# PEER REVIEW HISTORY

## ARTICLE DETAILS

| TITLE (PROVISIONAL) | Knowledge, attitude and self-efficacy of elderly caregivers in Chinese nursing homes: a cross-sectional study in Liaoning province |
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| AUTHORS | Zhang, Huijun; Sun, He |

## VERSION 1 – REVIEW

| REVIEWER | İlkim ÇITAK KARAKAYA |
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| | Muğla Sıtkı Koçman University, TURKEY. |
| REVIEW RETURNED | 12-Mar-2019 |

| GENERAL COMMENTS | Dear Editor, |
|---|---|
| | Thanks for asking me to review this paper on the knowledge, attitude and self-efficacy of elderly caregivers in Chinese nursing homes. I've completed my review and my recommendations/comments are as in the following: |
| | 1. English revision by a native speaker is strongly recommended, since some statements may be misunderstood (for example: With the acceleration of aging….?) and there are some grammatical and spelling mistakes in the text. |
| | 2. In the introduction section, the authors attempted to explain the traditional Chinese culture about the family-centered caregiving model for the elderly population, and to rationalize the increasing demands for the nursing homes and caregivers. It seems that Chinese and Turkish traditional cultures about the family-centered caregiving model for the elderly and the changing family structure dynamics resemble each other. Therefore, the authors may benefit from the information and findings given in a recently published study from Turkey in either/both introduction and discussion sections of their paper [Yenişehir S, Çıtak Karakaya İ, Karakaya MG. Knowledge and Practice of Nursing Home Caregivers about Urinary Incontinence. European Geriatric Medicine. 2019;10(1):99-105 (https://doi.org/10.1007/s41999-018-0129-0)]. |
| | 3. The accurate name of one of the scales used in this study should be "Kogan's Attitude Toward Old People Scale". Please use the same abbreviation for this measure throughout the paper (KAOP in page 7 or KOAP in page 8?). |
| | 4. Please indicate if the scales used in this study are developed or may be used for the caregiver population. |
| | 5. In page 8, line 33, it is not clear which references are cited, since there is no punctuation between the 17th and 25th reference numbers. Will it be "," or "-"? Also, this paragraph should be more clearly written, since some variables (the health status of the elderly) is not mentioned here, although they are given in table 1. The authors should reconsider if this variable is suitable to be presented in this table. Another question arising about this variable |

is that: according to which criteria were the elderly classified as complete/partial/with no disability?

6. The first paragraph of the data analysis section should be more clearly explained and given references.

7. In the second paragraph of the results section, only scores from the scales were presented. Please add statements about the interpretation of these scores (for example, high/low knowledge, positive/negative attitude, etc.)

8. The authors should indicate if the correlations found among the variables were low/moderate/high, by citing references. Also, in page 13, line 25, they should change "positive correction" as "positive correlation".

9. In the first paragraph of the discussion, the authors have stated that there was relatively low-level of knowledge, attitude and self-efficacy of caregivers in comparison with other countries or regions. They should give references for this statement. Also, there may be other countries/regions in which similar level of knowledge/attitude/self-efficacy exist in caregivers for the older people. The authors are recommended to review the literature and find out the relevant samples in order to improve their discussion about this statement.

10. The sample size was given as 403 in the results section, but it is written as 402 in the limitation section of the discussion. The authors should solve this conflict.

11. The limitations section of the paper is difficult to understand. Why the authors think that the variables (scales?) in their research are not comprehensive? If they are really not comprehensive and not suitable for use in this population; and also, if they think that the respondents might have not tell the truth by using a self-reporting questionnaire, why didn't the authors use different research methodologies other than questionnaires? They also say that "Further research considering other variables potentially influencing knowledge, attitude and self-efficiency of elderly caregivers would generate more insights". What are these "other variables"?

| REVIEWER | Kamal Wagle<br>Institute: Indiana University School of Medicine<br>City: Indianapolis<br>State: Indiana<br>Country: USA |
|---|---|
| REVIEW RETURNED | 23-Mar-2019 |

| GENERAL COMMENTS | First of all, I would like to thank authors for working on this very important topic.<br><br>Abstract:<br>Line 38-41: It is not clear how to interpret the scores. I will recommend it to be self explanatory.<br>Page 2, Line 48-59: It will The second sentence in Results section of abstract is not clear. It does not tell which gender, what work experience (longer/shorter) is associated with negative associations with attitude towards the old. Similarly in line 56, it is not clear variable description (is it younger age or older age) etc. A simple revision to further clarify will be good for reader. Abstract alone should be clear and straightforward. In contrary, the second sentence in results is very clear.<br>Page 3, line 12-17. It is not clear if conclusion is truly reflecting results in the abstract. |

Introduction:
page 5, line 25 - 30. The references mentioned 11-13 and 14-16 do not seem to implicate the statements made. In other words, references are not clearly referring to those statements. Also in same page, line 51-56: sentence needs to be rewritten to be clear. ( The aim of this study is to investigate the characteristics of caregivers and their perceptions on knowledge about aging, attitude towards the elderly and their self-efficacy). The words 'identify their associated factors' is confusing.

Methods:
It might be relevant to include the survey in methods or in appendix/supplemental file to clarify survey questions.
Page 6, line 59, remove "were volunteer to"
Page 7, line 4-9.. it seems a flow diagram can be more easier for readers to quickly understand this sampling.
It is not clear how the nursing homes are selected, and how it was decided to choose how many caregivers from large and small nursing homes.
Also what is the definition of 'establishment staff'?
Page 12: Use consistent word "elderly" or "older people"

Discussion, Limitation and Conclusion:
I will recommend authors to carefully review the sentences/words with attention to grammar and spelling and rewrite. There are several grammar issues, and confusing words and sentences; as well as strong statements instead of just concluding what the survey revealed. The overall message, however, seems to be helpful in this field.

| REVIEWER | Amanda Thrift |
| | Monash University, Australia |
| REVIEW RETURNED | 04-Apr-2019 |

| GENERAL COMMENTS | Statistical review: |
| | 1. The authors should justify the use of ANOVA and regression to assess differences in the groups. This presumes that the measurements obtained are from an interval scale, i.e. that the difference between a score of 0 to 5 is the same as the difference between 15 to 20. It is unclear that these scales could be considered interval scales, and so some justification of the approach is required. |
| | 2. The authors stated that the data were normally distributed. What statistical test was used to determine normality, and how did the authors interpret the test? Please provide details. |
| | 3. The authors should provide more details on the "ENTER" approach to the modelling, and how they interpreted whether or not a variable should remain in the model. |
| | 4. The term 'multivariate' should be replaced with 'multivariable'. 'Multivariate' is used to describe an approach to multiple-outcome measures, whilst 'multivariable' is the process of adjusting for the effects of several explanatory variables at once, e.g. a multivariable linear regression. The authors have undertaken the latter analysis rather than the former, i.e. there is only one dependent variable in the one model. Please amend. |
| | 5. Table 2 should include 95% confidence limits as well as p-values. |
| | 6. In Table 2, it is unclear why each model (i.e. for each scale) includes the same independent variables. Clearly, there are some variables in each model that are not statistically significant, and I |

| | have concern that there may be overfitting of the model. It is important to note that each time a predictor is added into a regression model the r-square increases. With too many predictors, the model can represent random noise leading to overfitting of the model. To ensure that the appropriate terms are included in each model, the authors should assess residual plots or goodness of fit, and provide details of the approach used and the diagnostic outputs. |
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| REVIEWER | Melina Evripidou<br>Cyprus University of Technology<br>Cyprus |
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| REVIEW RETURNED | 18-Jun-2019 |

| GENERAL COMMENTS | Dear authors,<br>Your manuscript is of great importance in geriatric care. The originality and the reasons for conducting the study are very well presented. Although, some revisions need to be done in order to upgrade the manuscript:<br>The aim of the study in abstract is not illustrated as the aim in the main document.<br>Page 3 line 46 of China or other countries as well.<br>In the introduction section a conceptual approach of self—efficacy or/and perception would be beneficial.<br>Setting and sampling: Was a power analysis preceded? How the sample size was estimated for large and small nursing homes? How was data collection conducted? Where the questionnaires stored somewhere or were given to the researchers right after completion?<br>In the results section you mention a good point how missing data were handled, but I think it lacks reasons for non-participation in the study. A point to consider is if non-participation reveals possible negative attitudes.<br>Page 15 line 54 you need to specify how lower the level of knowledge was in contrast with other studies and needs references.<br>Page 17 line 46-47 needs further development. Please clarify how knowledge plays indirect role between attitude and self-efficacy.<br>Page 18 line 45 this is a good point that measures needs to be taken, but is very general. I think you should be more precise about what measures are needed and give some examples.<br>It is not clear how the study promotes research. I think you should develop a paragraph revealing how important your topic is for future research. As the manuscript deals with perceptions a good point would be to mention that future research should focus on qualitative methods in order to investigate the topic more deeply. |
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| REVIEWER | Pedro L. Pancorbo-Hidalgo<br>University of Jaen. Spain |
|---|---|
| REVIEW RETURNED | 30-Jun-2019 |

| GENERAL COMMENTS | In general, it is a research that provides an new interesting perspective on elderly care in China. It is a local sample, so the results should not be generalised for the whole country (China).<br><br>Literature review offers a good background for the topic. Methods are described in enough detail.<br><br>There are some minor questions to address: |
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| | 1- In Methods, more information about the caregivers is needed. These caregivers had training as health care providers and, if yes, hoy much time? Are there nurses within these caregivers? Are there nurses working in the Nursing Homes, in addition to the caregivers? These points are important for readers for other countries to understand the study. |
|---|---|
| | 2- Which is the criteria to include variables in the multivariate regression model? It is not clear in the text. Please , explain. |
| | 3- In table 2 (linear regression models) the percentage of variance explained by the models ($R^2$) appear to be very low (11%). So it should be another factors that account for most of the variance. This fact should be explained or discussed in Discussion, or consider it as limitation. |
| | 4- Discussion, the more negative attitude toward the elderly of the female caregivers than the male ones, is an unexpected finding. This could be an important point, due to cultural change, but maybe another causes. The potential explanation of this point that the authors offers seems to be weak. Perhaps it should be addressed just a little more. |

## VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: İlkim ÇITAK KARAKAYA
Institution and Country: Muğla Sıtkı Koçman University, TURKEY.
Please state any competing interests or state 'None declared': None declared.

Please leave your comments for the authors below
Dear Editor,
Thanks for asking me to review this paper on the knowledge, attitude and self-efficacy of elderly caregivers in Chinese nursing homes. I've completed my review and my recommendations/comments are as in the following:
1. English revision by a native speaker is strongly recommended, since some statements may be misunderstood (for example: With the acceleration of aging….?) and there are some grammatical and spelling mistakes in the text.
Response: thanks for this suggestion. Revised manuscript has been checked by our colleague working in the English-speaking country. We hope such revision can provide a better understanding for readers.

2. In the introduction section, the authors attempted to explain the traditional Chinese culture about the family-centered caregiving model for the elderly population, and to rationalize the increasing demands for the nursing homes and caregivers. It seems that Chinese and Turkish traditional cultures about the family-centered caregiving model for the elderly and the changing family structure dynamics resemble each other. Therefore, the authors may benefit from the information and findings given in a recently published study from Turkey in either/both introduction and discussion sections of their paper [Yenişehir S, Çıtak Karakaya İ, Karakaya MG. Knowledge and Practice of Nursing Home Caregivers about Urinary Incontinence. European Geriatric Medicine. 2019;10(1):99-105 (https://doi.org/10.1007/s41999-018-0129-0)].

Response: thanks for this suggestion. This published study provided some evidences supporting our findings, and was cited in the introduction and discussion sections (20th reference).

3. The accurate name of one of the scales used in this study should be "Kogan's Attitude Toward Old People Scale". Please use the same abbreviation for this measure throughout the paper (KAOP in page 7 or KOAP in page 8?).
Response: thanks, we corrected this abbreviation throughout the paper.

4. Please indicate if the scales used in this study are developed or may be used for the caregiver population.
Response: thanks for this suggestion. the scales used in this study are widely used scales, and their Chinese versions have good reliability and validity. Previous study showed these scales can be used for the caregiver population (page 7).

5. In page 8, line 33, it is not clear which references are cited, since there is no punctuation between the 17th and 25th reference numbers. Will it be "," or "-"? Also, this paragraph should be more clearly written, since some variables (the health status of the elderly) is not mentioned here, although they are given in table 1. The authors should reconsider if this variable is suitable to be presented in this table. Another question arising about this variable is that: according to which criteria were the elderly classified as complete/partial/with no disability?
Response: thanks for this question. In revised manuscript, we rewrote description of variables in the last of the last part of the questionnaire for a better understanding. About the health status of the elderly, it was assumed that this variable might have an influence on workload of caregivers. Perceived health status of the elderly (complete/partial/with no disability) from caregivers was investigated because our outcomes variables are also caregivers' perceptions (page 8).

6. The first paragraph of the data analysis section should be more clearly explained and given references.
Response: thanks for this suggestion. We further explained the calculation process and gave references (page 8-9).

7. In the second paragraph of the results section, only scores from the scales were presented. Please add statements about the interpretation of these scores (for example, high/low knowledge, positive/negative attitude, etc.)
Response: thanks for this suggestion. We rewrote this section (page 9).

8. The authors should indicate if the correlations found among the variables were low/moderate/high, by citing references. Also, in page 13, line 25, they should change "positive correction" as "positive correlation".
Response: thanks for this suggestion. This part was re-explained, and you can find it in page 13.

9. In the first paragraph of the discussion, the authors have stated that there was relatively low-level of knowledge, attitude and self-efficacy of caregivers in comparison with other countries or regions. They should give references for this statement. Also, there may be other countries/regions in which similar level of knowledge/attitude/self-efficacy exist in caregivers for the older people. The authors are recommended to review the literature and find out the relevant samples in order to improve their discussion about this statement.
Response: thanks for this suggestion. In revised manuscript, we provided some references to support our findings and further discussed our results after reviewing these references. (page 15)

10. The sample size was given as 403 in the results section, but it is written as 402 in the limitation section of the discussion. The authors should solve this conflict.
Response: thanks for this reminder. We corrected this mistake in the limitation. (page 17).

11. The limitations section of the paper is difficult to understand. Why the authors think that the variables (scales?) in their research are not comprehensive? If they are really not comprehensive and not suitable for use in this population; and also, if they think that the respondents might have not tell the truth by using a self-reporting questionnaire, why didn't the authors use different research methodologies other than questionnaires? They also say that "Further research considering other variables potentially influencing knowledge, attitude and self-efficiency of elderly caregivers would generate more insights". What are these "other variables"?
Response: thanks for this question. This statement means that independent variables in the model mainly contained demographics and working environment characteristics of caregivers, not involved in other factors about nursing homes, such as the number of employees and elderly in nursing home. We re-explained this limitation (page 17).

Reviewer: 2
Reviewer Name: Kamal Wagle
Institution and Country: Institute: Indiana University School of Medicine
City: Indianapolis
State: Indiana
Country: USA
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
First of all, I would like to thank authors for working on this very important topic.

Abstract:
Line 38-41: It is not clear how to interpret the scores. I will recommend it to be self explanatory.
Response: thanks for this question. We re-explained these scores in the abstract (page 2).

Page 2, Line 48-59: It will The second sentence in Results section of abstract is not clear. It does not tell which gender, what work experience (longer/shorter) is associated with negative associations with attitude towards the old. Similarly in line 56, it is not clear variable description (is it younger age or older age) etc. A simple revision to further clarify will be good for reader. Abstract alone should be clear and straightforward. In contrary, the second sentence in results is very clear.
Response: thanks for this suggestion. We rewrote the results section of abstract (page 2).

Page 3, line 12-17. It is not clear if conclusion is truly reflecting results in the abstract.
Response: thanks for this question. We rewrote the conclusion section of abstract (page 3).

Introduction:
page 5, line 25 - 30. The references mentioned 11-13 and 14-16 do not seem to implicate the statements made. In other words, references are not clearly referring to those statements. Also in same page, line 51-56: sentence needs to be rewritten to be clear. ( The aim of this study is to investigate the characteristics of caregivers and their perceptions on knowledge about aging, attitude towards the elderly and their self-efficacy). The words 'identify their associated factors' is confusing.

Response: thanks for this question. After checking references, we adjusted some references to support our statements (page 5). The aim of this study included: 1) measure perception of caregivers on knowledge, attitude and self-efficacy; 2) explore factors associated with these attributes. (page 5).

Methods:
It might be relevant to include the survey in methods or in appendix/supplemental file to clarify survey questions.
Response: thanks for this suggestion. In the measurement section, we described survey questions (page 7-9).

Page 6, line 59, remove "were volunteer to"
Response: thanks for this suggestion. We removed "were volunteer to"

Page 7, line 4-9. it seems a flow diagram can be more easier for readers to quickly understand this sampling.
Response: thanks for this suggestion. We draw a flow diagram for sample screening (page 7).

It is not clear how the nursing homes are selected, and how it was decided to choose how many caregivers from large and small nursing homes.
Also what is the definition of 'establishment staff'?
Response: thanks for this question. nursing homes were selected randomly in each sample area according to their organization code. Large and small nursing homes had approximately 100 and 60 caregivers, respectively. Therefore, we determined selected the half of caregivers in each nursing home (page 6).
The establishment staff refers to the formal employee. We provided some explanation in the section of measurement (page 8).

Page 12: Use consistent word "elderly" or "older people"
Response: thanks for this suggestion. We corrected this word (page 12).

Discussion, Limitation and Conclusion:
I will recommend authors to carefully review the sentences/words with attention to grammar and spelling and rewrite. There are several grammar issues, and confusing words and sentences; as well as strong statements instead of just concluding what the survey revealed. The overall message, however, seems to be helpful in this field.
Responds: thanks for this suggestion. In the revised manuscript, we checked our study carefully and rewrote some statements for a better understanding.

Reviewer: 3
Reviewer Name: Amanda Thrift
Institution and Country: Monash University, Australia
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
Statistical review:
1. The authors should justify the use of ANOVA and regression to assess differences in the groups. This presumes that the measurements obtained are from an interval scale, i.e. that the difference between a score of 0 to 5 is the same as the difference between 15 to 20. It is unclear that these scales could be considered interval scales, and so some justification of the approach is required.

Response: thanks for this question. Actually, we also conducted logistic regression analyses for sensitivity test by recoding the knowledge, attitude and self-efficiency scores into dichotomous variables (using average values as a cut-off point). We found a basically the same result as presented in the manuscript (page 9).

2. The authors stated that the data were normally distributed. What statistical test was used to determine normality, and how did the authors interpret the test? Please provide details.
Response: thanks for this question. We conducted Kolmogorov-Smirnov (K-S) test to determine whether knowledge, attitude and self-efficiency scores are normal distribution. The results that p-value of three variables exceed 0.10 indicated the data were normally distributed (page 9).

3. The authors should provide more details on the "ENTER" approach to the modelling, and how they interpreted whether or not a variable should remain in the model.
Response: thanks for this question. The "ENTER" approach were used for observing effect of all independent variables on outcome variables despite some variables were not statistically significant. Variables remaining in the model were supported by previous study (page 9). Therefore, the guidelines that independent variables should explain degree of variation of outcomes as much as possible did not take into account.

4. The term 'multivariate' should be replaced with 'multivariable'. 'Multivariate' is used to describe an approach to multiple-outcome measures, whilst 'multivariable' is the process of adjusting for the effects of several explanatory variables at once, e.g. a multivariable linear regression. The authors have undertaken the latter analysis rather than the former, i.e. there is only one dependent variable in the one model. Please amend.
Response: thanks for this suggestion. We corrected this word in revised manuscript.

5. Table 2 should include 95% confidence limits as well as p-values.
Response: thanks for this suggestion. We provided 95% CI in the table 2 and highlighted the variables with p-values less than 0.05 or 0.001.

6. In Table 2, it is unclear why each model (i.e. for each scale) includes the same independent variables. Clearly, there are some variables in each model that are not statistically significant, and I have concern that there may be overfitting of the model. It is important to note that each time a predictor is added into a regression model the r-square increases. With too many predictors, the model can represent random noise leading to overfitting of the model. To ensure that the appropriate terms are included in each model, the authors should assess residual plots or goodness of fit, and provide details of the approach used and the diagnostic outputs.
Response: thanks for this suggestion. In revised manuscript, we provided adjusted r-square to assess goodness of fit.


Reviewer: 4
Reviewer Name: Melina Evripidou
Institution and Country: Cyprus University of Technology, Cyprus
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
Dear authors,
Your manuscript is of great importance in geriatric care. The originality and the reasons for conducting the study are very well presented. Although, some revisions need to be done in order to upgrade the manuscript:
The aim of the study in abstract is not illustrated as the aim in the main document.

Response: thanks for this reminder. We rewrote the purpose of the study in abstract (page 2).

Page 3 line 46 of China or other countries as well.
Response: thanks for this suggestion. We corrected this statement (page 3).

In the introduction section a conceptual approach of self—efficacy or/and perception would be beneficial.
Response: thanks for this suggestion. We added some descriptions about self-efficacy in the introduction (page 5).

Setting and sampling: Was a power analysis preceded? How the sample size was estimated for large and small nursing homes?
Response: thanks for this question. α level (type I error rate) at 0.05 and β level (statistical power) at 0.8 were used to conduct a power analysis. We found sample size is enough large to establish the model. To capture representative sample, a half of caregivers in each nursing home were selected.

How was data collection conducted? Where the questionnaires stored somewhere or were given to the researchers right after completion?
Response: thanks for this question. We adopted a multistage sampling strategy for data collection. More details can be found in the page 6. The questionnaires were given to the researchers right after completion.

In the results section you mention a good point how missing data were handled, but I think it lacks reasons for non-participation in the study. A point to consider is if non-participation reveals possible negative attitudes.
Response: thanks for this reminder. A total of 320 caregivers refused to participate in our investigation. During the investigation, we recorded the reasons for non-participation. Overall, these people had on idea about purpose of our study or no time to participate the survey. Therefore, it is unknown whether non-participation reveals possible negative attitudes since the data of these people is not available.

Page 15 line 54 you need to specify how lower the level of knowledge was in contrast with other studies and needs references.
Response: thanks for this suggestion. We rewrote this statement and added some references (page 15).

Page 17 line 46-47 needs further development. Please clarify how knowledge plays indirect role between attitude and self-efficacy.
Response: thanks for this suggestion. We gave an explanation about correlations among knowledge, attitude and self-efficiency (page 17).

Page 18 line 45 this is a good point that measures needs to be taken, but is very general. I think you should be more precise about what measures are needed and give some examples.
It is not clear how the study promotes research. I think you should develop a paragraph revealing how important your topic is for future research. As the manuscript deals with perceptions a good point would be to mention that future research should focus on qualitative methods in order to investigate the topic more deeply.
Response: thanks for this suggestion. We developed a separated paragraph to discuss the implication from out study (page 18-19).

Reviewer: 5

Reviewer Name: Pedro L. Pancorbo-Hidalgo
Institution and Country: University of Jaen. Spain
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
In general, it is a research that provides a new interesting perspective on elderly care in China. It is a local sample, so the results should not be generalised for the whole country (China).

Literature review offers a good background for the topic. Methods are described in enough detail.

There are some minor questions to address:

1- In Methods, more information about the caregivers is needed. These caregivers had training as health care providers and, if yes, hoy much time? Are there nurses within these caregivers? Are there nurses working in the Nursing Homes, in addition to the caregivers? These points are important for readers for other countries to understand the study.
Response: thanks for this question. We provided some information about the elderly caregivers in China in page 6.

2- Which is the criteria to include variables in the multivariate regression model? It is not clear in the text. Please , explain.
Response: thanks for this question. The independent variables in the regression model mainly contained background characteristics of caregivers and their work environment. The reason for selection of these variables is based on previous study (page 9).

3- In table 2 (linear regression models) the percentage of variance explained by the models ($R^2$) appear to be very low (11%). So it should be another factors that account for most of the variance. This fact should be explained or discussed in Discussion, or consider it as limitation.
Response: thanks for this suggestion. In revised manuscript, we provided some explanation about this question in the limitation section (page 18).

4- Discussion, the more negative attitude toward the elderly of the female caregivers than the male ones, is an unexpected finding. This could be an important point, due to cultural change, but maybe another causes. The potential explanation of this point that the authors offers seems to be weak. Perhaps it should be addressed just a little more.
Response: thanks for this reminder. In addition to Chinese family culture, we think the gender discrimination in the workplace can also explain this result (page 16).


### VERSION 2 – REVIEW

| REVIEWER | Kamal Wagle<br>Indiana University School of Medicine<br>Indiana<br>USA |
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| REVIEW RETURNED | 01-Aug-2019 |

| GENERAL COMMENTS | I am glad to see that authors incorporated prior comments.<br><br>Two comments this time:<br>1. Page 3, conclusion of abstract, second sentence. It will be nice to actually state which factors needs intervention from authors perspective instead of a generalized statement. |
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| | 2. Page 28, figure 1. This certainly gives a clear picture of the sample screening process. Typo in first box needs correction. |
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| **REVIEWER** | Amanda Thrift |
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| | Monash Unviersity, Australia |
| **REVIEW RETURNED** | 19-Jul-2019 |

| **GENERAL COMMENTS** | Statistical review: |
|---|---|
| | 1. Previously I requested that the authors justify the use of ANOVA and regression to assess differences in the groups, as it appears that the measurements obtained are not obtained from an interval scale. The authors justify the approach by stating that a sensitivity analysis was conducted using logistic regression, and this provided the same results. However, they do not provide details of these results, and so readers are unable to verify that the interpretation of the results is the same using this approach. Please provide details of these results as a supplementary table, and include a sentence or two to discuss how these findings support (or otherwise) the conclusions. |
| | 2. Previously I requested that the authors provide more details on the "ENTER" approach to modelling, and how they interpreted whether or not a variable should remain in the model. The explanation provided in the manuscript is unclear. For example, "ENTER" is a jargon phrase and should be replaced with plain English language about the specifics of what was done. Please make sure that you use language that is clear to all readers, and not just to those who use the same statistical package. |
| | 3. Previously I requested that Table 2 should include 95% confidence limits as well as p-values. The authors have chosen to replace the p values with confidence intervals. Having both is preferable. Please amend. |
| | 4. I still have concerns that there may be overfitting of the model. For example, it is unclear why education level would be considered a covariate in the model for self-efficacy. To be more specific, please provide details of whether the model is correctly specified using model diagnostic techniques, such as plots of residuals against the covariates or the linear predictor. |
| | 5. This is a cross-sectional study, and so we cannot determine causation. Consequently, please replace the word "predictors" with "associated with" or some other similar phrase. |

| **REVIEWER** | Melina Evripidou |
|---|---|
| | PhD candidate |
| | Cyprus University of Technology |
| | Cyprus |
| **REVIEW RETURNED** | 18-Jul-2019 |

| **GENERAL COMMENTS** | Thank you for proceeding with the suggested changes. Just a comment to include the responses of the cover letter in the main document in order to be more comprehensive. |
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| **REVIEWER** | Pedro L. Pancorbo-Hidalgo |
|---|---|
| | Universidad de Jaen |
| | Spain |
| **REVIEW RETURNED** | 05-Aug-2019 |

| GENERAL COMMENTS | This revised version of the article has improved some of the issues raised in the first version, but also has a number of points to modify/clarify. |
|---|---|
| | Abstract. Pg 2. Results. The values for the 95%CI of the beta are incoherent, e.g. 0.827- 0.907 it is not possible to be a CI for beta= 0.232. All the values of 95%CI should be checked and corrected along the article. |
| | Introduction. Pg 5. Self-efficiency and self-efficacy are used in the text, which is confusing; it is better to use the same denomination consistently in the text. |
| | Pg. 5. Objectives. The sentence is not clear " perceptions of caregivers and associated factors…" perceptions of caregivers, about what? |
| | Method. Pg. 6. The authors say, " caregivers in Chinese NHs mainly include physicians, nurses and allied health workers." And also "..the caregivers who provided direct care for the elderly were eligible to participate in the investigation". This could be confusing. It seems that caregivers that have participated in the study were not physicians or nurses, but the first sentence is not clear. What is the meaning of "provided direct care" ? This exclude nurses and physicians? Please, revise this paragraph and clarify. |
| | Results. Pg. 13 and table 2. Some of the values for the 95%CI did not match between text and table 2 ( e.g. knowledge score: bachelor degree or above 0.827 – 0.907 in the text, and 0.027 – 0.907 in the table 2. What are the correct values? If the values in the table are correct, then the Confident Interval is so wide that the results (associations found) have a lot of uncertainty; and this should be take into account in the interpretation of these results. The same applies to attitude and self-efficacy scores. This is a major concern for all study findings and conclusions that threaten the authors' conclusions. |

**VERSION 2 – AUTHOR RESPONSE**

Reviewer(s)' Comments to Author:


Reviewer: 4

Reviewer Name: Melina Evripidou

Institution and Country:

PhD candidate

Cyprus University of Technology

Cyprus

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

Thank you for proceeding with the suggested changes. Just a comment to include the responses of the cover letter in the main document in order to be more comprehensive.

Response: thanks for this suggestion. We added the responses of the cover letter.


Reviewer: 3

Reviewer Name: Amanda Thrift

Institution and Country: Monash Unviersity, Australia

Please state any competing interests or state 'None declared': None declared


Please leave your comments for the authors below

Statistical review:

1. Previously I requested that the authors justify the use of ANOVA and regression to assess differences in the groups, as it appears that the measurements obtained are not obtained from an interval scale. The authors justify the approach by stating that a sensitivity analysis was conducted using logistic regression, and this provided the same results. However, they do not provide details of these results, and so readers are unable to verify that the interpretation of the results is the same using this approach. Please provide details of these results as a supplementary table, and include a sentence or two to discuss how these findings support (or otherwise) the conclusions.

Response: thanks for this suggestion. We conducted logistic regression analyses for sensitivity test by recoding the knowledge, attitude and self-efficacy scores into dichotomous variables (using average values as a cut-off point) and a supplementary table was provided in appendix 1.


2. Previously I requested that the authors provide more details on the "ENTER" approach to modelling, and how they interpreted whether or not a variable should remain in the model. The explanation provided in the manuscript is unclear. For example, "ENTER" is a jargon phrase and should be replaced with plain English language about the specifics of what was done. Please make sure that you use language that is clear to all readers, and not just to those who use the same statistical package.

Response: thanks. We provided two reasons about using the "ENTER" approach and explained this approach. More details can be found in page 9-10.


3. Previously I requested that Table 2 should include 95% confidence limits as well as p-values. The authors have chosen to replace the p values with confidence intervals. Having both is preferable. Please amend.

Response: thanks for this suggestion. We added the p-value in the table 2.

4. I still have concerns that there may be overfitting of the model. For example, it is unclear why education level would be considered a covariate in the model for self-efficacy. To be more specific, please provide details of whether the model is correctly specified using model diagnostic techniques, such as plots of residuals against the covariates or the linear predictor.

Response: thanks for this question. We think overfitting of the model did not happen because F-value, $R^2$ and adjusted $R^2$ indicated models had an acceptable fit. In addition, we used plots of residuals against the covariates to observe relationship between independent and dependent variables. For example, the relationship between standardized residuals of self-efficacy scores and education level was presented (attached file "response"). All points ranged from -2 to 2 and were evenly distributed around 0. This indicated that there was a linear relationship between education level and self-efficacy scores.

5. This is a cross-sectional study, and so we cannot determine causation. Consequently, please replace the word "predictors" with "associated with" or some other similar phrase.

Response: thanks. We replaced the word "predictors".

Reviewer: 2

Reviewer Name: Kamal Wagle

Institution and Country:

Indiana University School of Medicine

Indiana

USA

Please state any competing interests or state 'None declared': none declared

Please leave your comments for the authors below

I am glad to see that authors incorporated prior comments.

Two comments this time:

1. Page 3, conclusion of abstract, second sentence. It will be nice to actually state which factors needs intervention from authors perspective instead of a generalized statement.

Response: thanks for this suggestion. We rewrote this sentence.

2. Page 28, figure 1. This certainly gives a clear picture of the sample screening process. Typo in first box needs correction.

Response: thanks. We corrected this word (figure 1).

Reviewer: 5

Reviewer Name: Pedro L. Pancorbo-Hidalgo

Institution and Country:

Universidad de Jaen

Spain

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

This revised version of the article has improved some of the issues raised in the first version, but also has a number of points to modify/clarify.

Abstract. Pg 2. Results. The values for the 95%CI of the beta are incoherent, e.g. 0.827- 0.907 it is not possible to be a CI for beta= 0.232. All the values of 95%CI should be checked and corrected along the article.

Response: thanks for this reminder. We corrected this mistake and other values were also checked.

Introduction. Pg 5. Self-efficiency and self-efficacy are used in the text, which is confusing; it is better to use the same denomination consistently in the text.

Response: thanks. We corrected this word and used "self-efficacy" throughout the manuscript.

Pg. 5. Objectives. The sentence is not clear " perceptions of caregivers and associated factors…" perceptions of caregivers, about what?

Response: thanks. We rewrote this sentence (page 1). This study aimed to investigate the perceptions of caregivers on knowledge about aging, attitude toward the elderly and self-efficacy, and their associated factors.

Method. Pg. 6. The authors say, " caregivers in Chinese NHs mainly include physicians, nurses and allied health workers." And also "..the caregivers who provided direct care for the elderly were eligible to participate in the investigation". This could be confusing. It seems that caregivers that have participated in the study were not physicians or nurses, but the first sentence is not clear. What is the

meaning of "provided direct care" ? This exclude nurses and physicians? Please, revise this paragraph and clarify.

Response: thanks for this question. Caregivers in this study obviously included physicians or nurses. "provided direct care" refers to those caregivers who had direct contact with the elderly in selected nursing homes. We revised this description about eligible participants (page 6).

Results. Pg. 13 and table 2. Some of the values for the 95%CI did not match between text and table 2 ( e.g. knowledge score: bachelor degree or above 0.827 – 0.907 in the text, and 0.027 – 0.907 in the table 2. What are the correct values? If the values in the table are correct, then the Confident Interval is so wide that the results (associations found) have a lot of uncertainty; and this should be take into account in the interpretation of these results. The same applies to attitude and self-efficacy scores. This is a major concern for all study findings and conclusions that threaten the authors' conclusions.

Response: thanks for this question. We corrected this mistake and checked other 95%CI in the text. There are two reasons for such wide Confident Interval. First, the mean for knowledge, attitude and self-efficacy scores were so large, such as mean and SD of attitude scores reached up to $127.85 \pm 14.36$. this reason can result in such wide Confident Interval. Second, a small sample size (403) also created an effect on the width of confidence interval. We discussed this point in the limitation.

In order to test the certainty of results, we conducted logistic regression analyses for sensitivity test by recoding the knowledge, attitude and self-efficacy scores into dichotomous variables (appendix 1). The results from sensitivity test also supported our findings.

**VERSION 3 – REVIEW**

| REVIEWER | Amanda Thrift<br>Monash University, Australia |
|---|---|
| REVIEW RETURNED | 15-Sep-2019 |

| GENERAL COMMENTS | Statistical review:<br>1. Previously I requested that the authors justify the use of ANOVA and regression to assess differences in the groups, as it appears that the measurements obtained are not obtained from an interval scale. The authors justify the approach by providing the results of a sensitivity analysis using logistic regression. They should also include a sentence or two in the limitations section to state that "As the outcome measurement is not on an interval scale, there may be concern about using linear regression in the main analyses. However, we obtained similar results in a sensitivity analysis using logistic regression with a cut point at the mean for each score, and so this provides some support for the approach used." or similar.<br>2. I had previously requested details of the model diagnostic techniques used, such as plots of residuals against the covariates or the linear predictor. The authors state that they provided plots between standardized residuals of self-efficacy scores and education level. However, these details were not available to me. I suggest including this as part of your online supplementary material, so that all readers have an opportunity to view these details. |

| | 3. In the abstract and main results, the authors use the term "improved health status" to indicate a positive health status for the elderly: ($\beta$=0.290, 0.447; 95% CI: 0.059 to 2.700 and 0.053 to 1.211). It is unusual to combine two effect sizes in this manner. In addition, the term "improved" is suggestive of a change in health status. As this is a cross-sectional study the term "better health status would be more appropriate. I also suggest separating out these two effect sizes and 95% confidence limits in the sentence into "partial disability" and "no disability". |
|---|---|
| | 4. The tables (in the manuscript and online material) include categories of "50≤" and "7≤". These should read "≥50" and "≥7". Please amend. |

| **REVIEWER** | Pedro L. Pancorbo-Hidalgo<br>University of Jaen<br>Spain |
|---|---|
| **REVIEW RETURNED** | 13-Sep-2019 |

| **GENERAL COMMENTS** | The authors have corrected some of the mistakes identified in the previous version of the manuscript.<br><br>However, There are too strong conclusions that are not fully supported by data and results.<br><br>1- Authors have included a sentence in page 19 , Limitations, stating that small sample affected the width of Confidente Interval of the beta coeficients. But N= 403 is not too small, and they should consider that it is possible that the true associations were different. For example, the effect of Education level on Knowledge score, beta is 0.232 ( which is a moderate association), but it could be as low as 0.027 (so this factor is not associated) or as high as 0.907 (so this factor is strongly associated). This means that these results have a largue degree of uncertainty, so interpretation need to be more cautious. In results and discussion sections , not just put a word in limitations.<br><br>2- In pag 20 , in Conclusions section, there are several statements that are not conclusions based in findings of the study, but are ideas or proposals of the authors (but in fact not supported by data). The paragraph starting from " Firstly, professional training for aged care should be conducted to improve the knowledge..." are not conclusions; perhaps these 3 ideas should be placed within the discussion and make clear that they are hypotesis or interventions that should be tested in further studies.<br><br>Conclusions should be clear about the aim of the study "perceptions of the caregivers on knowledge about aging, attitude toward the elederly adn self-efficacy, and what factors are associated". Please, revise. |
|---|---|

**VERSION 3 – AUTHOR RESPONSE**

Reviewers' Comments to Author:

Reviewer: 5
Reviewer Name: Pedro L. Pancorbo-Hidalgo

Institution and Country: University of Jaen, Spain
Please state any competing interests or state 'None declared': None declared

The authors have corrected some of the mistakes identified in the previous version of the manuscript.

However, There are too strong conclusions that are not fully supported by data and results.

1- Authors have included a sentence in page 19 , Limitations, stating that small sample affected the width of Confidente Interval of the beta coeficients. But N= 403 is not too small, and they should consider that it is possible that the true associations were different. For example, the effect of Education level on Knowledge score, beta is 0.232 ( which is a moderate association), but it could be as low as 0.027 (so this factor is not associated) or as high as 0.907 (so this factor is strongly associated). This means that these results have a largue degree of uncertainty, so interpretation need to be more cautious. In results and discussion sections , not just put a word in limitations.
Response: thanks for this suggestion. In order to make our results to be more stable, 500 bootstrapping replications were used to correct bias. Of course, we also added some explanations in the results (page 13-14) and discussion section (page 17-18) for those results still with wide confidence interval, for example, the association between knowledge scores and pre-training.

2- In pag 20 , in Conclusions section, there are several statements that are not conclusions based in findings of the study, but are ideas or proposals of the authors (but in fact not supported by data). The paragraph starting from " Firstly, professional training for aged care should be conducted to improve the knowledge..." are not conclusions; perhaps these 3 ideas should be placed within the discussion and make clear that they are hyphotesis or interventions that should be tested in further studies.
Response: thanks for your suggestion. We revised this section and moved some ideas into the discussion section following analysis of professional training and employment type (page 18-19).

Conclusions should be clear about the aim of the study "perceptions of the caregivers on knowledge about aging, attitude toward the elederly adn self-efficacy, and what factors are associated". Please, revise.
Response: thanks for this suggestion. We rewrote the conclusion according to your suggestion (page 20).

Reviewer: 3
Reviewer Name: Amanda Thrift
Institution and Country: Monash University, Australia
Please state any competing interests or state 'None declared': None declared

Statistical review:
1. Previously I requested that the authors justify the use of ANOVA and regression to assess differences in the groups, as it appears that the measurements obtained are not obtained from an interval scale. The authors justify the approach by providing the results of a sensitivity analysis using logistic regression. They should also include a sentence or two in the limitations section to state that "As the outcome measurement is not on an interval scale, there may be concern about using linear regression in the main analyses. However, we obtained similar results in a sensitivity analysis using logistic regression with a cut point at the mean for each score, and so this provides some support for the approach used." or similar.
Response: thanks very much for your suggestion. We added these statements in the limitations (page 20).

2. I had previously requested details of the model diagnostic techniques used, such as plots of residuals against the covariates or the linear predictor. The authors state that they provided plots

between standardized residuals of self-efficacy scores and education level. However, these details were not available to me. I suggest including this as part of your online supplementary material, so that all readers have an opportunity to view these details.

Response: thanks for this suggestion. We provided plots of residuals against the covariates to assess the fitness of the regression models in Supplementary Figure.

3. In the abstract and main results, the authors use the term "improved health status" to indicate a positive health status for the elderly: ($\beta$=0.290, 0.447; 95% CI: 0.059 to 2.700 and 0.053 to 1.211). It is unusual to combine two effect sizes in this manner. In addition, the term "improved" is suggestive of a change in health status. As this is a cross-sectional study the term "better health status would be more appropriate. I also suggest separating out these two effect sizes and 95% confidence limits in the sentence into "partial disability" and "no disability".

Response: thanks for your suggestion. We revised main results in the abstract (page 2).

4. The tables (in the manuscript and online material) include categories of "50≤" and "7≤". These should read "≥50" and "≥7". Please amend.

Response: sorry for this mistake, we have revised it.

**VERSION 4 – REVIEW**

| REVIEWER | Amanda Thrift<br>Monash University |
|---|---|
| REVIEW RETURNED | 21-Oct-2019 |

| GENERAL COMMENTS | The authors have addressed my concerns. |
|---|---|

| REVIEWER | Pedro L. Pancorbo-Hidalgo<br>University of Jaen (Spain) |
|---|---|
| REVIEW RETURNED | 08-Oct-2019 |

| GENERAL COMMENTS | The authors have improved the manuscript. All the comments and suggestions have been fully adressed. |
|---|---|