Author’s response to reviews

Title: Objective and perceived food environment and household economic resources related to food insecurity in older adults living alone in rural areas

Authors:

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Author’s response to reviews:

Technical Comments:

(1) Please include email address of all authors in the title page.

Response: We added information in the title page.

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Reviewer reports:

Youngmi Kim (Reviewer 1): The study addresses important topics regarding food insecurity and food environment for older adults living alone. This paper would be strengthened if the following were taken into consideration and incorporated.

Response: Thanks for your valuable comments.

1. This paper mainly raises a question about food insecurity status of older adults living alone in rural areas, South Korea. I find, however, the paper fairly remain with general older adults population, which may mislead the study focus. Three interesting characteristics of the target study population, "those living alone", "in rural areas", and "South Korea", should be greatly reflected in the background, methods, and discussion. What are the unique needs (competing consumption demands) of older adults living alone compared to those living with a family member(s)? What makes those living in rural areas confront high risks of food insecurity compared to those living in big cities? How are the experiences of Korean older adults living...
alone different from those in other countries? The authors would want to elaborate the underlying conceptual framework and make a strong argument/discussion accordingly.

Response: We added more explanation about rationale of the study subjects selected (older adults, rural area, living alone, South Korea) in the introduction section and discussion section (page 4, 12-13).

2. Methods:

1) The study participants were recruited in two counties, Yanpyeonog and Hongcheon. How rural are these areas? Are there variations across the counties in terms of economic and environmental characteristics?

Response: Both regions have similar age distributions to other rural areas. In addition, the two study areas had similar household economic characteristics including food insecurity (40.0% in Yangpyeong County and 46.3% Hongcheon County, data not shown) and average monthly income for last 1 year. We added the information above to the manuscript (page 5-6).

2) What kind of sampling method was used? The sample is fairly old (mean=78) and poor (44% in public assistance). Is it common among rural seniors?

Response: We added more explanation about sampling method and characteristics (page 5-6).

3) When was the data collection conducted and how long?

Response: The data collection was done between November and December 2013 and we added the information (page 6).

4) Measures

4-1) I highly recommend the authors revisit the description of the variables. I appreciate your efforts presenting the detailed tables 1-3, but it was not clear what each variable indicated and how it was measured.

Response: We added explanation on the measure of each variable, especially on food environment factors (page 7-9).

4-2) Also, please align the variables in the same order, indicate the reference periods, clarify each variable names (use it consistently throughout the entire paper - names of some variables may be desirable to be shorted for clear communications), make sure all the variables are
included in the tables, etc; international readers may not know what the national basic livelihood is;

Response: The manuscript was revised according to reviewer’s comments. Variables including national basic livelihood were defined as well (page 7).

4-3) household food insecurity is one of the key measures - more descriptions are needed and I would place it first in the measures. Related: please justify all of these variables are necessary. Some of them seem quite repetitive or may not make distinct contributions in the variation of food security of older adults (e.g. income).

Response: We added measures of food insecurity in detail (page 9). In terms of food environmental factors, we describe the conceptual framework in the method section. In addition, our study examined both objective and perceived measures for economic factors and environmental factors because a variety of methodologies including objective and respondent-based perceived measures have been used to capture best their actual circumstances. Thus, we considered various variables to examine the relationship with food insecurity (page 7-9).

4-4) Given the total sample size, the number of variables used in logistic regression appear too many. Did you check the statistical power?

Response: This study is a kind of ad hoc analysis using data from a cross-sectional investigation to assess needs of potential beneficiaries and providers in a program targeting vulnerable groups in rural areas. We analyzed variables according to our conceptual framework addressing a relationship between food environment and food insecurities in vulnerable older adults, while we couldn't make the power calculation for this study hypothesis.

3. Results:

3-1) Tables 1-3 compare the sample characteristics by food security status. If that is one of the study inquiries, please also show those of the full sample by adding one column in Tables 2 and 3 so that the full sample's characteristics are shared with readers. And, I prefer one combined table rather than three separate tables. Present test values (e.g., t or chi-square) instead of p values. P values can be shown with asterisks.

Response: We showed the values of full sample and presented test values with asterisk as you suggested. In terms of combining tables, if you don’t mind, we would like to show tables separately because readers may find it difficult to read due to too long table (page 21-23).

3-2) In the Table 4 note, I find "Dependent variables were selected based on the association with food insecurities (α=0.15)". I assume it is a typo for independent variables and α=0.05. In any manner, selecting significant independent variables from bivariate tests are like a random cherry
picking, which is not desirable in science. If this study is derived from theories per deductive reasoning, key determinants explaining food insecurity of single older adults living in rural areas should be logically selected as I comment above in # 1. Please revise the analysis or justify.

Response: All the potential independent variables were selected based on conceptual frame work of this study for food insecurity and examined through bivariate tests. In this revision, we included independent variables in the final model at the significance level of 0.05 (page 24).

3-3) In Table 4, I do not find any noticeable changes of findings in Model 3 after running (compared to) Model 1 and Model 2. Model 3 would be good enough to present.

Response: We excluded model 1 and 2 leaving model 3 only (page 24).

Reviewer 2 (Reviewer 2): PEER REVIEWER COMMENTS: To view the full report from the academic peer reviewer, please see the attached file.

REVIEWER COMMENTS FROM REPORT: This paper explores the relationship between food environment and food insecurity among elders in rural Korea. The results indicate that the food accessibility is likely to be more important than individual income to be related to food insecurity. More interventions may need to target the food availability and accessibility to improve food insecurity in elder Korean in rural areas.

Response: Thanks for your valuable comments.

REQUESTED REVISIONS:

1. The authors need to clarify the sampling frame. For example, what the base population is. It seems that not all seniors will receive the invitation since majority of the enrolled subjects receive public food assistance. Is there any income threshold for inclusion criteria?

Response: We added more explanation about sampling frame. The sampling procedure and scheme were elaborated as suggested. As already mentioned in the manuscript, we targeted older adults receiving National Home Healthcare Services which covers low-income populations (below 50% of the median income). Thus, already mentioned in the discussion, it is difficult to generalize results of this study to the larger population (page 5-6).

2. Understanding the size of base population will help assess the representativeness of the 170 subjects, which are small in an observational study.

Response: The base populations were around 900 households with older adults receiving the National Home Healthcare Services (NHHS) from 9 towns from Yangpyeong and 2 towns from
Hongcheon. Therefore, our study samples covered 18.9% of the study population. We added the information to the manuscript (page 6).

3. Moreover, the interpretation should be based on the full model, which included the economic burden and food environment. The expenditure of heating cost was not significant in the full model. That variable is also endogenous with regards to food insecurity.

Response: We wanted to address the risk factors that affect food insecurity within each aspect of economic resources and food environment. Although heating fees and heating costs were not significant in the full model, the factors were significant among economic resources affecting food insecurity. Thus, we discussed two factors (housing fees and heating cost) (page 13).

4. Therefore, only two food accessibility variables were significant. But one variable (inconvenient bus route) was negatively associated with food insecurity, which is contrary to the intuition. More discussions are needed.

Response: We added more explanation about what you mentioned (page 12).

ADDITIONAL REQUESTS/SUGGESTIONS:

see comments above

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Declarations

- Ethics approval and consent to participate
- Consent to publish
- Availability of data and materials
- Competing interests
- Funding
- Authors' Contributions
- Acknowledgements

Response: We added information as you requested.