Author’s response to reviews

Title: An additive effect of leading roles on the association between social participation and dementia onset among Japanese older adults: The AGES cohort study.

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Version: 1 Date: 13 Nov 2017

Author’s response to reviews:

Matteo Pasini

Editor

BMC Geriatrics

14 November, 2017

Dear Dr. Pasini,

Re: Manuscript reference No. BGTC-D-17-00347
Please find attached a revised version of our manuscript “An additive effect of leading roles on the association between social participation and dementia onset among Japanese older adults: The AGES cohort study”, which we are resubmitting as a Research Article for BMC Geriatrics.

Your comments and those of the reviewers were very insightful and have enabled us to improve the quality of our manuscript. The following pages contain our point-by-point responses to each of the comments of the reviewers.

Revisions in the text are shown using yellow highlight for additions, and strikethrough for deletions. We hope that the revisions in the manuscript and our responses will be sufficient to make our manuscript suitable for publication in BMC Geriatrics.

We look forward to hearing from you at your earliest convenience.

Yours sincerely,

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Responses to the comments of Reviewer #1

1) "holding leadership positions in organization could lead to a decrease in risk of dementia onset by almost 20% than regular members" - what part of this is influenced by socio-economic status? You have co-variables that can be an indicator of this i.e. job status and education - can you explain how much these influence this result?

Response: We wish to thank the reviewer for this comment. According to previous work suggests that educational attainment is strongly related to dementia onset, and positively related
to social participation. We hypothesized that socio-economic status, including educational attainment, would be associated with dementia onset, social participation, and having a leadership position. The factors related to socio-economic status (educational attainment, marital status, living arrangements, and occupational status) were therefore included in the analysis as covariates. However, we found no significant relationships between any of the socio-economic status variables and dementia onset in either age group. Equivalent income was not included in the analysis because the proportion of missing data was quite high, but the analysis including equivalent income using only the complete data showed the same results as the analysis using imputed data. There was no difference in educational attainment between the two groups with and without leadership roles in young-old elderly.

These results therefore show that socio-economic status did not affect the results of this study.

2) Please remove the language of 'unproven' to 'unknown'

Response: We thank the reviewer for this comment. In accordance with the reviewer's comment, we have changed ‘unproven’ to ‘unknown’.

3) Please provide more details regarding participant selection criteria i.e. Why did you select older adults who did not receive public long-term care insurance benefits?

Response: We appreciate the reviewer's comment on this point. We agree that this part of the text requires more detailed information. We have changed it to read (P8, L142–147):

To identify the predictive factors for dementia onset, we involved relatively healthy older adults, and excluded individuals with any premonitory symptoms of dementia, such as being unable to walk, take a bath or use a toilet independently. Individuals who developed dementia within two years of the baseline were also excluded to clarify the relationship between dementia onset and initial conditions (Fig. 1).

4) Explain how you accounted for selection bias.

Response: We acknowledge the reviewer's comment on this point. To make this clearer, we have changed the explanation about selection bias to read (P19 L329–333):

In this study, the characteristics of non-responders were unknown, but we think it is possible that old-old people or those with lower health status may have been less likely to respond to the survey. There may therefore have been differences in baseline characteristics between study participants and non-participants.
5) Can you discuss some determinants and potential factors that might explain this finding: "social activity non-members have a greater risk of incident dementia than social activity members, and members in leadership positions have a significantly lower risk compared with the non-leading members in the young-old group." Perhaps from some other studies that has investigated social participation and dementia (more broadly).

Response: We acknowledge the reviewer's comment on this point. We have explained the possible mechanism of the relationship between social activity and dementia onset at P15, L269–277. Based on the reviewer’s comment, however, we have revised the explanation about the relationship between a leadership role and dementia onset as follows (P16, L279–294):

Although the reasons for the additive effect of a leadership role on incidence of dementia are not fully understood, one reason might be the difference in the frequency of social participation. Compared with regular members, individuals who take on leadership roles such as president, facilitator or treasurer have more frequent opportunities for social participation, and also take responsibility for actions to manage group activities (e.g., holding meetings, planning activities, and communicating with regular members). In this study, the proportion of individuals engaging in group activities more than once a month was higher among those in leadership positions than regular members (81.7% vs 64.8%, data not shown). Higher frequency of social participation may help to strengthen the health benefits of social participation 24), or enable individuals to obtain information that supports a healthy lifestyle 25). Socially-responsible activities may improve the quantity or quality of stimulation of the brain’s cognitive function, or maintain better mental health 8). However, we did not investigate the type of activity, or use laboratory data, so this is only speculation. As little is known about the mechanism behind the increased positive effect of leadership on cognitive function, further investigation is needed.

6) From your findings, it seems that perhaps a future qualitative study might help acquire deeper understandings from older adults themselves their social participation, particularly their leadership position and how it has influenced their everyday life which might shed light on the fifth limitation of this study (the types of social activity or leadership in relation to the incidence of dementia). I would suggest including this as a recommendation of your study.

Response: We wish to thank the reviewer for this comment. We agree with the reviewer, and have added the following text to the Limitations section (P20, L343–346):

Fifth, this study could not identify which types of social activity or leadership were related to the incidence of dementia. Further studies are needed to examine this issue, especially qualitative studies that assess the influence of social participation or leadership roles on older adults’ daily lives.
7) This paper would benefit from a thorough proofread to enhance the English grammar aligned with academic style writing.

Response: We appreciate the reviewer's concerns on this point. Our manuscript has been edited and rewritten by an experienced scientific editor, who has improved the grammar and stylistic expression of the paper. I attach the certification of English editing.

Responses to the comments of Reviewer #2

1) The writing and data expression is not in a proper way. A large amount of text (p8. Row 135-144) was used to describe a fact that already expressed clearly in one charts (Fig.1). However, there is no relevant data for the precise incidence of dementia in different groups of elderly. Only crude incidence of dementia in young- and old-old group or the relationship was presented. In order to provide readers with detailed information, The description of the relevant table for incidence of dementia in the follow-up elderly by age, sex and education levels should be added.

Response: We wish to thank the reviewer for this comment. Reporting the numbers of individuals at each stage of study and using a flow chart are recommended in the STROBE statement, which is why we included these. However, following the reviewer’s comment, we have added a new table 2 to show incidence of dementia by age, sex, and educational attainment. Old tables 2 and 3 have therefore become Tables 3 and 4. An explanation of Table 2 has been added to the Results section as follows (P14, L241–243):

Table 2 shows that the incidence of dementia onset increased with age. The incidence in each category of old-old individuals was much higher than in young-old participants.

2) In the discussion, the author mentioned that one possibility in lack of significant relationship between social participation and dementia in old-old group may due to the effect of illness in older persons. However, the supplementary table shows that most of risk for dementia is lower in old-old group with some diseases than those without diseases (except for depression). This may not support the author's claim.

Response: Thank you for pointing this out. We checked the table and realized that the medical history labels were wrong. We have corrected these mistakes (the table in the Appendix). The Hazard Ratio for the subjects with diseases for dementia onset is higher than those without
diseases (except for hypertension), and the word ‘hypertension’ on P17, L305 was changed to diabetes.

3) The idea which quantity and quality of social participation may influence the incidence of dementia, is interesting. Whether the author could extract some evidence for quantitative and qualitative social participation from this work. Otherwise, how to persuade readers about this idea.

Response: We thank the reviewer for this comment. To make this point clearer, we have added several sentences to the Discussion:

In this study, the proportion of individuals engaging in group activities more than once a month was higher among those in leadership positions than regular members (81.7% vs 64.8%, data not shown). (P16, L285–287)

Socially-responsible activities may improve the quantity or quality of stimulation of the brain’s cognitive function, or maintain better mental health. However, we did not investigate the type of activity, or use laboratory data, so this is only speculation. As little is known about the mechanism behind the increased positive effect of leadership on cognitive function, further investigation is needed. (P17, L290–294)

4) Please to introduce the reference and details of dementia scale used in this work.

Response: We thank the reviewer for this comment. Following to the reviewer’s comment, we have added the following text to the Methods (P9, L163–176):

This scale was developed by the Japanese Ministry of Health, Labour and Welfare, and health professionals in Japan use it to assess physical and cognitive function and classify individuals into levels I–IV and M. Level I means that the individuals have symptoms of dementia, but will be able to maintain an independent daily life. Level II indicates that the individuals show some symptoms and behaviors causing trouble in their daily life or some difficulties with communication, but could continue to live independently if monitored. Level III indicates that the individuals have the same symptoms as Level II patients, but more frequently, and sometimes require care to support their daily lives. Level IV indicates that the individuals have the same symptoms as in Level III, but more frequently, and always need care in their daily lives. Level M indicates individuals with severe mental or physical diseases and behavioral disorders, who require specialized medical care. We defined individuals scoring levels II to IV or M as having dementia.
5) The title of table 1 is not accurate. Where the baseline status is ambiguous. Is it the initial state of this survey or the follow-up one.

Response: In accordance with the reviewer's comment, we have revised the title of Table 1 to read ‘Initial characteristics of the participants.’