Author's response to reviews

Title: Impaired psychological recovery in the elderly after the Niigata-Chuetsu Earthquake in Japan: a population-based study

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Author's response to reviews: see over
Response to Editor:

Dear Editor,

Thank you very much for giving us an opportunity to revise our manuscript entitled “Impaired psychological recovery in the elderly after the Niigata-Chuetsu Earthquake in Japan: a population-based study” (manuscript ID: MS: 1016394976104697), which was previously submitted to BMC Public Health. We have revised the manuscript in accordance with the comments by the referees and have also provided point-by-point replies to questions from the referees in this letter. All of the corrections in the manuscript have been underlined.

We also added to our manuscript information on ethics and consent and acknowledgments to contributors. In addition, we would like to ask you to add a coauthor to the list of authors because of his contribution to the statistical analyses.

Sincerely yours,

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Responses to Reviewer #1

Major compulsory revision

1) We discussed about the binary data factor analysis with another statistician. He suggested that there were several methods to handle binary data in factor analysis as kindly suggested by you. In those methods, binary data were assumed to be discrete type of latent continuous data that have a multivariate normal distribution. Otherwise, tetrachoric correlations between all item pairs were used to deal with categorical data. However, binary data have been used as continuous data in previous studies on factor analysis of GHQ, which was deemed analogous to dummy variables used in multiple regression analysis. As for AMOS, the software does not provide estimation methods specific to categorical data and polychoric correlations. Therefore, we followed your advice to add information on the problems of binary data factor analysis to Methods of our manuscript. We also cited the references that you kindly pointed out.

2) We appreciate your expert advice. Another statistician also suggested the use of multiple regression models or generalized linear models to analyze the factors that affect C-GHQ score. According to this advice, we performed multiple regression analysis with dummy variables instead of categorical regression analysis. The results of the analysis are shown in revised Table 4. We also added the results of analysis of factors that affect lower scale points of factor I and factor II to Table 4. The results are slightly different from the previous results.

Differences in CGHQ scores by age were also re-evaluated by using ANOVA
instead of Jonckheere-Terpstra tests. There were significant differences in CGHQ scores and the lower scale points by age in almost the same items as those in the previous results. However, age-dependent trend was remarkable only in the lower scale points of factor I five months after the earthquake (Fig. 3).

Time course of the three types of GHQ scoring (Fig. 1) was also re-analyzed by using ANOVA instead of Friedman’s tests with post hoc Scheffe’s tests, as you kindly suggested. The results of the analysis were almost the same the previous results.

We added the information to Methods and Results and revised the tables and figures.

**Minor Essential Revisions**

1) We changed the expression ‘post-traumatic’ to ‘psychological’.
2) We cited the original reference for GHQ.
3), 4) and 5) We corrected the mistakes.
6) We cited the general reference for factor analysis.
Responses to Reviewer #2

Major compulsory revision

1) We appreciate your helpful advice. According to your advice, we added description about the limitation of our study to Discussion. Absence of control subjects and timing of data collection are major limitations of our study, as you have pointed out. The fact that post-earthquake items are associated with pre-earthquake GHQ scores seems to arise from the same problem, i.e., timing of data collection.

2) We appreciate your expert advice. As you pointed out, there are many measures to evaluate the fit of models. We followed the recommendation of Browne and Mels (1992) and selected only three measures to evaluate fit of models, i.e., $F_0$, RMSEA and ECVI. There were no significant differences in these measures between the three scoring methods, as you suggested. However, the C-GHQ method generally produced the most optimal fitting measures compared with original GHQ and Likert scoring except RMSEA evaluated at five months after the earthquake. We revised Methods, Results and Table 3 based on these results.

Minor Essential Revisions

We revised Abstract according to your advice.

Discretionary Revisions

We appreciate your expert advice. According to your advice, we analyzed which
combination of age and type of exposure was associated with high GHQ score using ANOVA with interaction. However, there were no significant interactions between age and the various items shown in Table 1. Therefore, it is unknown what aspects of the trauma explain the age-dependent vulnerability.