

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form ([see an example](#)) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

This paper was submitted to the BJSM but declined for publication following peer review. The authors addressed the reviewers' comments and submitted the revised paper to BMJ Open. The paper was subsequently accepted for publication at BMJ Open.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Epidemiology of injuries in elite taekwondo athletes: two Olympic periods cross-sectional retrospective study
AUTHORS	Altarriba-Bartes, Albert; Drobnic, Franchek; Til Pérez, Luís; Malliaropoulos, Nikolaos; Montoro, Bruno; Irurtia Amigó, Alfredo

VERSION 1 - REVIEW

REVIEWER	Lohrer, Heinz Institute for Sportsmedicine Frankfurt am Main e.V., Orthopaedics
REVIEW RETURNED	01-Aug-2013

GENERAL COMMENTS	<p>your study deals with an important topic. Taekwondo is a very young Olympic sport. Epidemiologic work related to injuries is always the initial step to elucidate the health risks and finally to make a specific sport more safe.</p> <p>This manuscript is definitively worth to be published in the BJSM. However, there are some flaws to be addressed.</p> <p>General remarks:</p> <ol style="list-style-type: none">1. The manuscript ist too long. I recommend to substantially shorten it to maximally 2800 words.2. There is no information presented about the severity of the injuries.3. Your IE and MV seem to be closely related. At least this is my impression after viewing all the tables. If so, there is no need to continuously present both results. Too many data are confusing for the reader. Please consider to omit MV in the manuscript and present it as supplemental files ("Web only files").4. You present 12 tables. This again is too much and confuses the reader. Several of the results (in my opinion) are of minor importance for the reader and should be presented only as supplemental files ("Web only files"). I propose to present five tables at maximum within the manuscript to be published.5. I am not a statistician but for me it seems, that the so called Injury episodes (IE) (artificially) increase the numbers which build the basis for further statistical testing. E.g. in table 5 three male heavy weight athletes are responsible for 145 IE. I believe that the IE are not independent variables. This problem must be further addressed in the next version of the manuscript. <p>Specific comments:</p> <ol style="list-style-type: none">1. Page 2, line 22: please change "each risk factor" to "...each identified risk factor..."2. Page 2, line 24:"tipology". This term is incorrect. "Typlogy" is a psychologic term. Please change wording here and throughout the
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manuscript.

3. Page 2, line 32: please change "was" to "were".

4. Page 2, line 37: please delete "presenting".

5. Page 2, line 42: dislocations and sprains and also contusions can be "joint injuries". Therefore the diagnoses as given here should be defined more accurate.

6. Page 2, line 47-49: "... season moment ...level". It is unclear what you mean. Please rephrase.

7. Page 3, line 27: please insert a comma before "and". Please do so here and throughout the manuscript.

8. Page 3, line 31: "full-contact event". Please provide information about protective equipment.

9. Page 3, line 33-38: the content of this sentence is (semantically) incorrect. Victory is achieved by higher scores given by judges for the specific performances which you describe here. Please rephrase accordingly.

10. Page 3, line 43: please delete "associated".

11. Page 3, line 45: please substitute "realization of" by "for".

12. Page 4, line 20: please substitute "elevated" by "increased".

13. Page 4, line 20: please substitute "of" by "in".

14. Page 4, line 27: what do you mean by "determinate"? Can this word be omitted?

15. Page 4, line 50: what means "component"? Were respective analyses performed also for different sports? Please explain.

16. Page 5, line 14: please provide the definition for "elite".

17. Page 5, line 44: "European Union standards". Please provide a respective citation.

18. Page 5, line 52: please change "classifying" to "classified".

19. Page 5, line 57 to page 6, line 23: see my "General remark 3".

20. Page 6, line 3-12: this is unclear. Adopting the definition from Hagglund makes sense. This means that a two month interval without medical visits has to be stated after the initial injury needs no further medical help and full training and competition capacity has been restored during this interval.

21. Page 6, line 26: please change "Analysis" to "Analysed".

22. Page 6, line 44: "post-competition". Why including injuries obtained during the competition. Why not introducing a third category "competition injuries"? Please explain.

23. Page 7, line 28: please define the independent variables and insert in brackets.

24. Page 7, line 44: When do you use the t-test and when the Mann-Whitney U test? please describe more in detail.

25. Page 8, line 9: "anatomical sites". I think, this should be presented as a subheading in the same hierarchical order like "Chronological age".

26. Page 8, line 55: "injury typologies". I think, this should be presented as a subheading in the same hierarchical order like "Chronological age".

27. what do you mean by "higher number"? Do you mean "more than one". What about "one episode"? Please explain.

28. Page 9, line 50 to page 10, line 36: here you present absolute values and these values highly depend from the whole number of athletes observed in a specific age group. Please consider to relate the injury numbers to the respective participants within the same age group.

29. Page 10, line 24: "sufficiently high". This statement as it stands needs support by a power analysis. Please present a power analysis or rewrite this sentence like: "With the numbers available".

30. Page 11, line 20: "n(%)". What does this "n" mean? It is not clear from the table legend. Please add the respective information.

	<p>31. Page 11, line 34: "significant differences ...". It is unclear from the presented material which numbers you compared to obtain this statistical measure. Please clarify/give more detailed information.</p> <p>32. Page 11, line 43-50: see my comment 27.</p> <p>33. Page 11, line 53: What means "behavior-dependent generator"? It is not explained until now. Please provide the respective information preferentially in the "Methods".</p> <p>34. Page 14, line 5: "or during training sessions or". This is not congruent with your definition in the "Methods". I propose to delete "or during training sessions or".</p> <p>35. Page 14, line 31: "It does not exist differences". Please change to "No differences exist ...".</p> <p>36. Page 15, line 3-53: The problem with your "competition difficulty level" is that it is obviously unrelated to the numbers of exposures within a specific competition and this can bias the results. Please give a comment or consider this aspect respectively.</p> <p>37. Page 15, line 14: a bracket ")" is missing following "visits". Please add.</p> <p>38. Page 15, line 48: please change "in" to "to".</p> <p>39. Page 16, line 32-47: Please additionally present here a short summary of the most important findings of your study. There are several more limitations to be considered. 1. not prospective design, 2. despite the high number of IE there is a low number of athletes included and this can possibly result in relevant bias. Specifically, there is no information presented about previous injuries (which in all epidemiologic work is identified as the main risk factor for further injuries) in these athletes which may trigger further injuries during the observation period.</p> <p>40. Page 16, line 56-58: this sentence is misleading. If there is no statistically proven difference, you can only say that there is a "tendency". I propose to rewrite this sentence like: "There is no statistically proven difference found ..."</p> <p>41. Page 17, line 23: "... differences, that other authors found ...". Which differences do you mean? Please add this information. Which "other authors"? Please provide citations.</p> <p>42. Page 18, line 36: what do you mean by "themselves"? I think, that they kick each other and not themselves. Please explain.</p> <p>43. Page 18, line 48: please change "concrete" to "specific".</p>
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VERSION 1 – AUTHOR RESPONSE

General remarks:

1. The manuscript is too long. I recommend to substantially shorten it to maximally 2800 words.

The text has now 2854 words.

2. There is no information presented about the severity of the injuries.

We have an injury severity index (II), which is related to the Medical Visits (MV) generated by every Injury Episode (IE) and it's calculated using this formula: $II = MV / IE$. The more Medical visits required the higher Injury severity index will be. We decided not to put this index because of the words limitation of the article. In addition, according to your indications, we proceed to remove all the references according to the MV and we mentioned in the text that this information and the injury severity index will be located like a supplementary online data or web only files.

3. Your IE and MV seem to be closely related. At least this is my impression after viewing all the tables. If so, there is no need to continuously present both results. Too many data are confusing for the reader. Please consider to omit MV in the manuscript and present it as supplemental files ("Web only files").

We proceeded in this way, like you suggested.

4. You present 12 tables. This again is too much and confuses the reader. Several of the results (in my opinion) are of minor importance for the reader and should be presented only as supplemental files ("Web only files"). I propose to present five tables at maximum within the manuscript to be published.

We reduced the number of tables. We present five tables as you suggested.

5. I am not a statistician but for me it seems, that the so called Injury episodes (IE) (artificially) increase the numbers which build the basis for further statistical testing. E.g. in table 5 three male heavy weight athletes are responsible for 145 IE. I believe that the IE are not independent variables. This problem must be further addressed in the next version of the manuscript.

Indeed, it has operated statistically with IE ($n = 1678$) and not with every individual subject who has shaped the sample ($n = 48$). In relation to the above example (Table 5), it is clear that these three athletes of the Spanish National Team would probably have generated in the course of a long elite career (in this case, are recorded during the 8 years covered by the study) an average of 48 IE (6 IE per year). These data, according to the demand level that we are talking about, respond to normality. In any case, the aim of this study as we planned from the beginning has been to work with the number of injuries (which in this case stands for IE) and not with the subjects, which would certainly have used longitudinal designs or mixed-longitudinal.

Specific comments:

1. Page 2, line 22: please change "each risk factor" to "...each identified risk factor...".

Revised in the manuscript.

2. Page 2, line 24:"tipology". This term is incorrect. "Typlogy" is a psychologic term. Please change wording here and throughout the manuscript.

Revised in all the manuscript.

3. Page 2, line 32: please change "was" to "were".

Revised in the manuscript.

4. Page 2, line 37: please delete "presenting".

Deleted in the manuscript.

5. Page 2, line 42: dislocations and sprains and also contusions can be "joint injuries". Therefore the diagnoses as given here should be defined more accurate.

Revised and modified in the manuscript.

6. Page 2, line 47-49: "... season moment ...level". It is unclear what you mean. Please rephrase.

Revised and modified in the manuscript.

7. Page 3, line 27: please insert a comma before "and". Please do so here and throughout the manuscript.

Revised and modified in all the manuscript.

8. Page 3, line 31: "full-contact event". Please provide information about protective equipment.

Revised and added in the manuscript.

9. Page 3, line 33-38: the content of this sentence is (semantically) incorrect. Victory is achieved by higher scores given by judges for the specific performances which you describe here. Please rephrase accordingly.

Revised and modified in the manuscript.

10. Page 3, line 43: please delete "associated".

Deleted in the manuscript.

11. Page 3, line 45: please substitute "realization of" by "for".

Revised and replaced in the manuscript.

12. Page 4, line 20: please substitute "elevated" by "increased".

Revised and replaced in the manuscript.

13. Page 4, line 20: please substitute "of" by "in".

Revised and replaced in the manuscript.

14. Page 4, line 27: what do you mean by "determinate"? Can this word be omitted?

Revised and omitted in the manuscript.

15. Page 4, line 50: what means "component"? Were respective analyses performed also for different sports? Please explain.

Revised and modified in the manuscript: "This study is a large analytical cross-sectional..."

16. Page 5, line 14: please provide the definition for "elite".

"Elite" are national taekwondists selected by the national federation that training in the High Performance Sports Centre, Sant Cugat del Vallès, Spain. In this line of the manuscript this word has been replaced by "nationals". In the rest of the manuscript, if the reviewer doesn't consider it as wrong, we decided to maintain the standardized international word "elite".

17. Page 5, line 44: "European Union standards". Please provide a respective citation.

Revised and provide a respective citation (and consequent reference bibliography) in the manuscript.

18. Page 5, line 52: please change "classifying" to "classified".

Revised and modified in the manuscript.

19. Page 5, line 57 to page 6, line 23: see my "General remark 3."

Revised and modified in all the manuscript.

20. Page 6, line 3-12: this is unclear. Adopting the definition from Hagglund makes sense. This means that a two month interval without medical visits has to be stated after the initial injury needs no further medical help and full training and competition capacity has been restored during this interval.

Revised and modified in the manuscript.

21. Page 6, line 26: please change "Analysis" to "Analysed".

Revised and modified in the manuscript.

22. Page 6, line 44: "post-competition". Why including injuries obtained during the competition. Why not introducing a third category "competition injuries"? Please explain.

Revised and explained in the manuscript (discussion section).

23. Page 7, line 28: please define the independent variables and insert in brackets.

Revised and modified in the manuscript.

24. Page 7, line 44: When do you use the t-test and when the Mann-Whitney U test? please describe more in detail.

Revised and explained in the manuscript (statistical analysis section).

25. Page 8, line 9: "anatomical sites". I think, this should be presented as a subheading in the same hierarchical order like "Chronological age".

Revised and modified in the manuscript.

26. Page 8, line 55: "injury typologies". I think, this should be presented as a subheading in the same hierarchical order like "Chronological age".

Revised and modified in the manuscript.

27. what do you mean by "higher number"? Do you mean "more than one". What about "one episode"? Please explain.

Revised and substituted in the manuscript by "the type of injury with more IE..."

28. Page 9, line 50 to page 10, line 36: here you present absolute values and these values highly

depend from the whole number of athletes observed in a specific age group. Please consider to relate the injury numbers to the respective participants within the same age group.

Both the full text and the table itself have been modified to express the value of chronological age to the respective participants within the same age group.

29. Page 10, line 24: "sufficiently high". This statement as it stands needs support by a power analysis. Please present a power analysis or rewrite this sentence like: "With the numbers available".

Revised and modified in the manuscript rewriting the sentence as indicates the reviewer "with the numbers available..."

30. Page 11, line 20: "n(%)". What does this "n" mean? It is not clear from the table legend. Please add the respective information.

Revised and modified in all the manuscript indicating in the basis of the tables the meaning of "n" (number of...).

31. Page 11, line 34: "significant differences ...". It is unclear from the presented material which numbers you compared to obtain this statistical measure. Please clarify/give more detailed information.

We have included in the text a better explanation about how we obtained this values: (males: 48.8 ± 11.9 vs females: 26.6 ± 6.7 ; $p=0.03$). In addition, with the chronological age table, the reviewer and the reader would be able to check this result.

32. Page 11, line 43-50: see my comment 27.

Revised and substituted in the manuscript by the same form of comment 27.

33. Page 11, line 53: What means "behavior-dependent generator"? It is not explained until now. Please provide the respective information preferentially in the "Methods".

The section corresponding to statistical analysis has been modified, including the following paragraph: "In order to analyze the probability of considering a risk factor, or a possible behavior-dependent generator between the injuries (by the criterion of OSICS classification) and each of the independent variables, we used the Pearson Chi-squared test"

34. Page 14, line 5: "or during training sessions or". This is not congruent with your definition in the "Methods". I propose to delete "or during training sessions or".

Revised, deleted in the manuscript, and explained in the "Methods" section.

35. Page 14, line 31: "It does not exist differences". Please change to "No differences exist ...".

Revised and modified in the manuscript.

36. Page 15, line 3-53: The problem with your "competition difficulty level" is that it is obviously unrelated to the numbers of exposures within a specific competition and this can bias the results. Please give a comment or consider this aspect respectively.

We agree with the reviewer when he says that independently of the international level that a competition could have, these could differ from them in the difficulty level and it could alter the results. However, the combat sports' complexity for itself, like taekwondo, and the retrospective study design, it was impossible for us to approach to analyse and quantify this difficulty level and its complexity in another way. On the other hand, it's true that all the group have participated in the same competitions (they trained in the same centre, with the same coaches and using the same training programs) and this mistake without being removed it is minimized.

We added this justification in the discussion.

37. Page 15, line 14: a bracket ")" is missing following "visits". Please add.

Revised and modified in the manuscript.

38: Page 15, line 48: please change "in" to "to".

Revised and modified in the manuscript.

39. Page 16, line 32-47: Please additionally present here a short summary of the most important findings of your study.

Revised and modified (added) in the manuscript.

There are several more limitations to be considered. 1. not prospective design, 2. despite the high number of IE there is a low number of athletes included and this can possibly result in relevant bias. Specifically, there is no information presented about previous injuries (which in all epidemiologic work is identified as the main risk factor for further injuries) in these athletes which may trigger further injuries during the observation period.

Revised and modified (added) in the manuscript.

40. Page 16, line 56-58: this sentence is misleading. If there is no statistically proven difference, you can only say that there is a "tendency". I propose to rewrite this sentence like: "There is no statistically proven difference found ..."

Revised and modified in the manuscript.

41. Page 17, line 23: "... differences, that other authors found ...". Which differences do you mean? Please add this information. Which "other authors"? Please provide citations.

Revised and modified (added citations) in the manuscript.

42. Page 18, line 36: what do you mean by "themselves"? I think, that they kick each other and not themselves. Please explain.

Revised and modified in the manuscript (each other).

43. Page 18, line 48: please change "concrete" to "specific".

Revised and modified in the manuscript

VERSION 2 – REVIEW

REVIEWER	Lohrer, Heinz Institute for Sportsmedicine Frankfurt am Main e.V., Orthopaedics
REVIEW RETURNED	23-Oct-2013

GENERAL COMMENTS	<p>this second version of your manuscript is improved only a little bit. After careful reading, I am still unable to have an overview on the "injury epidemiology" topic.</p> <p>First, the structure of the manuscript is still critical. You should present the purposes/questions in a specific order. And this order must be repeated in the same sequence in the Methods, Results and in the Discussion. You confuse the reader by address so many different "objectives" that he/she is unable to profit from the information. And this is also true for the interpretation of the results. Next, the tables like they are now, in my opinion do not present information which is relevant for the reader. Fewer tables with summarized data make more sense.</p> <p>Finally, the conclusions which you draw from your statistics are critical in my opinion, because there is no information about the numbers of subjects within the different ages and weight categories. For risk calculations, however, you need to relate the ages/weight categories to the corresponding numbers of subjects.</p> <p>To put your principally interesting data in a readable and understandable manuscript I suggest to simplify (less is more) it by reducing its content to few bur relevant aspects. Reanalysis of the data (with the help of a statistician) is necessary. A strictly question/objective driven structure of the manuscript added by new and meaningful tables is demanded.</p>
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- This second version receives two reviews at BJSM but the other referee had declined to make the reviews public.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Comments to the Author

Dear Author(s), this second version of your manuscript is improved only a little bit. After careful reading, I am still unable to have an overview on the "injury epidemiology" topic.

First, the structure of the manuscript is still critical. You should present the purposes/questions in a specific order. And this order must be repeated in the same sequence in the Methods, Results and in the Discussion. You confuse the reader by address so many different "objectives" that he/she is unable to profit from the information. And this is also true for the interpretation of the results.

- Dear reviewer, we revised the document and now, the order is repeated in the same sequence in methods, results and in the discussion.

Next, the tables like they are now, in my opinion do not present information which is relevant for the reader. Fewer tables with summarized data make more sense.

- According to the two reviewers comments, we reduced the number of tables (Table 1 and Table 2)

and we generated two figures to show the results in a more accessible way for the reader.

Finally, the conclusions, which you draw from your statistics, are critical in my opinion, because there is no information about the numbers of subjects within the different ages and weight categories. For risk calculations, however, you need to relate the ages/weight categories to the corresponding numbers of subjects.

To put your principally interesting data in a readable and understandable manuscript I suggest to simplify (less is more) it by reducing its content to few but relevant aspects. Reanalysis of the data (with the help of a statistician) is necessary. A strictly question/objective driven structure of the manuscript added by new and meaningful tables is demanded.

- Finally, we proceed to reanalyse the data, including Bonferroni correction (p adjusted), and odds ratio (risk calculations in statically significance variables). We included in the study limitations the low number of individual subjects, obvious, because of the higher competition level of the subjects, elite taekwondo athletes, most who participated in Olympic Games and World Championships.

- We hope that all the corrections made correspond with the indications of the reviewer. We appreciate the review and hope that now the manuscript has the level of rigor and demand that all scientific work must show.