Author’s response to reviews

Title: BURNOUT IN MEDICAL STUDENTS: A SYSTEMATIC REVIEW OF EXPERIENCES IN CHINESE MEDICAL SCHOOLS

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Dear Editor

Thank you for the opportunity to revise this manuscript and for the helpful comments from the reviewers. We have addressed the issues raised and attach a revised manuscript in which we highlight these changes. We have described the changes made in relation to each of the reviewers’ comments below.

Reviewer 1

1. The introduction makes reference to studies of well-being but the authors have chosen to exclude such studies from the systematic review without explanation. The resulting sample of studies cannot be considered to be representative as many titles of studies may have included the word well-being and thus would have presumably been excluded. Also, burnout is a term used to assess individuals in an organisation rather than an individual diagnostic criterion. This should be defined better. Is the review meant to be about burnout or impairment in well-being (discussed in the introduction)?

This review focuses specifically on the issue of burnout as defined in the review rather than a broader study of well-being in medical schools. Whilst the latter is certainly an important and related issue, and one of interest to the team, the inclusion of studies of well-being would expand beyond the scope of this particular review. Well-being is noted only once in the introduction
section in the context that burnout may impact on clinician well-being rather than as a focus of this review.

2. The initials of the reviewers of the inclusion and exclusion criteria from the author list are not provided.

We have added these (pg. 5).

3. There is a paragraph entitled 'psychological factors correlation' which needs to be reworded.

The word ‘correlation’ has been removed (pg. 10).

4. I couldn’t find any study in Table 1 with a N of 1,402 as stated in the results section. Please check the Ns of the studies.

The paper Zhang et al 2011 (reference 17) includes a total of 1042 participants.

5. There are no page numbers.

Page numbers have been inserted throughout.

6. The section entitled 'Implications'. The word 'predictor' should be 'predict.'

This has been corrected.

7. The reference numbers are not provided for the studies reported in Table 1.

These have been added.

8. Providing the p values of the studies in the results section is not necessary. If anything effect sizes would be more usual for a systematic review. Also a zero before the value of p is not necessary as the value can never exceed 1. p is usually lower case and not upper case.

The p values have been removed throughout the section (pp. 8-11).
9. The word postgraduate may be misunderstood as commonly such students are referred to as graduates (i.e. have completed an undergraduate degree before entering medical school). Most medical students in the US are graduate students and so there may be some confusion here?

We have amended this to use the term graduate and qualified this with an explanation in the discussion section for those who use the term postgraduate (pg. 12).

Reviewer 2

1. In order to improve the internal consistency and make the study interesting for an international audience, authors should describe more in depth, the possible consequences of burnout on academic career of medical students (e.g. on learning, exam performance, Master Degree completion rate) which may require a contrast action by Universities.

The original introduction highlighted some potential threats of burnout for academic development but some additional detail has been added (pg. 3).

2. The associated constructs of emotional exhaustion, depersonalisation and personal accomplishment should be considered in the aims of the review.

The constructs have now been explicitly identified in the aims section (pg. 4).

3. Protocol: indicate if a review protocol exists and if it can be accessed

A review protocol was not published for this study but was prepared as part of the development of this work for a doctoral thesis.

4. Eligibility criteria: I suggest to provide a specific paragraph and to give the rational for the chosen time interval from January 1989 to July 2016. In addition, it is necessary to state how studies conducted on mixed populations (e.g. nursing students and medical students) have been considered.

Additional details have been provided to justify the date range and groups included when studies with more than one population were encountered (pg. 5).

5. Information sources: I suggest authors to specify in the following sentence (Page 6 - line 17-20) "Hand searching of relevant journals and reference lists of published papers ensured that relevant published material was captured": a) the relevant journal cited (giving an example) and b) reference lists of published papers (giving an example). Please also note that this information has been omitted in the PRISMA Flow-chart. Why?
We have provided examples of relevant journals and clarified the text to highlight that we searched reference lists of the included papers. In the PRISMA diagram have included a box to demonstrate that no additional papers were identified via the additional searches (pg. 5)

6. Search: although databases have been declared, there is no evidence of used keywords and their combination strategies (e.g. AND, OR, NOT). Furthermore, no search strings are available, making it difficult to reproduce the electronic search in the databases.

On page 5 we detail the terms that were combined, we have added a small clarification here to demonstrate that they were combined using AND (pg 5).

7. Summary measures and synthesis of results: Authors stated (page 7 - line 22-25): "Findings were analysed using a narrative synthesis in stages based on the study" and subsequently (page 7 - line 25-30): "A narrative approach was utilised to synthesize the findings as given the heterogeneity of the outcome measures used, a quantitative approach was not considered appropriate as the measures were not directly comparable." However, there are no description of the methods used to evaluate the heterogeneity of the included studies and it is difficult to understand the reasons for non-comparability of results although table 1 shows results measured with the same instrument and on the same population (e.g. Chen, 2011 and Di, 2014 and Fu, 2012 or Jin, 2010 and Li, 2009 and Zhu, 2012 etc.) Why?

We have added some clarification here. Whilst many studies used variants of the same measure, these were not consistently used in every study and therefore a narrative synthesis was appropriate on this occasion. This was not a meta-analysis. (pg. 6)

8. Study selection: in the "Search results" paragraph (page 8 - line 27), authors recall "Figure 1" (PRISMA Flow-Chart) which however should be completed with data on "other search strategies" (e.g. hand searching and reference lists screening)

See response to query 5.

9. Study characteristics: According to the data shown in table 1, "Characteristics of included studies" paragraph (Page 8 - line 37), should be completed with the description of: a) participants and b) burnout measuring instrument.

Thank you for this suggestion. Given that the details of participants and the burnout instrument used are shown in table one we have not added additional information in the main text as we feel this is unnecessary duplication.

10. Furthermore, the following sentences (Page 9 - line 3-23) should be inserted in the above paragraph and removed from "Study Quality": "There was no randomized controlled experiment
study design among the articles. Seven were non-randomized two group studies while one was a single group pre- and post-test design. The remainder were single group cross-sectional or single group post-test only. Response rate of all the studies were over 75%. Data analysis of all the articles included were appropriate for study design and type of data. However, the outcome of the articles are mostly satisfaction, attitudes, perceptions, opinions and general facts according to MERSQI. Only two articles developed knowledge or skills as outcome based on the study".

Aspects of this section have been moved but others retained in study quality as study quality issues related specifically to the quality assessment tool (pg. 8).

11. I suggest finally to cite references in phrases like the following (Page 8 - line 47-55): "seven studies divided participants into two or three groups to compare; 10 studies recruited students from more than two institutions." or "There were 25 studies analysing the present situation, seven studies were retrospective control studies and only one prospective cohort study."

Given the large numbers of studies being described here we have opted not to add in-text references to these sections, but to instead refer readers to table one for this information (pg. 8).

12. Synthesis of results: According to general aim "to identify the extent to which medical students in China are experiencing burnout" I suggest to synthesize the results using a population-based (undergraduate - post-graduate - internal) criterion and considering the measuring tools identified. This ensures clarity in the results and allows for their better understanding

Results are presented in relation to the review questions which relate to the factors impacting on burnout as opposed to the variations between different groups of students. Whilst variations between different student group is important, we have noted in the discussion that studies to date have predominantly focused on undergraduate rather than postgraduate students and that there is an absence of evidence regarding the latter. For these reasons we have not changed the format of the results.

13. According to the other aims of the review (2 - 3 and 4, Page 5 - line 30-40) I suggest to provide a specific paragraph to the factors that contribute to burnout (maintaining the planned organization: demographic, social and psychological factors) as well as for the potential solutions to reduce and prevent burnout in China and for the extent to which experiences in China reflect the international literature.

We have examined the link between the review aims and results to ensure that we address the aims in the results section. Findings relating to aims one and two are denoted I the results section but findings relating to aims three and four are covered in the discussion section as they go beyond the evidence in the included articles and relate more to our interpretation of these in the context of the wider literature.
14. Discussion and abstract should be modified according to the changes made in methods and results sections.

As we have retained the original results structure we have not made further changes in relation to these aspects.

15. I suggest to check the references list. For example n. 8 (page 17 line 24) Zeitschrift Für Medizinische Ausbildung 2012; 29(1), Doc10. Or n. 11 (page 17 line 36) The Clinical Teacher 2013; 10(4), 242-245.

We have reviewed the references and this one in particular but are unclear as to the problem. We are happy to address any issues relating to the references if further clarification can be provided as to the nature of the problem.

We hope that the changes made fully address the reviewers’ comments and look forward to your feedback.