Author's response to reviews

Title: Relationship between home care service use and changes in the care needs level of elderly Japanese

Authors:

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Version: 2 Date: 4 September 2009

Author's response to reviews: see over
Dear Dr. Hans Zauner:

I appreciate your and the reviewers’ helpful advice and comments. Based on your suggestions, I have revised the manuscript.

1. The changes we made were follows.
   We re-wrote our paper in a more descriptive manner, omitting the statements on causal relationships. We made changes to better describe the relationships between service use and change in deterioration and suggest further research that might contribute to uncovering the mechanism between service use and change in the care needs level.

2. We changed the title as follows.
   “Relationship between home care service use and changes in the care needs level of elderly Japanese”

3. To ease understanding we changed the groups to subgroups in the stratification.
   Before ‘the lower care needs level group’, ‘higher care needs level group’
   After: ‘the lower care needs level subgroup’, ‘higher care needs level subgroup’

I would like to thank the reviewers again for their helpful comments. I hope that this revised manuscript will meet approval and be accepted for publication in BMC Geriatrics.
Following comments indicates the point where we modified our paper in a more descriptive manner.

<table>
<thead>
<tr>
<th>#change1</th>
<th>Before: Effect of home care services on the care needs levels of elderly Japanese: A longitudinal study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>We changed the title as follows. After: Relationship between home care service use and changes in the care needs level of elderly Japanese</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#change2</th>
<th>Before: To deliver effective home care services, it is important to know how the services work to prevent deterioration of the care needs levels of community-dwelling elderly persons. This study examines the relationship between the use of home care services and changes in care needs levels.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract (Background)</td>
<td>We re-wrote the aim of our study in more descriptive manner. After: To deliver effective home care services, it is important to know the effects of service use. In this study, as the first step to determine this, we sought to describe different home service use in the sustained/improved group and deteriorated group in their care needs levels, and to report the relationship between the use of home care services and changes in care needs levels.</td>
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</table>

<table>
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<tr>
<th>#change2</th>
<th>Before: We conclude that respite stay in a nursing home service use and more types of service use do not prevent lower care needs level community-dwelling elderly persons from experiencing a deterioration of care needs level in Japan. Further, medical management by a physician service does not prevent higher care needs level community-dwelling elderly persons from experiencing a deterioration of care needs level.</th>
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<tbody>
<tr>
<td>Abstract (Conclusion)</td>
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</table>
After:
Service use was observed in two groups (the sustained/improved group and the deteriorated group).
Respite stay in a nursing home service use and more types of service use were related to experiencing a deterioration of care needs level in lower care needs level community-dwelling elderly persons in Japan. Further, medical management by a physician service was related to experiencing a deterioration of care needs level in higher care needs level community-dwelling elderly persons.

#change 3

p5 line 10-16

Before:
Therefore, we conducted a longitudinal study to explore the effectiveness of home care services on the change in care needs level in community-dwelling elderly persons.

We re-wrote our aim of the study in more descriptive manner.

After:
As a first step to determine the effect of service use on care needs level, an observational study to identify the relationship between home based service and changes in care needs level is necessary. We conducted a study to describe the differences in home service use between the sustained or improved group and the deteriorated group in their care needs level and to report the relationship between the use of home care services and changes in care needs levels.

#change 4

p5 line 17-20

Before:
Multiple logistic regression analysis was applied to examine the effect of service use on the care needs level, controlling for baseline confounding factors, such as gender, age, and the baseline care needs level.

We re-wrote our aim of the statistical analysis from examinational style to descriptive style.

After:
Multiple logistic regression analysis was applied to identify the relationship between service use and change in the care needs level, controlling for baseline confounding factors such as gender, age, and the baseline care needs level.
<table>
<thead>
<tr>
<th>Change</th>
<th>Page</th>
<th>Line</th>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>5</td>
<td>p6</td>
<td>9-11</td>
<td>Since the purpose of this study was to explore the effects of home care service use on the user’s care needs level,</td>
<td>We re-wrote in more descriptive manner.</td>
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<td></td>
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<td>After</td>
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<tr>
<td></td>
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<td>Since the purpose of this study was to describe the differences in home service use between the sustained or improved group and the deteriorated group in their care needs level,</td>
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<tr>
<td>6</td>
<td>p12</td>
<td>25-13</td>
<td>The comparison of the two groups defined by outcome stratified by baseline care needs levels revealed the difference in home service use between the two groups (SI and D groups). The use of respite stay in a nursing home, increased types of service use, and higher age were significantly related to a worsening care needs level (D group) in the lower care needs level subgroup. Further, use of medical management by a physician and a lower baseline care needs level were significantly related to a worsening care needs level in the higher care needs level subgroup.</td>
<td>We modified first paragraph of discussion in more descriptive manner.</td>
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<td></td>
<td>After</td>
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<td>The comparison of the two groups defined by outcome stratified by baseline care needs levels revealed the difference in home service use between the two groups (SI and D groups). The use of respite stay in a nursing home, increased types of service use, and higher age were significantly related to a worsening care needs level (D group) in the lower care needs level subgroup. Further, use of medical management by a physician and a lower baseline care needs level were significantly related to a worsening care needs level in the higher care needs level subgroup.</td>
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</table>
### Change 7

**Before:**

There are two possibilities to explain the mechanism of why respite service does not prevent the D group in lower care needs level from deteriorating: (1) an effect of respite service use itself, and (2) the users’ potential to deteriorate.

We added the limitation of our result, and omit the statement of causal effect of service use.

**After:**

Our study is descriptive, and therefore we cannot be certain of causal relationships. We can conjecture, however, that there are two possibilities to explain why some service use showed a significant relationship with a deteriorating care needs level: (1) user’s potential to deteriorate, not effect of service use; and (2) the effect of service use.

### Change 8

**Before:**

As to the recipients’ potential to deteriorate, first, the characteristics of care-recipient whose caregivers exhibit higher stress should be considered. Respite service is primarily utilized by the recipients with stressed caregivers [40, 41]. Caregivers’ higher stress relates poorer quality of care and causes adverse effects on recipients [42]. Second, lower care needs levels as a potential factor might be considerable. ‘Mild’ degree dementia and physical functioning recipients showed more adverse effects from respite service than those with more severe dementia or deterioration of physical function [31, 43]. Healthy users experienced a positive effect on function from respite stay [44]. From these facts, we inferred that lower care needs level users might have some potential risk factors for deterioration as ‘lower care needs level’ indicates the person is not fully healthy, but not in a severe condition.
We added discussion about the risk factors which already revealed as one of potential of deterioration. Also, we modified the restructure of the paragraph to support greater understanding.

**After:**

As to the potential of respite service users to deteriorate, first, we need to consider the possibility that respite service users had more risk factors of declining care needs level. Poorer health, poorer physical and cognitive functions are identified as risk factors for mortality in community dwelling frail older people [15]. Secondary, as respite service is reported to be used by recipients with stressed caregivers [32, 33], and that relates to poorer quality of care and causes adverse effects on recipients [34], respite service users may have such the characteristics before service use.

We deleted following sentence.

“Second, lower care needs levels as a potential factor might be considerable. ‘Mild’ degree dementia and physical functioning recipients showed more adverse effects from respite service than those with more severe dementia or deterioration of physical function [31, 43]. Healthy users experienced a positive effect on function from respite stay [44]. From these facts, we inferred that lower care needs level users might have some potential risk factors for deterioration as ‘lower care needs level’ indicates the person is not fully healthy, but not in a severe condition.”

#change 9
p13 line 17-
p14 line5

Before
The effect of respite stay service use is still controversial. Similar to our study, the adverse effects on respite service users’ Activity of Daily Living (ADL) functional performance and sleep rhythms were observed in past studies [31-33]. However, some literature reported that there were no adverse effects from respite stay service on older users and users with dementia in the standard program unit [34, 35] or a special unit for people with dementia [36].

As to the effect of respite stay service use, first, the lack of the perspective of the care recipients is considerable because respite stay service has been developed with the aim of easing the burdens of caregivers. This is supported by the fact that numerous publications evaluate the effects of respite care focusing on outcomes for caregivers not care recipients [37]. Moreover, to improve the quality of services for recipients, the Japanese LTCI system will introduce a payment schedule for the rehabilitation service on respite stay service users beginning in 2009 [38]. Second, the effect of relocation to the respite service was also considerable. Relocation from the community to respite institutions and back to the community within several days may be stressful for the recipients. Actually, inter-institutional relocation is one of the predictors of mortality for older adults [39].
We omitted the statements of the causal effect.
In addition, we restructure the paragraph to support greater understanding.

After

Though our study cannot indicate the effect, the reported effect of respite service use in previous studies itself is also still controversial. The adverse effect of respite service users’ Activity of Daily Living (ADL) functional performance and sleep rhythms were observed in past studies [35-37]. However, some literature reported that there were no adverse effect from respite stay service on older users and users with dementia in the standard program unit [38, 39] or a special unit for people with dementia [40].

It may be necessary to focus more on the content of respite service to investigate the effect of respite service on changes in the care needs level. We need to consider the lack of the perspective of the respite care recipients like rehabilitation because respite stay service has been developed with the aim of easing the burdens of caregivers. This is supported by the fact that numerous publications evaluate the effects of respite care focusing on outcomes for caregivers not care recipients [41].

We deleted following sentence in restructuring process..

Moreover, to improve the quality of services for recipients, the Japanese LTCI system will introduce a payment schedule for the rehabilitation service on respite stay service users beginning in 2009 [38].

Second, the effect of relocation to the respite service was also considerable. Relocation from the community to respite institutions and back to the community within several days may be stressful for the recipients. Actually, inter-institutional relocation is one of the predictors of mortality for older adults [39].

Deleted reference

Before:
However, our study did not control for quality of services and detailed characteristic of users, such as severity of dementia, comorbid conditions, ADL and care givers’ valuations, and consequently, it is difficult to make a full explanation of the mechanism of why the services do not prevent the care recipients from deteriorating. More studies investigating the detailed characteristics of the users and the quality of respite service use by care recipients is necessary.

We omitted the sentence which contains causal effect.

After:
In sum, we did not control detailed characteristic of users, such as comorbid conditions etc, care givers’ variables and the content of services. It is difficult to explain the causal effects which might underlie the relationship between service use and decline of care needs levels. Further research investigating the detailed characteristics of the users and the quality of respite service is necessary.

Before:
The length of our study may also limit our findings. Eleven months may be relatively short to evaluate the effect of home services on community-dwelling elderly persons.

We changed the former sentence in more descriptive manner.

After:
The length of our study may also limit our findings. Eleven months may be a relatively short period to observe the relationship between home services use and changes in the care needs level of community-dwelling elderly persons.

Reviewer 1: Steven M Albert

<table>
<thead>
<tr>
<th>Comments from Reviewer# 1-1 (Minor essential revisions)</th>
<th>1. Please consider review by an English editor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer to the comment#1-2</td>
<td>Thank you very much for your comments. We had a native English speaking editor re-edit the manuscript.</td>
</tr>
<tr>
<td>Comments from Reviewer# 1-2</td>
<td>2. Please make more clear exactly how the monthly service use data were handled.</td>
</tr>
</tbody>
</table>
Thank you very much for the comment.
We added information about how the monthly service use data were handled.
The following were added in the Method section.

This data includes the LTCl service users’ gender, age, monthly care needs level and monthly monetary amount of LTCl service utilization (details are reported elsewhere [26]). p.6 ,line3-4

To quantify the monthly service use data, the monthly monetary amount of home care service utilization was investigated for 11 month. If the monthly monetary amount of the service utilization in a month was > 0 then the monthly service use was scored one. In addition, monthly service use data were summed. Following this process, the service use variables were dichotomized (service use or not). The service use variables were recognized as ‘service use’ if the total monthly service use was 1 or over. p7 line 21-p8 line 2.

<table>
<thead>
<tr>
<th>Comments from Reviewer# 1-3</th>
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<tbody>
<tr>
<td>1. Please consider adding to the Discussion an alternative explanation for findings of no gain from intensive services in preventing functional decline. That is, people who are at risk of decline are likely to use these services. A key experiment would be to compare seniors at equal levels of initial disability, with one group receiving supportive services and one not. Would the service-use group show a slower rate of decline? Another comment worth mentioning is that these geriatric services are not for the most part meant to be rehabilitative.</td>
</tr>
</tbody>
</table>

Thank you very much for the comment.
We did not make an examination of the rate of decline.
But we make a comment about the rehabilitative service.
Following sentence was added.

It may be necessary to focus more on the content of respite service to investigate the effect of respite service on changes in the care needs level. We need to consider the lack of the perspective of the respite care recipients like rehabilitation because respite stay service has been developed with the aim of easing the burdens of caregivers. This is supported by the fact that numerous publications evaluate the effects of respite care focusing on outcomes for caregivers not care recipients [41]. p 13 line24-p.14line4.

Reviewer: Masafumi Kuzuya
| Reviewer’s report | The manuscript has been improved very much after excellent revision. The manuscript presents an empirical evaluation of an important topic - the effect of community-based services on the care needs of recipients. However, as described in previous review, the causal effects that might underlie the association between service use and poor outcome (decline of care needs levels) is still unclear. Care recipients who use various community-based services may tend to decline care needs levels as a consequence of their worse health, worse physical and cognitive functions, or worse informal care levels. Thus, community-based service use may derive from caring patients in worse health and in worse informal care levels, and therefore at greater risk of decline care needs levels, and not contributes to the outcome directly. |
| Answer to reviewer’s report | Thank you very much for the report. We re-wrote our statement more descriptive. In addition, we recognized poorer health and poorer physical and cognitive functions as possible and significant risk factors for community dwelling frail elderly. The following were added. Our study is descriptive, and therefore we cannot be certain of causal relationships. We can conjecture, however, that there are two possibilities to explain why some service use showed a significant relationship with a deteriorating care needs level: (1) user’s potential to deteriorate, not effect of service use; and (2) the effect of service use. p13 line 5-9 As to the potential of respite service users to deteriorate, first, we need to consider the possibility that respite service users had more risk factors of declining care needs level. Poorer health, poorer physical and cognitive functions are identified as risk factors for mortality in community dwelling frail older people [15]. p13 line 10-13 Though our study cannot indicate the effect, the effect of respite service use itself was still controversial. p.13 line 17-18 In sum, we did not control detailed characteristic of users, such as comorbid conditions etc, care givers’ variables and the content of services. It is difficult to explain the causal effects which might underlie the relationship between service use and decline of care needs levels. Further research investigating the detailed characteristics of the users and the content of respite service is necessary. p. 14 line 5-9 |
| Comments from Reviewer | P6, the first line, ?1,474 of the LTCI service users? should be ?1,474 who were approved for LTCI. Because it is clear for the following sentence not the all of |
1,474 use LTCI services. Is it correct?

**Answer to the comment#2-1**

Thank you very much for the comment.

The study population includes all people who were approved for LTCI during an 11–month period.

Therefore, we added the following.

The initial study population was 1,474 persons who were approved for LTCI in a period of 11 months.  

**Comments from Reviewer #2-2**

P 9, line 25-P10, line 9, This reviewer believe that data of Table 2 & 3 must be comparison between SI and D groups. The first sentence ?There were no home based services ----.? What does this mean??

**Answer to the comment#2-2**

Thank you for the comments.

As you mentioned, this sentence is not correct.

We added the following sentence in the result section.

*There were no home-based services that were used significantly more by the SI group than by the D group in both the lower and higher care needs level subgroups.*  

**Comments from Reviewer #2-3**

Table 2, and 3: This reviewer is not sure that Wilcoxon Rank Sum Test is suitable for the comparison analysis of categorical variables between two groups. If the Wilcoxon Rank Sum Test was used for nonparametric numeric variables of two groups, this reviewer would like to know the mean and SD of each group.

**Answer to the comment#2-3**

Thank you very much for the comments.

We added the mean and SD in the Table 2 and 3.

To calculate the median or quantails, we remain the information of the frequency.

Table 2

In the lower care needs level group, the Mean (SD) of number of kinds of care services used in the SI group and the D groups were 1.83 (0.93) and 2.33 (1.25), respectively.

Table 3

In the higher care needs level group, the Mean (SD) of number of kinds of care services used in the SI group and the D group were 3.00 (1.18) and 3.75 (1.65), respectively.
Table 3. The variables used for multivariate analysis were any services with p-values <.025 in univariate analysis. However, there are no data of univariate analysis. Therefore at least variable used for multivariate analysis should be described in the text.

Answer to the comment#2-4

Thank you very much for the comments. We misused “univariate analysis” as a simple statistical tests. Therefore, we changed the term from “univariate analysis” to “simple statistic tests”. We also describe which variables were imputed in the stepwise logistic regression. We revised as follows:

Simple statistic comparison and multiple logistic regression analyses in which the change in care needs level was set as a dependent variable were performed. In abstract (Method)

Second, simple statistical tests were carried out to compare basic characteristics and service use between the SI and the D groups. p8 line 23-24

Any services with p-value < 0.25 in simple statistical tests were imputed as independent variables based on the Hosmers and Lemeshow’s screening criteria [29]. p.9 line 5

The results of simple statistical tests for lower care needs level subgroup and higher care needs level subgroup are shown in Table 2 and Table 3, respectively. p10 line 12

In the lower care needs level subgroup, visiting nurse, nursing home daycare, health daycare, respite stay in a nursing home, respite stay in sanatorium-type medical care facilities, medical management by a physician and number of kinds of care services used were imputed as independent variables. In higher care needs level subgroup, visiting nurse, health daycare, medical management by a physician and number of kinds of services used were imputed as independent variables. p11 line 1-p11 line 7

Comments from Reviewer #2-5

P11, line 2,5,: would be useful to add the mean and SD values of duration.

Thank you very much for the comment. We added the Mean and SD of the duration. The following were added in the results section.

As the results of sub-analysis, we determined first that the D group in the lower care needs subgroup had significantly longer durations of respite stay in nursing homes (mean +/- SD 2.3 +/- 3.4 vs. 1.0 +/- 2.6, p<0.01) and in sanatorium-type medical care facilities (mean +/- SD 0.950 +/- 2.6 vs. 0.00 +/- 0.0, p<0.01) than the SI group. The D group in higher care needs...
subgroup had significantly longer durations of medical management by a physician (mean +/- SD 3.40 +/- 4.9 vs. 1.1 +/- 3.0, p=0.01) than the SI group.

P11, line 6, 7, How and what variables were used for the adjustment?

Thank you very much for the comments.
We used sex, age and baseline care needs level as adjust variables.
We used services variables that were used in the model developed by the main analysis. They were forced into the model.
Therefore, following were added.
The adjusted OR of the duration of the respite stay in a nursing home service use was 1.10 (CI, 1.01-1.18) in the lower care needs level subgroup. Gender, age baseline care needs level were used for the adjustment. The duration of respite stay in a nursing home and number of kinds of care services used were forced into the model. The adjusted OR of the duration of the medical management by a physician service use was 1.21 (CI, 1.03-1.44) in the higher care needs level subgroup. Gender, age baseline care needs level were used for the adjustment, the duration of visiting nurse, health daycare and medical management by a physician were forced into the model.

Comments from Reviewer #2-6
P9, line 5, 6, and P11, line 10-; more clear definition of ?discontinuous users?? was required. If the user stopped using service only one month among 11 months, does this user defined as ?discontinuous users??

Thank you very much for the comments.
If the user stopped using service in only one month during the 11 months, this user was defined as discontinuous a user.
The explanation of the definition was confusing, so we modified it as follows.
The LTCI service users who did not use home care service continuously 11 months (n=229), of which 51 users were in the community at the baseline but received institutional care service in the following 10 months, were treated as discontinuous users.

Comments from Reviewer #2-7
P9, line 6, 7; How to compared between two groups?

Thank you very much for the comment.
We compared between two group by the $\chi^2$-test or Fisher’s exact test.
Following sentences were added.
The change in care needs level of discontinuous users (n=229) was compared to that of the main subjects (n=624) and stratified by baseline care needs level using the $\chi^2$-test. Service use by discontinuous users was compared between the SI and the D groups using the $\chi^2$-test or Fisher’s exact test.

| Comments from Reviewer #2-8 | In abstract and discussion, p12, line 9, p13, line 12, p14, line 3, p15, line 21 and 23; ?not prevent? is not suitable for this manuscript. Because the results indicate that the service use deteriorates their care needs levels compared with nonusers. Thank you very much for the comment. We discussed and changed the sentence to be more descriptive and show the relationship between service use and change in the care needs level. The following changes were made. There were different home service use in two groups (the sustained/improved group and the deteriorated group). Respite stay in a nursing home service use and more types of service use were related to experiencing a deterioration of care needs level in lower care needs level community-dwelling elderly persons in Japan. Further, medical management by a physician service was related to experiencing a deterioration of care needs level in higher care needs level community-dwelling elderly persons. Conclusion in abstract Our study is descriptive, and therefore we cannot be certain of causal relationships. We can conjecture, however, that there are two possibilities to explain why some service use showed a significant relationship with a deteriorating care needs level: (1) user’s potential to deteriorate, not effect of service use; and (2) the effect of service use. p13 line 5-9 Medical management by a physician service were related to a deterioration in care needs level by users in the higher care needs level subgroup. p14.line25 There are differences in service use between the sustained or improved care needs level group and the deteriorated care needs level group. We concluded that respite stay in nursing homes and more types of services used were related to a deterioration of the users with lower care needs levels. Medical management by a physician service was related to deterioration in care needs level in higher care needs level subgroup who might be severely disabled. p16 line15-20 |
| Comments from Reviewer #2-9 | As authors mentioned in the discussion, there are number of limitations in this study. Therefore, the conclusion should tone down. |
Thank you very much for the comment.

We made our study more descriptive.

Finally we changed the conclusion as follows.

There are differences in service use between the sustained or improved care needs level group and the deteriorated care needs level group. We concluded that respite stay in nursing homes and more types of services used were related to a deterioration of the users with lower care needs levels. Medical management by a physician service was related to deterioration in care needs level in higher care needs level subgroup who might be severely disabled.

<table>
<thead>
<tr>
<th>Reviewer 3: Angel Otero</th>
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<tbody>
<tr>
<td>Version: 3 Date: 24 October 2008</td>
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<tr>
<td>Reviewer’s report</td>
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<tr>
<td>Answer to the comment</td>
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</tbody>
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