**Author’s response to reviews**

**Title:** A Meta-Analysis of the Impacts of Internal Migration on Child Health Outcomes in China

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**Version:** 1  **Date:** 13 Dec 2015

**Author’s response to reviews:**

All comments from both reviewers are very helpful. The manuscript has been revised and edited according to the suggestions made by the reviewers. Below are responses to all comments and suggestions.

(R: Response)

Reviewer 1:

Response:

Thank you very much for your comments and suggestions. They are very useful for revising the manuscript.

Introduction:

(a) The introduction gives sufficient background but will need to be reduced in volume, e.g. the part about the situation in the EU can be easily disposed of without affecting it. I suggest it gets reduced to refer only to China.

R: We have cut the introduction part short.

(b) Mou et al published a review of the literature on China's rural-urban migrants and their families (http://bmb.oxfordjournals.org/content/106/1/19.full), so how does this review add to Mou et al's?

R: We have mentioned Mou et al's study in the last paragraph on page 8, which helps justify the rational of our study.
"As reported in a systematic review conducted by Mou [24] and his colleagues, scholars have compared test results between migrant children and urban children and generally found that migrant children present higher rates of psychological disorder symptoms. However, this systematic review has two limitations. First, it fails to take a neutral standpoint, only including studies showing that migrant children were disadvantaged in health outcomes. Second, it fails to point out the heterogeneity of migrant children, that is migrant children in migrant children and those in public school are not identical."

(c) Page 8 paragraph starting at line 34: Removing the detail on the items used will make the message clearer.

R: We have removed the details of the four items. Please refer to the last paragraph on page 8. "According to a review conducted by Zhang [23], Chinese scholars mainly used specialized mental health instruments to measure the psychological well-being of migrant children. Some scholars also use single item like social adaptation and loneliness."

(d) Study questions: Don't questions 2 and 4 overlap? -wellbeing includes mental health.

R: Question 2 aims to compare health outcomes of children in different schools, including migrant and public schools. Attending public school is coded as a moderator and the effect size is the standard difference in means; the results indicated a protective role of attending public school for some child outcomes. Question 4 is changed to "What are the protective/risk factors of mental health outcomes for all migrant children regardless of the school type?" It examines protective/risk factors related to all migrant children's mental health outcomes, exploring the relationship of child outcomes with individual academic performance, parent-child relationship, peer support, teacher-student relationship, and discrimination; so the effect size is their correlations. The results showed that better academic performance, better parent-child relationship, higher peer support, and better teacher-student relationship is related to better child mental outcomes; and discrimination were related to increased mental health problems.

Methods:

(e) The search strategy was clear but a search of the grey literature and unpublished studies could reduce the threat of publication bias.

R: It is amended on page 10 (line 2) and 12 (line 2 of the last paragraph).

"For grey literature, we manually searched the references of review articles, CNKI, and Google Scholar and also contacted authors of published articles." "We identified nine grey literature, whilst only one was eligible for analysis." Accordingly, Figure 1 has been amended as well.

(f) Rigorous quality assessment is required. The checklist used has components 1, 2, 4 and 5 based on the quality of reporting rather than the quality of study conduct and the only component that assesses the methodology is number 3. Rigorous assessment of the actual
methodology of the studies was needed, e.g. sources of bias and role of confounders according to each study design.

R: We revised the checklist. After revision, item 1, 2 and 5 examine the quality of reporting; item 3, 4, 6 & 7 examine the methodology of the studies. After revising the checklist (appendix), we reassessed the quality of the studies and gave a quality score to each study respectively that can be found in Table 2 (page 14).

(g) What is the age range of 'school age' in China?

R: The range of school age is about 6 ~15 years old during nine-year compulsory education. We added the explanation in the fourth line of paragraph 2 on page 13.

"Though the school age in China is six to 15, participants in mental health studies were roughly between nine and 19 years old."

(h) Exclusion criteria seem to be just opposites of the inclusion criteria so they may not add much information, except for number 3.

R: We agree that the second exclusion criterion did not add much information, so we deleted that criterion. However, the first exclusion criterion helps exclude many studies that focus on international migration, so we would prefer to keep it. The third exclusion criterion was changed as shown in line 4 of the second paragraph on page 10. It seems just opposite to the fourth inclusion criteria; however, many studies only reported the prevalence of health problems or correlations without sample size, standard difference, or standard error. The third exclusion criterion helps to screen out those studies.

(i) Page 11 line 14: can the authors explain how "all studies were eligible for inclusion"; the flowchart shows most studies were excluded.

R: In the sentence "all studies were eligible for inclusion because they provided sufficient data to compute effect sizes and employed satisfactory methodology", "all studies" means the selected 13 studies instead of the 1,592 studies. In order to avoid misunderstanding, we have changed "all studies" to "all of the 13 studies" as shown in line 11 of the first paragraph on page 11.

(j) It would be clearer if the mental health outcomes were defined in the methodology

R: It has been amended in line 5 of paragraph 2 on page 11.

"Positive mental outcomes include emotional well-being and sociocultural adjustment; negative mental outcomes include internalizing and externalizing problems such as loneliness, depression, and anxiety, etc."

Results:
(k) Figure 1: 601 studies excluded; why?
R: 601 studies were directly excluded through title and keywords scan. We added the exclusion reason in Figure 1 on page 14.

(l) Table 2: what does DI stand for? Also please include the study design for each study.
R: DI stands for discrimination, which can be found in the notes below Table 2 on page 16. In addition, a column named in "Study design" as added in Table 2 on page 14.

Discussion:

(m) Page 20 line 34: It is much more preferable to commit to the 95% confidence interval and to not make any statements with a lower confidence level.
R: We agree to commit to the 95% confidence interval, as the sample size is large. The revision was made in the third line of paragraph 1 on page 21.

"Although the standard difference in the means of migrant children in migrant schools and local children is not statistically significant, migrant children in migrant schools have previously been found to score highest in loneliness, depression, and anxiety scales, followed by migrant children in public schools, whilst local children scored the lowest [36]."

Conclusion:
Rigorous assessment of the methodology of the included studies and a search strategy that minimizes publication bias are needed before making such a clear-cut conclusion.

R: Thank you for your comments. We made revisions according to your suggestion, please refer to the paragraph 1 on page 23. "Third, though the study followed a strict search strategy and quality assessment, we only included one eligible grey literature. This limits our control of publication bias, which may affect the generalization of study results."

Reviewer 2:
Response:

Thanks a lot for your comments and suggestions. They are very useful for revising the manuscript.

1. There is not enough context information which should aid a reader from outside China to understand certain issues and the rationale of the study. For instance, migrant schools have not been defined and so is there no definition for public schools;
"Children living in a place where their hukou registered are guaranteed to attend publically funded schools (public school) for the nine-year compulsory education, which is supported by local government." "Migrant schools specifically refer to schools open for children of migrant workers, privately run by migrant workers and charging lower fees."

2. The systems where migrants leave and attend certain schools and not others may have to be described, while of course paying attention to the sensibilities of the situation;

R: Please refer to the last paragraph on page 7 for the explanation about why migrant children have limited access to public school in Chinese educational system.

"Children living in a place where their hukou registered are guaranteed to attend publically funded schools (public school) for the nine-year compulsory education, which is supported by local government. However, the right to accessing public education cannot mobile as people migrate because the financial support does not transfer between local governments."

3. There was a recommendation that migrant children should have government health insurance; the justification for this was unclear to me;

R: Please refer to the first paragraph on page 20.

"Many migrant children had problems with being insured and reimbursement application when they were not living in their hukou registration place, so the health care system should adapt to solve the problems of frequent mobility and remote application for reimbursement. In the meanwhile, the government should provide fiscal incentives for local government in order to promote the health care of migrant children. The local government can target migrant children and involve them in urban health insurance system with lower payment standard in order to reduce financial burden on migrant families."

4. That different studies included in the review used different instruments, age groups need to be recognized as a limitation of the study. This is also should be included in the discussion of the aggregate statistical parameters

R: We think it is important to mention the reasons of combining studies that employ different instruments. According to our review, instruments used in selected studies measured very similar constructs, therefore, it is acceptable to combine data from the selected studies. Please refer to line 3 of the last paragraph on page 11. "Although different studies employed different instruments, the measure constructs were similar enough for data synthesis [28]."

In terms of the age groups, it is no doubt a limitation for analysis. This was added in line 3 of paragraph 1 on page 23. "Another problem with limited information is that we cannot control for age in our analysis; some studies provided the average age of participants, while some provided
the range of participants' age. It may influence the accuracy of the effect size without controlling for age."

5. I would suggest the authors do not use the term "prevalence rates" as prevalence is hardly a rate.

R: Thank you for the suggestion! We have made two revisions in the last paragraph on page 13 and in line 1 of the first paragraph on page 23. "Three studies examined the prevalence of child health problems." "which made it impossible to compute the prevalence of health problems for these subgroups."