-sanction, but the helmet use did. When we checked the ORs of mortality in pre- and post-sanction, the post-sanction mortality OR in DUI was significantly higher than pre-sanction-DUI. It may be explained by these DUI drivers after sanction change is more addicted to alcohol and was associated with lower helmet use. According to your kind suggestion, we had indicated this in the Page 13 of the revised manuscript.

9. Page 11, DISCUSSION: The use of airbags going down is due to the model year of car driven. DUI drivers tend to drive older vehicles.

**Answer:** That is a good point. We had integrated this viewpoint into the first paragraph of discussion in page 11 of the revised manuscript. Thank you for your kind recommendation.

10. Page 11, lines 50-53: Drivers in alcohol-involved crashes also tend to not wear a safety belt or drive a late model vehicle. They also speed.

**Answer:** Yes, we had integrated this viewpoint into the first paragraph of discussion in page 11 of the revised manuscript. Thank you.

11. Page 14, lines 3-10: What covariates did you use in your analyses? It was not clear. Did you control for population pre-post? Vehicle miles travelled pre-post? Alcohol consumption per capita pre-post? Vehicles and motorcycles registered pre-post? You must control for some of these factors or your findings will not be considered as valid.

**Answer:** Unfortunately, alcohol consumption, vehicle miles travelled, and vehicles and motorcycles registered did not be recorded in our trauma database, Therefore, we did not use them as a control in the comparison. We had indicated those as limitations in Page 15 of the revised manuscript as "Finally, there may exist bias in the outcome assessment with control of alcohol consumption, vehicle miles travelled, and vehicles and motorcycles registered, which were lack in the registered trauma database."

12. You certainly did your homework on the background and the list of References.

**Answer:** We are glad of your appreciation of our work. Thank you.

13. Table 1: It looks like the DUI % (10.99% vs. 6.64%, pre-post), was not statistically significant. Correct? Yet that was your main outcome measure. Please explain.

**Answer:** It had been shown significant in the Table 1 of original manuscript ( $p < 0.001$ ). To avoid confusion, we had emphasized that in the abstract and result sections of the manuscript with "significantly". Thank you for your meticulous reading.

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.

Ching-Hua Hsieh, M.D. Ph.D., FACS

Department of Plastic and Reconstructive Surgery, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Taiwan.

Dear Ali Behnood

Thank you for your time, effort and professional comments in regard to our manuscript entitled "The effect of lowering the legal blood alcohol concentration limit on driving under the influence (DUI) in southern Taiwan – a cross-sectional retrospective analysis" to BMJ open. I have revised the document according to your kind recommendation and highlighted those areas with tracking function of the Word.

Please leave your comments for the authors below

1. DUI increases the risk of accident but it has complicated effects on the severity of the accidents. It would be suggested to revise the paper accordingly. Previous studies have shown that statistically significant differences exist in the injury severity of road users in the presence/absence of alcohol/drug impairment. The following papers provide a discussion for this topic:

- Ali Behnood, Arash M. Roshandeh, Fred L. Mannering, 2014. Latent class analysis of the effects of age, gender, and alcohol consumption on driver-injury severities, *Analytic Methods in Accident Research*, 3–4, 56-91.
- Ali Behnood & Fred L. Mannering, 2017. The effects of drug and alcohol consumption on driver injury severities in single-vehicle crashes, *Traffic Injury Prevention*, 18:5, 456-462.

**Answer:** Yes, your suggestion is very good. We had included some point of views of these two manuscripts into the limitation section of discussion in the revised manuscript. Thank you.

2. How did you make sure that the patients were drivers and not passengers?

**Answer:** It was already recorded in the registered trauma database as drivers or passengers when those patients were admitted.

3. Why did you use logistic regression in your study? This method does not account for the potential unobserved heterogeneity in the dataset. Please note that unobserved heterogeneity is a part of almost every crash-related dataset. I understand that logistic regression has been widely used to analyze crash-related data. However, with the recent advancement in methodological approaches, this method would not be suggested for the analysis of crash-related data. Some examples of the models that could account for the unobserved heterogeneity are mixed logit models, markov switching model, latent class model, mixed logit models with heterogeneity in mean and/or variances.

**Answer:** Yes, we agreed with your opinion. Therefore, we had indicated in the page 14 of the revised manuscript as “In fact, drivers with or without DUI had more heterogeneity in the factors that may affect injury severity. The bias may exist in the analysis with multivariate logistic regression for the association between the injury severity and the drivers with or without DUI, thus may comprise a limitation in this study.”

4. Page 7, line 55: this value does not represent the mean value; it represents mean value plus minus std. Correct?? Please clarify that.

**Answer:** Yes, it was mean plus and minus std. Therefore, a description as average age would be better. We had corrected this in the revised manuscript. Thank you for your meticulous inspection.

5. In Figure, data is so scattered and there is not trend in the data points. The statement about the declining trend of monthly DUI patients after sanction change should be justified by statistical analysis.

**Answer:** Yes, such description of trend in monthly would not be suitable. We had deleted such description in the page 8 of the revised article. Thank you for your professional recommendation.

6. In this study, it has been claimed that females accounts for less DUI patients compared to their male counterparts. This claim should be based on the proportion of the gender-based drivers to the total number of drivers. In total, is there fewer female drivers than male drivers in the region of study?

**Answer:** In the region of study, the female is fewer than the male drivers. As we had indicated in the original article that “our previous studies also reported more males than females with traffic accidents crashes sent to our emergency room. Compared to females, males had a higher risk of motorcycle accidents, which accounted for approximately 60% of injuries in southern Taiwan. In this study, the male patients comprised 88.47%, which is higher than the non-DUI group (55.94%) and the general population.

However, to avoid confusion, we avoid to use the term as “risk” associated with gender and had revised the article to present what we just observed that “Males still showed increased odds of DUI (Crude OR 6.01, 95% CI: 4.69-7.69)” (Page 9) as well as the description of “In this study, females accounted for a minor proportion (12%) of DUI patients” (page 11) of the revised manuscript.

7. Gender has a complex effect on the injury severities. Higher number of male drivers in motorcycle accidents compared to female drivers does not an indication of a higher risk.

**Answer:** Yes, we agreed with your opinion as we indicated in the lines 5-7 of first paragraph in the Discussion of the original article as “Complex causal relationships in physiological and social factors may account for the difference in males and females involved in DUI.”. Therefore, we avoid to use the term as “risk” associated with gender and had revised the article to present what we just observed that

“Males still showed increased odds of DUI (Crude OR 6.01, 95% CI: 4.69-7.69)” (Page 9) of the revised manuscript. Thank you for your kind opinion.

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.

Ching-Hua Hsieh, M.D. Ph.D., FACS

Department of Plastic and Reconstructive Surgery, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Taiwan.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	James C. Fell NORC at the University of Chicago Bethesda, Maryland, USA
<b>REVIEW RETURNED</b>	26-Dec-2018

<b>GENERAL COMMENTS</b>	In reviewing my initial comments and the responses, there are still some issues with the manuscript: (1) The term "accident" still appears in the revised manuscript at least 10 times. Change each time to "crashes". (2) In my opinion, the analysis of SVN/MVD crashes confirms the finding that DUI crashes decreased pre-sanction to post-sanction. However, the SVN/MVD analysis needs to be moved to the Results section as a major finding. (3) I still did not see any data on safety belt use of DUI drivers vs. Non-DUI drivers. That needs to be examined. (4) All the other issues I had were dealt with adequately. However, there are still places in the revised manuscript that use incorrect English. Please have an editor whose first language is English go over and edit the manuscript. (5) The second reviewer still needs to determine if you have adequately responded to his/her comments.
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<b>REVIEWER</b>	Ali Behnood Purdue University
<b>REVIEW RETURNED</b>	28-Nov-2018

<b>GENERAL COMMENTS</b>	Thanks for addressing the comments.
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#### VERSION 2 – AUTHOR RESPONSE

Dear Ali Behnood

Thank you for your time, effort and professional comments in regard to our manuscript entitled “The effect of lowering the legal blood alcohol concentration limit on driving under the influence (DUI) in southern Taiwan – a cross-sectional retrospective analysis” to BMJ open. I have performed the second revision of the document according to your kind recommendation and highlighted those areas with green. In addition, upon the request of the second reviewer, the manuscript had also been sent for second English revision by the same company Editage with marked tracking of the Word.

Please state any competing interests or state ‘None declared’: None declared. **Answer:** I had indicated “The authors declare no conflict of interest.” in the conflict of interest section. Thank you.

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.

Ching-Hua Hsieh, M.D. Ph.D., FACS

Department of Plastic and Reconstructive Surgery, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Taiwan.

Dear James C. Fell

Thank you for your time, effort and professional comments in regard to our manuscript entitled "The effect of lowering the legal blood alcohol concentration limit on driving under the influence (DUI) in southern Taiwan – a cross-sectional retrospective analysis" to BMJ open. I have performed the second revision of the document according to your kind recommendation and highlighted those areas with yellow. In addition, upon your request, the manuscript had also been sent for second English revision by the same company Editage with marked tracking of the Word.

In reviewing my initial comments and the responses, there are still some issues with the manuscript:

(1) The term "accident" still appears in the revised manuscript at least 10 times. Change each time to "crashes".

**Answer:** Yes, I had substituted the term "accident" with "crashes" in the revised manuscript. Thank you for your recommendation.

(2) In my opinion, the analysis of SVN/MVD crashes confirms the finding that DUI crashes decreased pre-sanction to post-sanction. However, the SVN/MVD analysis needs to be moved to the Results section as a major finding.

**Answer:** Yes, I had moved the result of SVN/MVD analysis from the discussion section to the result resection of the revised manuscript (page 10 and 13). Thank you.

(3) I still did not see any data on safety belt use of DUI drivers vs. Non-DUI drivers. That needs to be examined.

**Answer:** As you had indicated at the prior recommendation that drivers in alcohol-involved crashes also tend to not wear a safety belt. We agreed with you point, however, the registered data of our Trauma Registry System could not reflect such condition. Therefore, I will indicate that as one of the limitation of this study as "In addition, the use of safe belt of these drivers was not registered in the trauma database, therefore, a further analysis of the impact of law sanction on the safe belt use cannot be performed." (page 14). Thank you for your professional opinions.

(4) All the other issues I had were dealt with adequately. However, there are still places in the revised manuscript that use incorrect English. Please have an editor whose first language is English go over and edit the manuscript.

**Answer:** The article had been revised by a professional company Editage before its submission. Upon your request, I had sent this revised article to the same company for further revision of the English. I hope such revision would improve the English writing a lot and satisfy our request. Thank you

## CERTIFICATE OF ENGLISH EDITING

This document certifies that the paper listed below has been edited to ensure that the language is clear and free of errors. The edit was performed by professional editors at Editage, a division of Cactus Communications. The intent of the author's message was not altered in any way during the editing process. The quality of the edit has been guaranteed, with the assumption that our suggested changes have been accepted and have not been further altered without the knowledge of our editors.

### TITLE OF THE PAPER

The effect of lowering the legal blood alcohol concentration limit on driving under the influence (DUI) in southern Taiwan – a cross-sectional retrospective analysis

### AUTHORS

Ching-hua Hsieh

### JOB CODE

HIIEH\_79\_2



Signature

A handwritten signature in black ink that reads "Vikas Narang".

Vikas Narang,  
Senior Vice President,  
Operations-Author Services, Editage

Date of Issue  
January 24, 2019

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(5) The second reviewer still needs to determine if you have adequately responded to his/her comments.

**Answer:** The other reviewer is appreciated of our work. Thank you.

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.

Ching-Hua Hsieh, M.D. Ph.D., FACS

Department of Plastic and Reconstructive Surgery, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Taiwan.



### VERSION 3 – REVIEW

<b>REVIEWER</b>	James C. Fell NORC at the University of Chicago Bethesda, Maryland USA
<b>REVIEW RETURNED</b>	08-Feb-2019

<b>GENERAL COMMENTS</b>	Thank you for the revised manuscript and adequately responding to each of my concerns.
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Reviewer: 1

Reviewer Name: James C. Fell

Institution and Country: NORC at the University of Chicago, Bethesda, Maryland, USA

Please state any competing interests or state 'None declared': None declared.

Answer: I had already indicated "The authors declare no conflict of interest." in the conflict of interest section. I think this may be used to remind the reviewer to sing the declaration of the competing interests. Thank you.