

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Receiving the home care service offered by certified care workers prior to a patients' death and the probability of a home death: observational research using an instrumental variable method from Japan
<b>AUTHORS</b>	Abe, Kazuhiro; Miyawaki, Atsushi; Kobayashi, Yasuki; Noguchi, Haruko; Takahashi, Hideto; Tamiya, Nanako

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Soong-nang Jang Harvard T.H.CHAN School of Public Health
<b>REVIEW RETURNED</b>	21-Dec-2018

<b>GENERAL COMMENTS</b>	<p>This study was to assess the effect of the certified care workers' home care service which is provided by non-medical professionals prior to a patients' death on the probability of home death Japan. This paper deals with the very interesting topic, and I think it is very important research that provides a basic evidence for community care in the long-term care policy specifically in super aged society.</p> <p>The authors set up the research question clearly and tried to analyze data appropriately by using as many data sources as possible even there were some limitation of data. The results are also meaningful, and the authors have fully described the interpretation of the results.</p> <p>Through this reviewer's first impression, the current level of manuscripts is sufficient for publication, but for readers, it would be better to consider some of the questions below in the revision.</p> <p>Even though the latent factors were adjusted with IV, but I am not sure that the quality of home care is also considered in the study design. Probably the quality of care might be important for decision on sustainable home care and finally home death, too. If LTCI beneficiaries receive home care from a formal caregiver, do they nurse or doctor's visit treatment opportunities also increase? Does not that affect them? In other words, can you say that it is a "net effect" of home care from formal caregiver? Would not other elements be contaminated?</p> <p>Regarding to IV, how about unemployed (for example, certified but still seeking job opportunity) care worker? Were they included in the numbers?</p> <p>Based on introduction and table 1, we recognize and are surprised that huge portion of older people still die at hospitals and nursing</p>
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	homes not in their home, even almost 20 years after Long-term care insurance implementation. One hypothesis is that older residents who have been staying at home would be transferred to hospitals or facilities at the end-stage near death because family members might be afraid of letting older people die at home. In this kind of situation, home is 'place of DYING' and hospitals & facilities could be 'place of DEATH' just at the very last stage. I want to hear more of the authors' opinion about this.
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### VERSION 1 – AUTHOR RESPONSE

Reviewers' Comments to Author:

Reviewer: 1

Reviewer Name: Soong-nang Jang

Institution and Country: Harvard T.H.CHAN School of Public Health Please state any competing interests or state 'None declared': None declared

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- Thank you for point out this issue. In this study, we used the instrumental variable of the municipal data. Thus, the other municipal factors such as the nurse or doctor's visit opportunities could confound between the IV and the outcome (place of death). Therefore, we used the data of the previous year as the instrumental variable. Moreover, the confoundable factors at the municipal level and the dummy variables of the 330 secondary medical areas that comprise a complex of adjacent municipalities were adjusted. We supposed that these adjustments would resolve the instrument-outcome confounders. In response to your remarks, we have clarified this point to the limitations (P18L17-21).

- As the reviewer mentioned, our estimates might include the effect by interaction with the other elements such as physicians' visit. In this study, we would not be able to conclude a "net effect" of certified care workers' home care service as a single service. We have added a sentence for it in the third limitation (P18L28-P19L1). Further, we have avoided assertive phrases in the conclusions sections of the abstract (P3L3) and discussion (P17L6-9 and P19L11).

Regarding to IV, how about unemployed (for example, certified but still seeking job opportunity) care worker? Were they included in the numbers?

- The IV in this study did not include unemployed care workers. The certified care workers have provided home care service only through home care service offices registered with the LTCI. Thus, we used the full-time translated number of certified home care workers who work at the home care service offices as an IV. We have added a sentence for it in the method section (P7L18.)

Based on introduction and table 1, we recognize and are surprised that huge portion of older people still die at hospitals and nursing homes not in their home, even almost 20 years after Long-term care insurance implementation. One hypothesis is that older residents who have been staying at home would be transferred to hospitals or facilities at the end-stage near death because family members might be afraid of letting older people die at home. In this kind of situation, home is 'place of DYING' and hospitals & facilities could be 'place of DEATH' just at the very last stage. I want to hear more of the authors' opinion about this.

- Thank you for your insightful suggestions. As the reviewer pointed out, 73.3% of patients who used the home care service every month during the three months prior to the month of death died at hospitals or facilities as shown in Table 1. We think there would be several reasons that patients' home could not be the 'place of DEATH', though many elderly people in Japan wished they would live there last moments at home. According to a survey conducted by the government in 2017, several reasons were reported regarding patients not dying at their homes (reference 9). The largest number (73.3%) concerned the burden of their families when the patients stay at home during the end of their lives. This burden includes families' concerns as the reviewer mentioned. Thus, in addition to doctors, nurses and social workers, we think that the certified care workers could reduce their burdens and then increase the possibility of deaths at home. As we mentioned in the possible mechanism section, the certified care workers' home care service was reported with a reduction in the psychological burden of care-giving of patients' families in the previous studies. We believe it is possible to raise the proportion of home deaths in Japan. We have added a phrase about this in the Introduction (P4L9-10).