Author’s response to reviews

Title: The mediating effect of health anxiety in the relationship between functional somatic symptoms and illness behavior in Chinese inpatients with depression

Authors:

Yue-Jiao Ma (mayuejiao@csu.edu.cn)
Dong-Fang Wang (dongfangwangcsu@163.com)
Ming Yuan (myuan_csu@163.com)
Jiang Long (longjiang@csu.edu.cn)
Shu-Bao Chen (yisem@126.com)
Qiu-Xia Wu (wqx11111@126.com)
Xu-Yi Wang (wxy19751211@163.com)
TieQiao Liu (liutieqiao123@csu.edu.cn)

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BMC Psychiatry

Dear Editor,

Please find a revised version of our manuscript “The mediating effect of health anxiety in the relationship between functional somatic symptoms and illness behavior in Chinese inpatients with depression” in the attachment. The comments of the reviewers are highly insightful and have enabled us to greatly improve the quality of our manuscript. In the following pages are our point-by-point responses to each of the comments of the reviewers. Revisions in the text are highlighted by using blue color.

We hope that the revisions in the manuscript and our responses will be sufficient to make our manuscript suitable for publication in BMC Psychiatry. Please let me know if there is anything else we need to do with the revision, and we’ll prepare it as soon as possible.
We thank you very much for your excellent work. Your kind assistance is greatly appreciated. We look forward to any future correspondence.

Yours sincerely,

Tieqiao Liu

Reviewer reports:

Responses to Reviewer 1

Xiancang Ma (Reviewer 1):

This is a meaningful manuscript, previous research has indicated that somatic symptoms (SS) is correlated with both health anxiety (HA) and illness behavior (IB). However, research has not tested mediational models of how HA may lead to IB in a clinical contexts. This manuscript exploring the possible psychological mechanisms between functional somatic symptoms (FSS) and IB using structural equation model in an inpatient sample of individuals with MDD. It concludes claiming that HA may mediate the influence of FSS on IB. In addition, age may moderated the impact of FSS on HA. I have some comments to contribute for the improvement of this manuscript.

Question 1: Introduction: In the first paragraph, I suggest to replace sentence " This misdirecting or unnecessary IB can probably misguide diagnosis, delay treatment, hinder patients' rehabilitation, and cause a huge waste of health care services" with" This misdirecting or unnecessary IB can probably result in misdiagnosis, treatment delays, rehabilitation barriers, and huge waste of health care services".

Answer: Thank you very much for such careful reviewing. We have replaced " This misdirecting or unnecessary IB can probably misguide diagnosis, delay treatment, hinder patients' rehabilitation, and cause a huge waste of health care services " for " This misdirecting or unnecessary IB can probably result in misdiagnosis, treatment delays, rehabilitation barriers, and huge waste of health care services [8, 11, 12]. " as suggested. (Introduction section, line 13-15, page 3).
Question 2: Methods (2.1 Participants and procedure): I don’t see why the authors use electronic medical records instead of asking participants to fill in directly during the collection of the duration of illness.

Answer: This point is excellent. The reason why we use electronic medical records in the collection of duration of illness is that the assessment of professional psychiatrist is more realistic and reliable than the patient’s own assessment about duration of illness.

Question 3: Methods (2.2.1 Functional somatic symptoms): Would be better "…… which was translated and revised by Lee et al. [26] from the original version [27]." instead of "…… which was developed by Lee et al. [26], who translated the original version [27].", in the beginning of the first sentence of 2.2.1 Functional somatic symptoms.

Answer: Thank you very much for pointing this out. The expression of '…… which was translated and revised by Lee et al. [26] from the original version [27].' is better than '…… which was developed by Lee et al. [26], who translated the original version [27]'. As suggested. We have modified this sentence. (see Methods section, 2.2.1 Functional somatic symptoms, line 19-20, page 5).

Question 4: Methods (2.2.2 Illness behavior): The last two sentences of this paragraph "Internal consistency of the Chinese version of the SAIB was found to be 0.88, and Cronbach's alphas across the 5 subscales were 0.69 (diagnosis verification), 0.73 (expression of symptoms), 0.82 (medication/treatment), 0.61 (illness consequences), and 0.79 (body scanning), respectively. Cronbach's alpha values in the present study were as follows: 0.75 for diagnosis evaluation, 0.68 for expression symptoms, 0.79 for medication and treatment, 0.53 for illness consequences, 0.83 for scanning, and 0.88 for the total score on the SAIB. " There are too many repeated phrases in these two sentences, I suggest the authors to simplify the sentence.

Answer: Thank you very much for this suggestion. We have modified these sentence as “Internal consistency of the Chinese version of the SAIB was found to be 0.88, and Cronbach’s alphas across the 5 subscales were between 0.61 to 0.82. Cronbach’s alpha values in the present study were between 0.53 to 0.83, and 0.88 for the total score on the SAIB.” (see Methods section, 2.2.2 Illness behavior, line 13-16, page 6).

Question 5: Results (3.4 Moderate mediation model): There is some confusion in the description of how grouped in the second paragraph of the "3.4 Moderate mediation model". The authors described "M+SD (33.84 + 12.35) was set as the high age group and M-SD (33.84 – 12.35) as the low age group to". Are the authors mean that the two values (M+SD and M-SD) are
the dividing line, and the individuals above the high value and below the low value are the high age group and the low age group respectively? Please, clarify how you grouped.

Answer: Thank you very much for your excellent suggestion. We have clarified this information as suggested, showing on Results section (3.4 Moderate mediation model), page 8 (line 22-24) as “To further test the moderating effects of age between SSs and HA, subjects who aged above \( M + SD (33.84 + 12.35) \) were set as the high age group and below \( M - SD (33.84 - 12.35) \) as the low age group.”

Question 6: Participants in this study are from clinical hospitalized depressed patients with severe depression and anxiety symptoms. These confounders may have effects on variables in the mediation model. This may be a limitation of this article. The result can be further validated after adjusting for confounders such as depression in a population-based study.

Answer: Thanks very much for this comment. This point is very excellent. This is indeed one of the limitations of the present study. In addition to the assessment of somatic symptoms, health anxiety and illness behavior, we also assessed the depression severity using Patient Health Questionnaire-9 (PHQ-9). The results showed that there was a positive correlation between depression (PHQ-9) and somatic symptoms, also and health anxiety, but no correlation was found between depression (PHQ-9) and illness behavior (SAIB). Therefore, we did not include depression severity in the equation model according to the above results. But, because the subjects recruited are hospitalized patients with severe symptoms of depression, depression may still have certain effects on variables in the mediation model. As your suggestion, we have added the following content in the limitations section of this article, page 12-13, showing as “It is worth mentioning that we found no association between SAIB and the depression scale of Patients Health Questionnaire-9 in the present study, which is consistent with the finding of Rief et al [29]. While this result is in contrast to results of Wilson Barnett and Trimble who using Illness Behavior Questionnaire (IBQ) as assessment tool[56]. The possible reason for this inconsistence may be that IBQ focus on evaluation of emotional aspects and hypochondriacal concerns rather than aspects of illness behavior (SAIB). However, because the subjects recruited are hospitalized patients with severe symptoms of depression in our study, depression may still have certain effects on variables in the mediation model. It would be helpful to validate the mediation model in the general population. Despite these limiting factors, the strength of this study is the emphasis on the mediating effect of health anxiety in clinical major depressed samples. In future, the result can be further validated in a population-based study and non-hospitalized sample in order to control these effects.”

Question 7: Discussion: Cognitive behavioral model of severe health anxiety was introduced by researchers around 1990. The strengths of the cognitive behavioral model of severe health anxiety
lies in its account of maintaining factors. Somatic symptoms are the triggering factor of health anxiety. The maintenance factor of health anxiety lies in the faulty cognitive belief. For example, health-anxiety persons are also more likely than others to attribute common somatic symptoms (e.g., headache and dizziness) to somatic causes (e.g., brain cancer). Therefore, the treatment of health anxiety aims to change these false beliefs. To further improve the manuscript, I would suggest that the authors can further discuss the intervention and treatment of health anxiety in discussion section. Authors may be interested in this following reference.


Answer: This point is very excellent. We have added this information to the Discussion section on Page 11-12, showing as “High levels of health anxiety might be a multidimensional trait, where triggering factor (such as physiological processes), cognitive and behavioral strengthen each other. Although avoiding triggers and using safe behaviors (such as more examinations of symptoms) may lead to a reduction in health anxiety in the short term but higher levels of health anxiety in the long run[49]. Fortunately, psychoeducation, exposure and response prevention, antidepressants, and cognitive restructuring techniques might be helpful for patients with severe health anxiety. Specifically, cognitive-behavioral therapy has been reported to be a highly effective treatment for hypochondriasis/HA [18, 50, 51], even better than drug treatment [52]. The strengths of the cognitive behavioral model of severe health anxiety lies in its account of maintaining factors. The maintenance factor of health anxiety lies in the faulty cognitive belief of bodily sensations and external events. Consequently, the hallmark of cognitive therapy is that it entails components aiming to change these faulty beliefs. It can alleviate HA by helping patients recognize and modify false beliefs about the symptoms [53]. A recent study found that cognitive-behavioral therapy can reduce perceived risk of disease, attention to bodily symptoms, and intolerance of uncertainty significantly to improve HA [54].”

Responses to Reviewer 2

Ti-Fei Yuan (Reviewer 2): The study examined relationships for functional somatic symptoms, health anxiety and illness behavior in 323 depression patients.

I have few comments to improve the manuscript.

1. Please discuss the relevance of described findings to mild depression patients (such as non-hospitalized). (see the answer below)
2. To understand the potential causal relationship, the authors should include depression severity / history (years of illness) into the analyses. (see the answer below)

Answer:

I am very grateful for your comments. These two points are very excellent. I will answer the above two questions together. First of all, the subjects of the present study are hospitalized patients with severe symptoms of depression. In addition to the assessment of somatic symptoms, health anxiety and illness behavior, we also assessed the depression severity using Patient Health Questionnaire-9 (PHQ-9). The results showed that there was a positive correlation between depression (PHQ-9) and somatic symptoms, also and health anxiety, but no correlation was found between depression (PHQ-9) and illness behavior (SAIB).

Some previous studies are consistent with our conclusion. For example, Rief and Derogatiset et al. [1-2] also found no association between SAIB and the depression subscale of the SCL-90R. These results are in contrast to results of Wilson Barnett and Trimble [3] who found higher associations between the IBQ (another illness behavior measurement tool) and BDI depression scores. The possible reason for this inconsistence may be due to the difference about assessment tools. IBQ focus on evaluation of emotional aspects and hypochondriacal concerns rather than aspects of illness behavior(SAIB).

The relevant results also showed that duration of illness was not related to the three variables. (See the table below). Therefore, we did not include depression severity and duration of illness in the equation model according to the above results.

But, because the subjects recruited are hospitalized patients with severe symptoms of depression, these confounders may still have certain effects on variables in the mediation model. It would be helpful to validate the mediation model in the general population and non-hospitalized sample. Despite these limiting factors, the strength of this study is the emphasis on the mediating effect of health anxiety in clinical major depressed samples. In future, the result can be further validated in a population-based study and non-hospitalized sample in order to control these effects.

Based on these valuable suggestions, we have added the following content in the limitations section of this article, page 12-13, showing as“it is worth mentioning that we found no association between SAIB and the depression scale of Patients Health Questionnaire-9 in the present study, which is consistent with the finding of Rief et al [29]. While this result is in contrast to results of Wilson Barnett and Trimble who using Illness Behavior Questionnaire (IBQ) as assessment tool[56]. The possible reason for this inconsistence may be that IBQ focus on evaluation of emotional aspects and hypochondriacal concerns rather than aspects of illness behavior (SAIB). However, because the subjects recruited are hospitalized patients with severe symptoms of depression in our study, depression may still have certain effects on variables in the mediation model. It would be helpful to validate the mediation model in the general population.
Despite these limiting factors, the strength of this study is the emphasis on the mediating effect of health anxiety in clinical major depressed samples. In future, the result can be further validated in a population-based study and non-hospitalized sample in order to control these effects.”

Table: Associations of illness behavior (SAIB) with psychopathological variables.

<table>
<thead>
<tr>
<th></th>
<th>SAIB</th>
<th>WI</th>
<th>PHQ15</th>
<th>PHQ-9</th>
<th>Duration of illness</th>
</tr>
</thead>
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<tr>
<td>SAIB</td>
<td>1</td>
<td>-0.53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>-0.53**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHQ-15</td>
<td>-0.49**</td>
<td>0.55**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHQ-9</td>
<td>-0.11</td>
<td>0.25**</td>
<td>0.22**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Duration of illness</td>
<td>0.01</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.04</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: WI-7: Whiteley Index-7 (assessing health anxiety); SAIB: the Scale for the Assessment of Illness Behavior (assessing illness behavior); PHQ-15: the Patient Health Questionnaire (assessing somatic symptoms); PHQ-9: the Patient Health Questionnaire (assessing depression symptoms);

**Significant at 0.01 level.

