Author’s response to reviews

Title: Grading and Assessment of Clinical Predictive Tools for Paediatric Head Injury: A New Evidence-Based Approach

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Author’s response to reviews:

To the Chief Editor
BMC Emergency Medicine Journal

Dear Professor Wiil,

Thank you very much for your email and attached valuable reviews on our submitted manuscript “Grading and Assessment of Clinical Predictive Tools for Paediatric Head Injury: A New Evidence-Based Approach” (EMMD-D-19-00043).

In this letter, we include our point-by-point response to each comment made by the three reviewers. All the changes made accordingly have been highlighted in the manuscript. We believe that this response, and the changes made in the manuscript, cover all the reviewers’ comments. We hope the manuscript is now suitable for publication.

Elaine Rabin (Reviewer 1):

This work presents an application of a previously described method for assessing clinical prediction tools, GRASP. As the authors rightly note, with the proliferation of clinical prediction tools, it is useful to classify them by their rigor, degree of validation, usability and potential impact. I am intrigued by this concept and the GRASP tool seems well thought-out, so I would certainly recommend consideration of this work for publication. However, I have a few issues with the manuscript that I'd suggest reviewing prior to acceptance.

First, the development and prior testing (if any) of GRASP is not well-described, though the authors repeatedly refer to it as "evidence-based". It is referenced (ref #36) but by following the link I only find a conference agenda without other information available for the relevant talk. Either more information
should be given in the current manuscript or there should be a more robust reference. Or are the authors using "evidence-based" to refer to the fact that the GRASP tool considers evidence for a prediction tool in ranking it? If so, the wording is confusing as is.

Response:

We are using “evidence-based” to refer to the fact that the GRASP framework considers published evidence on clinical predictive tools to rank them. This is clarified in the Methods section, page 6, lines 155-157.

We have two other previously conducted studies; one describes the development of the GRASP framework and the other describes its validation. Both studies are still under review in other journals and could not be cited in the manuscript. We believe the information included about the GRASP framework in the Methods section, pages 5-8, in addition to the GRASP concept in Figure 1 (page 8) and the GRASP detailed report in Table 3 in the Appendix (page 39) are sufficient to illustrate the approach.

Next, the paper is split into 3 parts: A literature review to identify paediatric head trauma prediction rules, a ranking of the identified rules using GRASP, and then what appears to be a descriptive analysis that the authors describe as "a comprehensive and objective analysis to answer the question of what makes certain tools more widely accepted and successfully implemented than others." The third section seems only partly relevant and perhaps the basis of a separate paper, though I have a few more concerns about this section (below).

Response:

The whole third section has now been moved to the Background section, pages 4-5, lines 98-114 (based on the comment of Nicole Almenrader (Reviewer 3).

The literature review was performed using a method with which I am unfamiliar, but intuitively seem that it would yield appropriate results. It was performed with "no specific time frame", which I presume means it used the default time frame of each search engine. It would be good to list these if so.

Response:

Yes. We used the default time frame of each search engine and up to January 2019. This is now added in the Methods section, page 6, lines 137-138.

The grading of the identified tools was a nice illustration of the application of the GRASP tool. The output is a bit unwieldy and thus I am not sure how much use would be made of the tool by the average clinician, though researchers and those with more developed interest in evidence-based medicine will likely appreciate it.

Response:

We have clarified that using the GRASP framework might need some training for expert healthcare professionals and researchers, who are going to grade predictive tools and some awareness for end user clinicians who are going to use GRASP output to select predictive tools. This is added to the Discussion section, pages 19-20, lines 513-516.
The third part, correlations of the resulting rankings and various aspects of the tools is of less convincing value, partly because the authors assume some causality from the correlations that is not obvious a priori. For example, more citations makes it more likely that a tool has been externally validated, etc, and external validation is an input for the GRASP ranking. So does a higher-ranking yield more citations, as the authors suggest, or do more citations yield a higher ranking. Also, the authors suggest that this analysis might help those developing clinical prediction tools develop better ones, but tool developers have little control over some of the characteristics analyzed, such as the country of origin or the year of development. Finally, the N for much of the analysis seems to be 5, which is underwhelming.

Response:

We agree with this point and have clarified this in the text. We are assuming association, not causality, between the assigned grade of the tool and some tool characteristics. Higher grade does not yield more citations but coincides with them. So, if a tool is not assigned a grade yet, clinicians could use the number of citations as a crude indicator of being more studied and more validated.

It is true that tools’ developers have little control over some characteristics, however, they still have control over other characteristics, such as the tool’s development methodology, patient sample size, finding enough funding for their research, and designing and developing simple and feasible tools. This is now clarified in the Conclusion section, page 20, lines 529-541.

More minor comments:

• The writing overuses commas. Reducing their use would make the manuscript more readable. (Example: line 180)

Response:

This has been now improved throughout the text.

• The abstract background only refers to 1 of the 3-objective stated in the manuscript.

Response:

This has now been fixed and made consistent.

• p 3 line 69- typo- missing the word "One"

Response:

This has now been fixed.

Thank you for the chance to review this work.

Martin Rohacek (Reviewer 2):

Khalifa et al performed a study that aims to grade and assess paediatric head injury predictive tools.
This is a well written and interesting manuscript. Its message is clinically relevant.

I have only minor comments:

Abstract: The conclusion does not clearly refer to the research question.

Response:

We have added some details to the conclusion section of the Abstract to refer clearly to the research question. Changes are highlighted in the Abstract, page 2, lines 38-47.

Background: Is well written, and objectives are clearly stated.

Methods: are clearly described.

Results: The results are clearly outlined

Discussion: Limitation section is missing

Response:

Study limitations have been now added to the Discussion section, page 20, lines 518-525.

Conclusion: The conclusion does not clearly refer to the objectives and results.

Response:

This has now been fixed. The beginning of the Conclusion section is now updated with more information and clarifications to clearly refer to the objectives and results. Changes highlighted in the Conclusion; page 20, lines 529 to 541.

Nicole Almenrader (Reviewer 3):

This is a well performed study assessing the quality of predictive paediatric head injury tools. The manuscript follows a clear description from study purpose to conclusions and gives a detailed overview of currently available and valid tools regarding prediction of paediatric head injury. However, the manuscript is very long and in part repetitive which makes it a difficult read. A more concise presentation of information would be preferable.

Response:

Thank you for your comments. We have made efforts to present the research in a more concise form. Repetitions have now been removed throughout the text. For example, we removed some text from the Results section that is mentioned in the tables. We also removed the repetition of the sentence “to understand what makes certain tools more widely accepted and successfully implemented than others”.

Specific comments:

• Section 'introduction': page 4, line 93 to 96: please divide the study purpose into primary (only
one) and secondary aims.

Response:

This has now been done.

• Section 'methods', page 5: Is the research confined to tools in English language and hence only applicable to the English-speaking world?

Response:

This has now been clarified. The search was conducted for studies published in English language. Changes are now highlighted in the Methods section, page 6, line 135-136.

• Page 7, whole paragraph 2.3 Analysing predictive tools: should be moved to section 'introduction'. Please keep the section 'methods' concise and clearly defined.

Response:

This has now been done. The whole paragraph has now been moved from the Methods section to the Background, page 4, lines 98-114.

• Page 7, line 182/183 and page 17, line 432/433: There is some repetition here. Please move all to section 'discussion'. - 'What makes certain tools more widely accepted…?' Rather than the single 'end user' clinician it should be national and institutional guidelines that incorporate predictive tools in their pathways and guide the clinician through the decision-making process. Are certain rules more user-friendly than others? The number and complexity of items used for each rule may play a role as well.

Response:

Repetitions have now been removed. The concept of “end user” has now been replaces with the concept of “national and institutional guideline developers” and moved from the Discussion to the Background section, as a response to the previous comment, page 4, lines 101-105.

The direct comparison of tools’ user friendliness or complexity was not possible, since we do not have usability studies on each of the 14 tools. However, the concept of simplicity and feasibility, in terms of the required resources, technical specifications, complexity and number of predictors, training or financial support are discussed in the Discussion, page 19, lines 488-496.

• Section 'results' could be shortened especially as there are many figures/tables which illustrate very clearly the findings. There is no need for a 'double' description with text and figures.

Response:

The Results section was shortened by removing the information that is already presented in the tables and the figures.

• Section 'discussion': page 19, second paragraph: can be omitted.
Response:

This paragraph has now been shortened. We prefer to keep part of this paragraph to discuss some additional reasons of tools’ success, such as tools’ simplicity and feasibility, in terms of the required resources, technical specifications, complexity and number of predictors, training or financial support. This is also part of the response to one of the previous comments. This is now in the Discussion, page 19, lines 488-496.

• Page 19, last paragraph: the authors should try to be more concise. Do they consider GRASP as a user-friendly tool which can be easily applied by clinicians to choose the most valid tool? Not sure about that.

Response:

We tried to be as concise as possible. However, this paragraph is very essential as an argument for the importance of the GRASP framework for clinicians and clinical guidelines developers.

We consider GRASP an easy to use tool for clinicians. However, we have clarified that using the GRASP framework might need some training for expert healthcare professionals and researchers, who are going to grade predictive tools and some awareness for end user clinicians who are going to use GRASP output to select predictive tools. This is added to the Discussion section, page 19-20, lines 513-516.

• Please discuss 'limits of the study'.

Response:

Study limitations have been now added to the Discussion section, page 20, lines 518-525.

• Section 'conclusions' far too long and repetitive.

Response:

This has now been fixed. The Conclusion is revised and shortened. Repetitions were removed.

• Page 20, line 537-544: please concentrate on the study aim which is not the validity of GRASP framework (reference 36), but application of GRASP for paediatric head injury predictive tools. Main finding and conclusion: GRASP framework confirmed the PECARN rule as the highest quality tool.

Response:

The Conclusion has now been focused to reflect the main findings, page 21, lines 544-546.

• Reference 13 typing error 'systems a'

Response:

This has now been fixed.
• Figures and tables are appropriate

Thank you for all the reviews and comments.

Sincerely,

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