Author’s response to reviews

Title: The Associations of Multimorbidity with the Sum of Annual Medical and Long-Term Care Expenditures in Japan

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Dear Drs. Shuai Chen and Xiaoyin Li,

On behalf of my co-authors, I would like to thank you for your time and effort in reviewing our manuscript and providing valuable comments. We have further revised our manuscript to address the suggestions. Below, please find item-by-item responses to the comments. We hope that you will find the revised manuscript suitable for publication in BMC Geriatrics and appreciate the positive and insightful feedback that you have given us.

Thank you again.

Reviewer reports:
Xiaoyin Li, Ph.D. (Reviewer 2): The authors improved the manuscripts based on the reviewer's comments. I still have two major concerns as follows:

1. It is still not clear why dichotomous age categories were used in the analysis. If the participant age was indicated by a birth year question/item with 5 year-age range and the youngest age range was 72 to 76 (table 1), how did you make sure that only people aged 75 or older were selected?

Response: Thank you so much for raising this point. In our analyses, we included those adults ≥ 75 years who used medical insurance for the Late-Stage Medical Care System for the Elderly was during the study period and then merged their medical insurance claims data with the LTC insurance data. As the Late-Stage Medical Care System for the Elderly was available only for adults who were 75 and older, we, therefore, were able to excluded those < 75 years. We agree that it was not entirely clear in the manuscript, so we added the following sentence to make it clear.

Under Methods, Data sources and participants

We obtained medical insurance claims data from the Late-Stage Medical Care System for the Elderly (i.e., adults ≥ 75 years) and LTC insurance claims data from the municipal government of Kashiwa City… In this study, we included those who were enrolled in the Late-Stage Medical Care System for the Elderly (i.e., adults ≥ 75 years) between April 2012 and September 2013 in Kashiwa city (Figure 1) … We merged the medical insurance claims data for those aged ≥ 75 years with the LTC insurance data at an individual level using these dummy ID numbers. (page 5 line 37- page 6 line4)

Table 1, Footnote

*** We included only those individuals who were enrolled in the Late-Stage Medical Care System for the Elderly (i.e., adults ≥ 75 years) in this analysis. in this analysis.

Why 86 was the cutoff for age categories? Any rationale or previous research about differentiating people who were 87 years or older from people who were 86 years or younger?

Response: The rational for these cutoffs was based on the Joint Committee of Japan Gerontological Society and the Japan Geriatrics Society’s statement that those who are aged 75-89 are defined as being “old” and those who are aged 90 or older are defined as being “super-old” in Japan (1). In this dataset, participant age was indicated by a 5-year age range based on birth year, so we were able to divide the sample into two category by putting birthyear 1925-29 (ages 82-86 as of January 1, 2012) and later as the younger group and birthyear 1920-24 (ages 87-91 as of January 1, 2012) and earlier as the older group. Please note that the ages were the individuals’ ages as of January 1, 2012 and the study period was between April 2012 to September 2013.
In a sensitivity analysis, we divided into two categories, in which birthyear 1920-24 (ages 87-91 as of January 1, 2012) and later was defined as the younger group and birthyear 1915-19 (ages 92-97 as of January 1, 2012) and earlier was defined as the older group. The results were very similar and the conclusions remained the same. Every increase in one unit of the CCI score (0, 1, 2, 3, 4, or ≥ 5) was associated with ¥266000 ($3020) increase in the sum of both medical and LTC expenditures (95% CI [ ¥251,000, ¥280,000] or 95% CI [$2850, $3180]). (p value <0.001), while the original analysis showed that every increase in one unit of the CCI score was associated with ¥257000 ($2920) increase in the sum of both medical and LTC expenditures (95% CI [ ¥242,000, ¥271,000] or 95% CI [$2750, $3080]) (p value <0.001).

We prefer not to include this information about the sensitivity analyses in the current manuscript because this level of detail can be somewhat confusing for readers and more importantly, this shift in the division of age groups between 1920-24 and 1925-29 or between 1915-19 and 1920-24 did not change the findings or conclusions of the study.


2. For the majority of participants (even when they have a CCI score of 5 or higher), LTC was not required. It might be helpful to have some comparison between LTC required cases and LTC not required cases, in addition to reporting the total Medical and long-term expenditures among all participants. For example, in table 2 and somewhere in results and discussion, try to report the medical expenditure and total expenditure by whether LTC is required, or report the ICC score by whether LTC is required.

Response: Thank you for your comments, as you raise a very interesting point for consideration. We have now included this information in the manuscript to allow for a comparison between those with LTC and without LTC services. For those who required LTC (n=7385), the mean and median scores were 2.01 and 2, respectively, while for those who did not required LTC (n=22,657), the mean and median scores were 1.22 and 0, respectively. We included this in the Results section as follows:

Of 30,042 individuals, the descriptive statistics showed that the mean and median scores of CCI were 1.42 and 1, respectively (Table 1). For those who required LTC (n=7385), the mean and median scores were 2.01 and 2, respectively, while for those who did not required LTC (n=22,657), the mean and median scores were 1.22 and 0, respectively. (page 9 line 44-49)

To further address your comment, for those who required LTC (n=7385), medical, LTC, and, the sum of both expenditures were ¥1,073,000 (US$12190), ¥1,504,000 (US$17090), and ¥2,577,000 (US$29290), respectively. On the other hand, those who did not required LTC (n=22,657), medical, LTC, and the sum of both expenditures were ¥600,000 (US$6810), ¥0, and ¥600,000 (US$6810), respectively.
In this study, our intention was to focus on the association of multimorbidity (i.e., CCI scores) with medical and LTC expenditures. We are afraid that the results of medical and LTC expenditures stratified by LTC requirement might be distracting from our primary focus and aims and therefore prefer not to these additional details in the manuscript. We truly hope that you could understand that our philosophy is to keep the main text and table simple and clear, so that our message can be directly and smoothly conveyed to the readers of the journal.