Author’s response to reviews

Title: Simulation training in vitreoretinal surgery: A systematic review

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Author’s response to reviews:

Concerning Manuscript BOPH-D-18-00858:

Dear Editor,

Thank you for the valuable comments on our manuscript.

We have made a point-by-point list of all changes requested by the reviewers and hope that these improvements will make our paper suitable for publication in BMC Ophthalmology.

Yours sincerely,

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Editor: This review concerns an timely and relevant question, especially in the field of vitreoretinal surgery. The authors have done many things rigorously so it is a disappointment that some aspects of the review were lacking.

I do share the concerns of the second reviewer. For an intervention review such as this, an instrument assessing risk of bias would be most appropriate. The MERSQI instrument has a place, especially in educational studies, but it does not really assess where in the included study bias arises and where biases could impact the reported results. Either the Cochrane risk of bias or the Ottawa Newcastle scale could be used to assess risk of bias. Given that one of the objectives was to review the quality of the available literature, it is important to assess the risk of bias.

Response: Thank you for taking the time to edit this paper. We agree that our review needs an instrument assessing risk of bias and have therefore implemented the Cochrane risk of bias tool. We still believe the MERSQI instrument has a place, because, as you pointed out, it is useful when assessing methodological quality of educational studies.

Editor: Also, generally a single reviewer could be somewhat biased so it would be advisable for a second person to either independently extract a portion of the data or review the original extraction. Similarly, optimally a second person should either independently review all or a sample of the risk of bias or 'quality'.

Response: You are completely right. To help correct the issue, a second author (A.S.V.) has reviewed the original extraction and agrees with it. In the newly included risk of bias assessment, two authors independently rated the studies.

Editor: Lastly, it would be helpful if the specific outcomes or objectives of the review were included, rather than the general statement to ‘investigate the current literature’.
Response: We understand your comment, and hope that the addition of “level of validation” and “supporting evidence” adds a bit more clarification.

Yuan Liu (Reviewer 1):

Reviewer: Surgical simulator is an important component of surgical skills training. This article performed a systematic review of the current literature on simulator-based training in vitreoretinal surgery (VRS). It is well-written and organized. The following is some of my concerns.

1. the authors had very strict inclusion criteria. some publications like "SIMULATION TRAINING IN VITREORETINAL SURGERY: A Low-Cost, Medium-Fidelity Model" were excluded. Also, there are some similar review like "Intraocular surgery - assessment and transfer of skills using a virtual-reality simulator". So here is my question whether the inclusion criteria is proper for analysis. And could the author highlight the difference or advantage compare their study to the previous study?

Response: First, thank you for taking your time to review our manuscript. We do believe we made our inclusion criteria as broad as possible. We have included all studies fulfilling the three criteria of (1) investigating simulators in VRS, (2) including VRS novices in their study population, and (3) published in English. "SIMULATION TRAINING IN VITREORETINAL SURGERY: A Low-Cost, Medium-Fidelity Model" were excluded because it did not include VRS novices.

The previous study mentioned is different in terms of their inclusion of all studies involving simulation-based training and assessment in all ophthalmology. The novelty of our study is that we are much more focused and specifically suggest the areas where researchers in the field of VRS could improve in order heighten the quality. The literature in this field is limited and heterogeneous, which is why our broad inclusion of studies is a strong asset.

Reviewer: 2. there are some written mistakes like line 19 "over the last many decades simulation..." should be "over the last many decades, simulation.";
line 21 " surgical simulators offers" should be "surgical simulators offer"; line 52 (retinal surger or vitreoretinal surger) should be "retinal surgery or vitreoretinal surgery", also there are so many missing or misused preposition or Singular and plural problems.

Response: Again, thank you for pointing out the issues. We have taken actions to improve the grammar in our manuscript. We hope the revised version meets the quality standards.

We have made a correction in the manuscript regarding line 52, so it now clarifies that “(retinal surger* or vitreoretinal surger*) …” is the exact search string used for the literature search.

S. Swaroop Vedula (Reviewer 2):

Reviewer: This seems to be an interesting study, but I have some major concerns that I've listed below.

1. I wonder whether the authors are trying to conflate quality with risk of bias or they are ignoring risk of bias. I think using MERSQI to evaluate studies in this systematic review defeats the purpose of the effort. MERSQI does not capture what is important in the context of a systematic review because it does not adequately capture an assessment of risk of bias. Of note is the fact that MERSQI was developed in the context of "quality of studies" and its association with study funding and not as a method to be integrated with systematic reviews. For example, if we applied MERSQI to the current manuscript then we will have some score. But what is important to me, and I imagine to other reviewers and readers as well, are details such as review of title/abstracts and study quality by a single author, unclear eligibility criteria, etc. These are examples of details that matter to me when I try to decide whether your findings are likely to be biased, and if so then by how much and in what direction. These are overlooked by MERSQI because its purpose is different. I'm not convinced that MERSQI is the correct methodology to use here. I would stick with risk of bias assessments described in the Cochrane Handbook for Systematic Reviews of Interventions for the purpose of a systematic review. Note that there are methods for both randomized and non-randomized studies.

Response: Thank you for your comments on our manuscript. We appreciate them and have done our best to revise the manuscript accordingly.

We agree that our original manuscript did not evaluate risk of bias sufficiently. We have now implemented the Cochrane risk of bias tool, as you suggested. We have debated internally whether to keep the MERSQI or not. Even though the MERSQI score might be insecure, we
believe it serves a purpose in pointing out the methodological flaws of the included studies. We acknowledge the high importance of evaluating bias, but also want to focus on methodological quality.

Reviewer: 2. The aim or objective of the systematic review is rather vague. What did the authors want to investigate in the current literature on simulation and training for retinal surgery?

Response: We have now specified our purpose and hope that the addition of “level of validation” and “supporting evidence” helps to clarify the aim.

Reviewer: 3. The Methods section now includes results, specifically about what studies were excluded. These details belong in the Results section.

Response: Thank you for making us aware of this. We have changed the phrasing, so it is no longer related to specific studies.

Reviewer: 4. Exclusion criterion pertaining to studies on training curricula is confusing because reportedly, Grodin, et.al., is included but evaluated a training curriculum.

Response: We think the confusion might be due to the previous phrasing (your third question). We did not have any specific exclusion criteria, all studies which met our inclusion criteria were included. We only excluded specific results from Grodin et al., specifically related to their training curriculum and how it was performed.

Reviewer: 5. What are the outcomes evaluated for this systematic review?

Response: Instrument validity of the simulator in question. We evaluated all outcomes related to simulator performance. We know this is a rather vague response, but it is not possible to focus on specific outcomes, as all the included studies had different ones.
Reviewer: 6. Title/abstract review and evaluation of studies was done by a single author. I appreciate the transparency in reporting this detail, but it is neither standard practice nor reassuring about methodological rigor. I don't see what reasons might preclude independent assessment by two individuals.

Response: You are completely right. We have no reasons not to include a second assessor. We have done what we could to correct this methodological flaw, and a second author (A.S.V.) has gone through all articles from the original literature search. Fortunately, it did not identify further articles to be included.

Reviewer: 7. The use of a score to summarize "quality" of studies in a systematic review is primitive. Please see the Cochrane Handbook for related literature. See my note above on using MERSQI for systematic review purposes. Furthermore, while the score for the MERSQI scale was shown to be reliable for a small number of raters, who were also involved in developing the scale, its reliability in any other sample of raters remains unknown.

Response: We acknowledge that the value of the MERSQI overall score is rather unreliable. We still believe the tool has a place in our review. We use the individual items of the MERSQI to identify where the included studies are lacking methodological quality. In the discussion, line 220, we also indicate that overall scores should be interpreted with caution and that it is more useful to look at item-specific scores.

Reviewer: 8. This study is a potentially useful catalog of studies evaluating simulation for training in retinal surgery. But its current format for presentation, with a summary of each included study, is not useful. I would ask that the authors consider additional ways to synthesize data from the included studies, perhaps along concepts described in the data simplifications section.

Response: We completely agree with you on this issue. During the initial drafting of the manuscript, we tried numerous ways to synthesize the data. But because of the heterogeneity of the included studies, we could not find another way to do it. The presentation in Table 1 seems to be the only reasonable way to simplify the data. Without the details from the current text presentation, we feel that the readers will be unable to follow our argumentation in the discussion.
We have given it yet another try, but when we tried to combine the comparability of Table 1 and the details, which we believe are necessary, it became too complex to be helpful for the reader.

Adel Ebraheem (Reviewer 3):

Reviewer: Dear Dr. Rasmussen,

Thank you for allowing us to review your paper.

Response: Thank you for taking the time and providing your expertise for this review.