Author’s response to reviews

Title: Factors Associated with Health Literacy in Rural Areas of Central China: Structural Equation Model

Authors:
Yaofei Xie (2016103050005@whu.edu.cn)
Mengdi Ma (2010302170019@whu.edu.cn)
Yanan Zhang (623208724@qq.com)
Xiaodong Tan (00300469@whu.edu.cn)

Version: 3 Date: 27 Mar 2019

Author’s response to reviews:

Cover Letter

Dear Editor KHIN THET WAI and Reviewer Lilli Herzig, Sarah Schrauben and German Malaga,

On behalf of my co-authors, we thank you very much for giving us an opportunity to revise our manuscript, we really appreciate your positive and constructive comments and suggestions on our manuscript entitled "Factors Associated with Health Literacy in Rural Areas of Central China: Structural Equation Model" (BHSR-D-18-02386R2). We have studied all the comments carefully and tried our best to revise our manuscript according to the comments which we hope to meet with approval. Revised portion are marked in red in the paper. Attached please find the revised version, which we would like to submit for your kind consideration.

We would like to express our great appreciation to you again for comments on our paper. Looking forward to hearing from you.

Thank you and best regards.

Yours sincerely,

Xiaodong Tan

Corresponding author:
Prof. Dr. Xiaodong Tan
Dear Editor KHIN THET WAI and Reviewer Lilli Herzig, Sarah Schrauben and German Malaga,

Thank you for your comments concerning our manuscript entitled "Factors Associated with Health Literacy in Rural Areas of Central China: Structural Equation Model" (BHSR-D-18-02386R2). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied all the comments carefully and have made correction which we hope to meet with approval. Revised portion are marked in red in the paper. The responds to the editors' and reviewers' comments and the main corrections in the paper are as flowing:

Responds to editor's comments:

Comment 1: Please check for grammatical errors and language use and revise as appropriate to improve readability.

Response: We are very sorry for the unreadability of the paper, and we have polished up the paper carefully for better readability. We hope it can meet your requirements. All the modifications are marked in red in the paper.

Comment 2: In LINE 66- Please add 'The purpose of this study was to develop and test a hypothesized model'.

Response: Special thanks for you and according to your good suggestion, we have modified the sentence in LINE 68-69, PAGE 4 to 'the purpose of this study was to develop and test a hypothesized model'.

Comment 3: In LINE 72- you have stated about multiple dependent variables but only one dependent variable was used for the structure equation model. Please clarify.
Response: We are very sorry for our negligence and inconsistent statement. We have corrected the sentence in LINE 74-76, PAGE 4 to 'SEM can simultaneously estimate the structural relationships between multiple independent variables and the dependent variable'.

Comment 4: In LINE 86- authors mentioned the use of 'self developed questionnaire'. But in LINES 90-91: authors have elucidated the use of questionnaire based on 2015 questionnaire of HL developed by Chinese Ministry of Health. Please clarify the inconsistency.

Response: We are deeply sorry for our incorrect writing that we mistook 'self developed questionnaire' for 'self designed questionnaire' and we have made a correction of the statement in LINE 92, PAGE 5 to 'self-designed questionnaire'.

Comment 5: Please include the flow diagram depicting the multistage sampling procedure and clarify how the present sample size was arrived at.

Response: We really appreciate your constructive comment and we have included a flow diagram Fig.1 to depict the multistage sampling procedure. Accordingly, we added the sentence 'The procedure is illustrated in Fig.1.' in LINE 81, PAGE4, and changed 'Fig.1' in LINE 155, PAGE 8 to 'Fig.2', 'Fig.2' in LINE 171, PAGE 8 to 'Fig.3'. In addition, the following sentences were added in LINE 88-91, PAGE4:

The total sample size was set to 1300 or at least 2‰ of the 576.4 thousand people residing in Shishou City. All participants should be aged between 15 years and 79 years. The sample size for each selected district was weighted by the proportion of its population to that of the entire Shishou City.

Comment 6: LINE 119- Due to the wide age range of respondents, please specify the median and IQR rather than the mean value.

Response: As your good suggestion, we calculated the median and IQR of respondents’ age and made a correction in LINE 137, PAGE 7. The modified statement is 'with a median age of 47 years, inter-quartile range of 25 years,'

Comment 7: In Table 1, please include the values of two variables: Health knowledge and Health skills.
Response: It is our negligence and we are sorry about this. We have added the values of Health knowledge and Health skills as '1 = poor status (correct rate <80%) 2 = not poor (correct rate ≥80%)' in Table 1.

Comment 8: Importantly, during the factor analysis, there was a multicollinearity in occupation and education variables. Besides, due to the multistage sampling procedure, was your data weighted or unweighted?

Response: We really appreciate your extremely valuable comment. It was our fault and please accept our sincere apologies for the incorrect expression of 'multicollinearity'. Compared to linear regression, SEM can better address the correlation and variable interaction effects inherent in assessing multicollinearity. So it was our misnomer that we deeply apologize again. We considered that perhaps the sample size of this study could be regarded as a relative large sample, and unweighted data might be acceptable.

The situation was that the linear dependency among variables lead to none positive definite of the residual covariance matrix. It was our negligence that we adopted an inappropriate data processing method. Thanks to your constructive comment, we reanalyzed the data considering simultaneously the correlation between education and occupation, as well as the correlation between education and age that you mentioned in 'Comment 9'. The reanalyzed results showed that the models also demonstrated an acceptable fit to the data: $\chi^2 = 129.362$, df = 22, $p < 0.001$, CFI = 0.975, TLI = 0.960, RMSEA = 0.065 (95% CI = 0.054-0.076). For better explanation of the relationships among variables, we replaced the original model, and the new models are in documents of 'Figure 2' and 'Figure 3', respectively.

References:


Comment 9: please also consider multicollinearity between age and education as well as occupation variables that might provide different results in the structural equation model.

Response: We are very grateful for your valuable suggestion that help to improve the technical quality of this manuscript. As mentioned in 'Comment 8', we took the correlation between age and education into consideration and reanalyzed the data. The results presented that the modified
models could fit the data well and better explain the relationships among variables. The modified models were presented in 'Response to Comment 8'.

Comment 10: It would be great if the authors could run two SEM stratified by two age groups supposing younger and older age groups.

Response: We deeply appreciate your constructive suggestion. We divided all the participants into two age groups, the younger age group was 15 to 44 years old and the older age group was 45 to 79 years old. We tried to run a model in each group while the results were different from the general population. In the younger age group, the SEM model was not convergent because of the unrecognizable latent variable of demographic information. In the older age group, the SEM model didn’t fit the data well and the path coefficient between demographic information and HL was not significant. We consider these results may be due to that the differences in age contribute to differences in the characteristics of the population as a whole. We are very grateful for this extremely valuable comment, and focusing on specific population could be an essential part of our future work, which goes further than our current population-wide studies.

Responds to Lilli Herzig’s (Reviewer 1) comments:

Comment 1: As said in your limitation section, it is impossible to know the direction of the association between analyzed factors and HL. Also, I'm a little bit confused when you use independently terms as influence, association, relation probably for the same information. Please consider clarifying this in the whole paper.

Response: We are sorry for the unclear report and we really appreciate your valuable comment that helps to improve the presentation of this manuscript. We have made corresponding corrections that consistently using the term of ‘association’ in the whole paper.

Comment 2: I regret to have the legend for the figures but didn't see the figures themselves.

Response: Please accept our apologies and explanations that each figure was uploaded as a single document in line with the 'Instruction for authors', so the original figures were not included in the document of 'manuscript'. Now the three figures are in the documents 'Figure 1', 'Figure 2' and 'Figure 3', respectively. We appreciate your understanding.

Comment 3: Please consider giving some more information on how face-to-face interviews were conducted - who did this and how have they been educated?
Response: Thank you very much for your good suggestion, we have added this content in LINE 93-97, PAGE 5 in the 'Method' section. The statement was as following:

The research team included three PhD candidates and nine master candidates in the School of Health Sciences of Wuhan University and the public health physicians from local health agencies. All these investigators were trained on the research purpose, survey procedure, and other important matters before conducting the survey.

Comment4: The used HL questionnaire was developed in China - maybe it would be interesting to put it in an additional file? And it would be interesting to have some information of the interpretation of the three observed variables in the description of the method.

Response: We really appreciate your valuable suggestion. We have added the translated health literacy survey part as an additional file 'The questionnaire of health literacy survey'. And in LINE 115-119, PAGE6 in the 'Method' section, we explained science health knowledge, health behavior and skills of safety and basic medical care as following:

Health knowledge refers to one’s understanding of basic and scientific health concepts, such as healthy lifestyle, safe medication, and chronic disease prevention and control. Health behavior mainly includes daily health-related lifestyles, including diet, exercise, smoking, and drinking. Health skill refers to one’s ability to obtain and understand information related to their health and self-rescue ability.

Responds to Sarah Schrauben’s (Reviewer 2) comments:

Comment 1: Overall, the English language needs to be edited throughout the manuscript to improve its readability -specifically need to 1) correctly use tense (past, present and future), 2) correctly use singular vs plural forms, 3) use 'participant's instead of 'objects', 4) consistently use capitalization, 5) avoid run-on sentences

Response: We are very sorry for the unreadability of the paper, according to the requirements, we have corrected the tense and singular vs plural forms, replaced 'objects' with 'participants', consistently used capitalization, and avoid using run-on sentences. We really appreciate your kind consideration and we hope to meet your requirements.

Methods

Comment 2: Please provide the rationale for the latent variables chosen.
Response: We are very grateful for your constructive suggestion. We have added the content to explain the latent variables chosen in LINE 101-106, PAGE 5 in the 'Method' section. The statements were as following:

Many studies have reported that sociodemographic factors, including gender, age, race, marital status, education level, and income, are associated with one’s HL level.3-6 Based on these univariate factors, we hypothesize that two latent variables, namely, demographic factor sand socioeconomic status (SES), can be extracted and used to collectively reflect the basic demographic characteristics and SES of the participants, respectively.

References:


Comment 3: Please clarify what 'self-developed' or 'self-designed' questionnaire means? Do you mean self-administered or self-report?

Response: It was our fault and we felt very sorry. We mistook 'self developed ' for 'self designed' in the manuscript. It should be 'self-designed' questionnaire, and we have made corrections to 'self-designed' in LINE 92, PAGE 5 in the 'Method' section.

Comment 4: Please include what were the reasons for retaining and/or excluding questionnaires

Response: It is our negligence and we really appreciate for the positive suggestion. We have added the exclusion criteria of questionnaires as following in LINE 97-99, PAGE 5:

Those questionnaires with missing values for personal information or HL outcome variables were excluded from the analysis.
Results

Comment 5: At total of 1199 questionnaires were withdrawn- what were the reasons for this? did this population differ significantly from the population that was ultimately studied?

Response: Please accept our sincere apologies for not being able to present clearly the real meaning. What we meant to express was we collected 1199 questionnaires. We are deeply sorry for the wrong expression. We have corrected the expression in LINE 137, PAGE 7 as:

Among the 1199 participants, 1164 returned valid responses.

Comment 6: Table 1 - please include the prevalence and number of each of the variables and values - without this information, it is difficult to judge what the study population looked like;

Response: We really appreciate the comment that significantly helps improve the presentation of this manuscript. We made Table 2 that presents the prevalence and number of each variable in Table 1, and the original Table 2 and Table 3 were changed to Table 3 and Table 4, respectively. The corresponding statements are added in LINE 141-144, PAGE 7 as following:

As shown in Table 2, those participants with different genders, age groups, marital status, distances between residence and nearest medical institution, income groups, occupations, and education levels showed significant differences in their rate of qualified HL. (Table 2)

Comment 7: suggest providing a table of the characteristics of the questionnaires that were excluded to visualize the difference between the populations

Response: We deeply apologize for our incorrect writing again, and as 'Response to Comment 5', we have corrected the statement in LINE 137, PAGE 7 as: ' Among the 1199 participants, 1164 returned valid responses'. Deeply thanks to you for your patience.

Comment 8: Suggest running a model with education instead of the occupation variable to see if you obtain similar results as the model without education and with occupation.

Response: We would like to express our deep appreciation for your constructive suggestion. We have run a model with education instead of the occupation variable. The results show that the loading ranges of three latent variables were similar to the former model overall, while the model was not as good fit to the data as the former one: χ² = 48.390, df = 17, p < 0.001, CFI = 0.988, TLI = 0.980, RMSEA = 0.040 (95% CI = 0.027-0.053). In SEM model, the path coefficient
between demographic information and HL was not significant. Due to that we are not allowed to upload picture in the 'Response to Reviewers' webpage, please accept our apologies and don’t hesitate to contact us if you want to see the details of the results.

However, considering the correlation between education and occupation, as well as education and age, we modified the original model. The reanalyzed results showed that the new models demonstrated an acceptable fit to the data: $\chi^2 = 129.362, df = 22, p < 0.001, CFI = 0.975, TLI = 0.960, RMSEA = 0.065 (95\% CI = 0.054-0.076)$. The new models are in documents of 'Figure 2' and 'Figure 3', respectively.

Responds to German Malaga’s (Reviewer 3) comments:

Comment1: An important factor associated with HL and that has been reported as significant, but that was not discussed is the educational level, I believe that it would benefit in the understanding of the article.

Response: We really appreciate your valuable suggestion that greatly help improve the technical quality of this manuscript. We have added the discussion about educational level in LINE 201-206, PAGE 10 in the 'Discussion' section. The statement is as following:

The association between education level and HL level has also been reported in many studies7-12, Similar to the findings of this work, those individuals with higher education level were reported to have a higher HL level. Because having higher access to education could improve one’s ability to read, analyze, and judge information. In other words, people with better education had easier access to health knowledge and skills.

References:


Comment2: The conclusion of the abstract is much more focused than that of the article, it gives me the impression that ends up wandering and making assumptions not concordant with the results shown in results and discussion and above all, taking into account the nature of the type of study.

Response: We are sorry for our inconsistent and unclear expression. Special thanks to you for your good suggestion that help to improve the presentation of this manuscript. We have made corresponding modifications in 'Conclusions' part in LINE 220-227 to try to state the conclusion more clearly. The statement was as following:

Older people, with higher BMI, residing far away from medical institutions, earning a lower monthly income, and having lower education levels were more likely to have a lower level of HL. Occupation also plays a significant role in predicting HL. Accordingly, the aging, obese, and undereducated population as well as those residents living far away from medical institutions warrant more attention when performing health education or promotion work. Health resources should also be allocated rationally to different occupational groups to enhance their utilization efficiency.

Comment3: The finding of association of HL and obesity, is highlighted in the discussion, I believe that due to its potential importance, it could be considered mention in the conclusions.

Response: We are very grateful for your comment. As shown in 'Response to Comment 2', we have added the statement of the association of HL and obesity in LINE 220, PAGE10 in 'Conclusions' section. The statement was as following:

Older people, with higher BMI, residing far away from medical institutions, earning a lower monthly income, and having lower education levels were more likely to have a lower level of HL.
We tried our best to improve the manuscript according to the comments. We deeply appreciate for your warm work earnestly, and hope that the correction will meet with approval.

Once again, thank you very much for your comments and suggestions. Looking forward to hearing from you.

Best regards.

Yours sincerely,

Xiaodong Tan