PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Utilization Willingness for Institutional Care by the Elderly: A Comparative Study of Empty Nesters and Non-empty Nesters in Shandong, China
AUTHORS	Qian, Yangyang; Qin, Wen; Zhou, Chengchao; Ge, Dandan; Zhang, Li; Sun, Long

VERSION 1 – REVIEW

REVIEWER	Zhiyong Lin University of Maryland, College Park, United States
REVIEW RETURNED	21-Mar-2018

GENERAL COMMENTS	1. This manuscript is generally well-structured and may fill an important gap in the literature. The authors collected data in Shandong Province, China (2011-2012, N=3923), and used a series of binary logistic models to examine factors associated with older adults' willingness for institutional care. They found that elders living away from children were more likely to think about institutional care than those living with children, and other factors associated with this willingness also varied across current living arrangement. 2. The introduction part is generally well-written, but more work need to be done on literature review of changes in family elderly support in China and research on institutional care. - For elderly support in China, this study has talked about changes in the availability of children's support from the perspective of decreasing fertility and increasing mobility. The authors should also talk about changing cultures in intergenerational relations in China (e.g, Croll, 2006; Lin & Pei, 2016). Traditional culture of filial piety is actually challenged by younger generation and thus elderly support is no longer considered to be as an unconditional obligation by adult children. - Some more discussion on the increasing institutionalization of older adults in China (e.g., Peng & Wu, 2015) and how it may be related to increasing need to eldercare (Cheng, Rosenberg, Wang, Yang, & Li, 2012) may be helpful to justify why studying institutional care willingness matters in the context of population aging in China and how the the availability of family support and need of older adults may be related to that. Reference: Cheng, Y., Rosenberg, M. W., Wang, W., Yang, L., & Li, H. (2012). Access to residential care in Beijing, China: making the decision to relocate to a residential care facility. Ageing & Society, 32, 1277–1299. Croll, E. J. (2006). The intergenerational contract in the changing Asian family. Oxford Development Studies, 34(4), 473–491. Lin, Z., & Pei, X. (2016). Intergenerational exchange of resources

	and elderly support in rural China. International Journal of Aging and Human Development, 83(2), 108–127. Peng, R., & Wu, B. (2015). Changes of Health Status and Institutionalization among Older Adults in China. Journal of Aging and Health, 27(7), 1223–1246. 3. The method part clearly states most variables and methods included in the paper. - One limitation of this study concerns with the generalization of the findings from this study. As the authors also mentioned in the discussion part, Shandong province is a relatively conservative region, and thus the results of this study may not be generalized to other parts of the China. The authors should at least mention it in the limitation part. - How to deal with childless elders? What's the proportion of them? If they were included in the sample, how to measure their relationship with children? 4. Results part need more clarification and revisions. - One page 10, line 14, "at the ages of 60 and 69" should be "between the ages of 60 and 69". - In tables, the first category of education is illiteracy or semiliterate while in the methods part it is illiteracy (p. 8). Please be consistent. - The tile of Table 2 should be "Association of willingness for institutional care…". - In Figure 1, please be consistent on reporting digits after the decimal point, for example, 10.60% should be 10.6%. - In Table 3-5, why using "Univariate analysis" rather than multivariate logistic models? Page 10 line 49, what is the "multi-logistic analysis" here? I guess the authors may mean the multivariate logistic analysis? If significance of variables is consistent in multivariate models, why use univariate models (considering their weakness in controlling for covariates)? Also, what are the final two columns in the Table 3-5 showing? For example, in Table 3, rural older adults are more likely to think about institutional care (OR = 0.365), then what the 0.304 means here? - In Table 4, those report POOR relationships with children are more willing to choose institutional care, not "normal relationship" in the manuscript (page 10, line 55-56). 5. There are some problems in the citations across the paper. For example, on page 6, line 14, "(Nations, 2011)" should be "United Nations, 2011" or "UN, 2011". 6. There are a lot of typos need to be addressed, even in the abstract (page 3, line

REVIEWER	Colin Reid University of British Columbia - Okanagan campus, Canada
REVIEW RETURNED	22-Mar-2018

GENERAL COMMENTS	This study seeks to understand the influence of living arrangement (empty nester single, empty nester couple, and non-empty nester) on the propensity of a senior (60+) to be agreeable to eventual institutionalization in Shandong, China. The effects of potential additional determinants such as geographic region (rural or urban), gender, education and several other factors are also estimated in binary logistic regression equations. A fairly large sample consisted of almost 4,000 participants. Primary results show that empty nesters are more likely to be willing to be institutionalized. Other significant results, such as differences between willingness of rural

	and urban residents and between those with more and fewer children, among others, are noted. This is an interesting study that makes use of a larger-than-usual sample to assess relationships in these populations. This research has the potential to contribute to knowledge in this area. I have several comments. This manuscript requires further grammatical work. For example, "willingness to be institutionalized" is referred to in several variations. One phrase or term should be introduced and then referred to using an acronym throughout. And I'm not convinced that "willingness" as a keyword is useful. Also, people are referred to in the introduction in both "number" and "amount". Amount should not be used to refer to the number of people. There are a number of other grammatical shortcomings that should be addressed. The first statement in the introduction states that China entered the aging society in 1999. It is unclear what this means. Was this study guided by theory? If yes, this should be explained. If not, this should also be explained briefly. Methods: "districts and counties in Shandong province were stratified into three groups on the ground of GDP." Explain further. Data collection, lines 11-16: What is the procedure following quality supervisor end-of-day questionnaire checks? Do they return to the field to complete missing data? Do they discard questionnaires with missing data? What is the specific purpose(s) of the quality checks? Variables and measures, line 26: Willingness to institutionalize is identified as the independent variable, but is actually the dependent variable. Numeric coding for each variable in the study should be identified. For example, gender is coded male vs female but the numeric coding in now provided. This information is needed to interpret the statistical analyses. The authors may consider adding a tables that summarizes this information for all variables, if allowed by BMJ Open. Statistical analysis, line 50: Please be more specific with the alpha level that determines statistical significance. Here, an alpha of .05 is given but in the results we see that a p-value of exactly .05 is calculated for set of two variables (page 8, line 47: "Empty-nest singles who had greater psychological stress (p=0.050)…). Did the authors mean that their alpha is less than or equal to .05? Clarification is needed. Were the assumptions for logistic regression satisfied? – independence of observations, lack of multicollinearity, independent variables related to log odds? In the first paragraph of the results, K10 scores are presented as 15.8+/- 6.0 and per capita living space as 33.9 +/- 23.1. Are these means and confidence limits or means and standard deviations? The discussion and conclusion are well done and relevant.

VERSION 1 – AUTHOR RESPONSE

-Reviewer 1

1. This manuscript is generally well-structured and may fill an important gap in the literature. The authors collected data in Shandong Province, China (2011-2012, N=3923), and used a series of binary logistic models to examine factors associated with older adults' willingness for institutional care. They found that elders living away from children were more likely to think about institutional care than those living with children, and other factors associated with this willingness also varied across current living arrangement.

> **Response:** Thank you very much for your careful read, your helpful comments, and kind words.

2. The introduction part is generally well-written, but more work need to be done on literature review of changes in family elderly support in China and research on institutional care.

> **Response:** Many thanks to the reviewer for the helpful comments.

- For elderly support in China, this study has talked about changes in the availability of children's support from the perspective of decreasing fertility and increasing mobility.

The authors should also talk about changing cultures in intergenerational relations in China (e.g, Croll, 2006; Lin & Pei, 2016). Traditional culture of filial piety is actually challenged by younger generation and thus elderly support is no longer considered to be as an unconditional obligation by adult children.

> **Response:** A good point! Many thanks to the reviewer for telling us the point that can strengthen the background of this study and also the recommendation for the references. In response, we have added this point in the Introduction section and also the two publications into the Reference section(See the reference list below). The new paragraph now reads as follows:

> > "Traditionally, taking care of the elderly by adult children in the family was a basic norm in the Confucian doctrine (Liu and Sun, 2015). In recent years, increased geographic mobility and reduced family size due to one-child policy have made more adult children unavailable for elder care (Zhan et al., 2006b).**Actually, inter-generational relations are also changing, thus elderly support is no longer considered to be an absolute obligation by adult children (Croll, 2006; Lin & Pei, 2016).** More women in urban China are gaining higher education and becoming more work-oriented which indicate that gender roles in elder care are changing and the availability of

elder care by adult children has become questionable (Zhan and Montgomery, 2003).On the other hand, with Chinese baby boomers approaching retirement age, informal care such as familial care is unlikely to meet the needs of all seniors (Zhan et al., 2006a). One study indicated that nearly half of seniors, who needed some level of assistance in their activities of daily living or instrumental activities of daily living, actually lived alone instead of living with their adult children (Zhan and Montgomery, 2003). Another study found that many seniors expressed preference to live alone or with their spouse, if housing and health status permit (Xu, 1994). Consequently, institutional care has been strongly promoted to

meet older adults' long-term care needs (Chou, 2010)."

"References

Croll E. The Intergenerational Contract in the Changing Asian Family.

Oxford Development Studies. 2006;34(4):473-91.

Lin Z, Pei X. Intergenerational exchange of resources and elderly support in rural China. International Journal of Aging and Human Development. 2016;83(2):108-27."

- Some more discussion on the increasing institutionalization of older adults in China (e.g., Peng & Wu, 2015) and how it may be related to increasing need to eldercare (Cheng, Rosenberg, Wang, Yang, & Li, 2012) may be helpful to justify why studying institutional care willingness matters in the context of population aging in China and how the the availability of family support and need of older adults may be related to that.

Response: Many thanks for your helpful comments, and we are happy to follow. In response, we have added the point in the Introduction section, and the recommended publications in the Reference section(See the reference list below). The new paragraph now reads as follows:

"After the welfare reform in 1990s, former government-sponsored nursing homes have become decentralized, and a great amount of private nursing homes is on the rise, mostly emerging in large cities (Zhan et al., 2006b). Previous studies have identified the empty-nest elderly's attitudes towards institutional care and its predictors. **Some studies found that the rate of institutionalization of Chinese elderly was on the rise rapidly, which might be due to elderly's increasing need for institutional care (Cheng**

et al, 2012; Peng & Wu, 2015) . Another study found that the seniors' living arrangements prior to elder home placement and their assessment of the cost involved for such care were related to seniors' willingness to stay in elder homes (Guan et al., 2007). Some other studies found that factors including gender, educational attainment, occupation, health insurance, number of children were associated with willing for institutional care among the empty-nest seniors(Chen 2015; Xie et al., 2010; Zhu et al., 2017). However, few of such studies were published in international journals. Moreover, the studies described earlier have some systematic weaknesses. First, almost all of the empirical studies were based on small sample sizes (e.g.,n=523 in the case of Xie et al.; n=570 in the case of Chen et al.; n=1000 in the case of Zhu et al.)(Chen 2015; Xie et al., 2010; Zhu et al., 2017). Second, in many studies it is not clear who is serving as the reference group. In other words, the asscіated factors were only explored in the empty-nest seniors(Chen 2015; Xie et al., 2010; Zhu et al., 2017)."

"References:

Peng R, Wu B. Changes of Health Status and Institutionalization Among Older Adults in China. Journal of Aging and Health. 2015;27(7):1223-46.

Cheng Y, Rosenberg M, Wang W, Yang L, Hairong L. Access to residential care in Beijing, China: making the decision to relocate to a residential care facility. . Ageing & Society. 2012;32(8):1277-99."

3. The method part clearly states most variables and methods included in the paper.

- One limitation of this study concerns with the generalization of the findings from this study. As the authors also mentioned in the discussion part, Shandong province is a relatively conservative region, and thus the results of this study may not be generalized to other parts of the China. The authors should at least mention it in the limitation part.

Response: Thanks a lot to the reviewer for the helpful comments. We agree with the reviewer that Shandong is rather a conservative province, and the results cannot be generalized to other parts of China. In response, we have added this point into the Limitation section. The new paragraph now reads as follows:

"This study has a large size of the sample (nearly 4000), which is much larger than that used in most of the similar studies. This give the study a high degree of statistical power. This study has some limitations. Firstly, our study has a cross-sectional design and the result could not be interpreted as cause and effect. Secondly, all data were based on self-reported measures which could lead to recall biases. Thirdly, even though we have included

some variables of social support in this study (e.g., living arrangements of the elderly households, number of the children and relationship with children) , we have not yet used a scale to measure social support of the seniors, which would be remedied in the future study. **Finally, our investigation is conducted in Shandong province,which is rather a conservative region, thus the results of our study may not be generalized to other parts of China.**"

- *How to deal with childless elders? What's the proportion of them? If they were included in the sample, how to measure their relationship with children?*

Response: A good catch! Actually, the proportion of childless elders in our study is 1.7%, which is very small. When we conducted the survey, for those childless elders, we asked the respondents about the relationships with their nephews or nieces. In this round of revision, the authors conducted a group discussion about this comment, and reached an agreement that using the relationships with nephew or niece as a proxy for the relationships with children is not very suitable, and decided to regard the relationships with children for those childless elders as missing data, then to reanalyze the data. In response, we have analyzed the data again and presented the outputs in the Tables in the revised version of the manuscript.

4. Results part need more clarification and revisions.

- *One page 10, line 14, "at the ages of 60 and 69" should be "between the ages of 60 and 69".*

Response: Thank you so much for your comments. We've changed "*at the ages of 60 and 69*" into "*between the ages of 60 and 69*". The new sentence now read as follows:

"Generally speaking, the majority of the elderly were female (53.6%), between the ages of 60 and 69 (65.5%), illiterate or semiliterate (44.5%), farmers (64.2%), couple (79.1%), having 0 to 3 children

(67.4%), having good or normal relationship with children (92.8%), rural (54.9%), having good self-reported health status (52.1%), having mild dysfunction (72.7%), and having NCDs (65.9%)."

- *In tables, the first category of education is illiteracy or semiliterate while in the methods part it is illiteracy (p. 8). Please be consistent.*

Response: A lot of thanks for your comments. We've changed "illiteracy" into "illiteracy or semiliterate". The new sentence now read as follows:

"Other demographic characteristics were classified as follows: gender (male vs. female), education (illiteracy or semiliterate, primary school and junior school or above), past occupation (farmer vs. others), marital status (single vs. couple), number of children (0-3 vs. >3), relationship with children (good vs. bad), residence (urban vs. rural),

self-reported health status (good vs. normal), ADL (Ⅰ, Ⅱ and Ⅲ),

NCDs in the past six months (yes vs. no) and household income (Q1, Q2, Q3 and Q4)."

- *The tile of Table 2 should be "Association of willingness for institutional care…".*

Response: Many thanks for your comments. The title of Table 2 has been

changed into "Association of willingness for institutional care composition in Shandong, China".

- *In Figure 1, please be consistent on reporting digits after the decimal point, for example, 10.60% should be 10.6%.*

Response: Thank you so much for your careful read. Have done!

- *In Table 3-5, why using "Univariate analysis" rather than multivariate logistic models? Page 10 line 49, what is the "multi-logistic analysis" here? I guess the authors may mean the multivariate logistic analysis? If significance of variables is consistent in multivariate models, why use univariate models (considering their weakness in*

controlling for covariates)? Also, what are the final two columns in the Table 3-5 showing? For example, in Table 3, rural older adults are more likely to think about institutional care (OR = 0.365), then what the 0.304 means here?

Response: Many thanks for your helpful comments. Yes, "multi-logistic analysis here is "multivariate logistic analysis". In response, here, we have replaced "multi-

logistic analysis" with "multivariate logistic analysis" in the revised version of manuscript, and the new paragraph now reads as follows:

> "Table 3 showed the factors assoicated with willingness for institutional care among empty-nest singles. Univariate analysis indicated that empty-nest singles who were from rural areas (p=0.000) had lower willingness for institutional care. Empty-nest singles who had greater psychological stress (p=0.050) had higher willingness for institutional care. Multivariate logistic analysis also showed that the two factors were associated with willingness for institutional care."

In this study, we used two models to identify factors associated with willingness of institutional care among different types of the seniors. Firstly, we used univariate logistic regression model to explore those single factors associated with willingness of institutional care. Secondly, only those identified factors were included in the final mutli-variate logistic regression model to controll for covariates, so as to explore the factors associated with willingness of institutional care. Thus, we used univariate models just to determine which variables would be included in the multivariate logistic models. ORc means crude odds ratio, which presented the results of univariate models. ORa means adjusted odds ratio, which was presented in the last two columns in the Table 3-5, showed the results of the multivariate logistic models. In response, we have edited the "Statistical Analysis" to make it more clearly. The new paragraph of "Statistical Analysis" now reads as follows:

> "The data was double entered and checked using EpiData 6.04. Statistical analyses were performed using SPSS 21.0. For continuous variables, p value was calculated using Student's t test or F-test; for categorical variables, p value was calculated using chi-square test. Two binary logistic regression models were employed to assess the association between living arrangements of elderly households and willingness of institutional care. We used univariate logistic regression model and mutli-variate logistic regression model to explore the factors associated with willingness of institutional care. All reported CIs were calculated at the 95% level. Statistical significance was set at the 5% level."

- In Table 4, those report POOR relationships with children are more willing to choose institutional care, not "normal relationship" in the manuscript (page 10, line 55-56).

Response: Thank you so much for your advice. We've added a new table to present numeric coding in the paragraph.So now the paragraph read as follows:

> "As shown in Table 4, univariate analysis showed that those empty-nest couples who had higher education level, who were not farmers (p=0.000), who had poor relationship with children (p=0.013), who had higher household income were more willing for institutional care."

5. There are some problems in the citations across the paper. For example, on page 6, line 14, "(Nations, 2011)" should be "United Nations, 2011" or "UN, 2011".

Response: Many thanks for your suggestion. "Nations, 2011" has been changed into"UN, 2011".

6. There are a lot of typos need to be addressed, even in the abstract (page 3, line 39-41). Please read paper VERY carefully for several times to address all typos across the paper.

Response: Thank you so much for your comments. We've read paper very carefully and tried our best to address the typos in this paper throughout the paper.

-Reviewer 2

1.This study seeks to understand the influence of living arrangement (empty nester single, empty nester couple, and non-empty nester) on the propensity of a senior (60+) to be agreeable to eventual institutionalization in Shandong, China. The effects of potential additional determinants such as geographic region (rural or urban), gender, education and several other factors are also estimated in binary logistic regression equations. A fairly large sample consisted of almost 4,000 participants. Primary results show that empty nesters are more likely to be willing to be institutionalized. Other significant results, such as differences between willingness of rural and urban residents and between those with more and fewer children, among others, are noted.

This is an interesting study that makes use of a larger-than-usual sample to assess relationships in these populations. This research has the potential to contribute to knowledge in this area. I have several comments.

Response: Thank you very much for your careful read, your helpful comments, and kind words for our revision. And we hope we can address all of your concerns in this round of revision.

2.This manuscript requires further grammatical work. For example, "willingness to be institutionalized" is referred to in several variations. One phrase or term should be introduced and then referred to using an acronym throughout. And I'm not convinced that "willingness" as a keyword is useful. Also, people are referred to in the introduction in both "number" and "amount". Amount should not be used to refer to the number of people. There are a number of other grammatical shortcomings that should be addressed.

Response: Many thanks for your comments, and we are happy to follow. In response, we have read carefully throughout the manuscript and polished it again.

3.The first statement in the introduction states that China entered the aging society in

1999. It is unclear what this means.

Response: A good point, and we have to say sorry for the confusion. Here, the aging society means that the percentage of the seniors aged 60 or over among the general population in China has reached more than 10%. In response, we have edited the first sentence to make it more clearly. The new sentence now reads as follows:

"Since 1999, the proportion of the seniors aged 60 and above among the general population in China has reached more than 10%, the amount of aging population in China has ranked the first in the world (Aging, 2006)."

4.Was this study guided by theory? If yes, this should be explained. If not, this should also be explained briefly.

Response: Thank you so much for your comments. Our study is an empirical study, and it is not guided by theory. We've explained it briefly in the last paragraph in the Introduction section. The new paragraph now reads as follows:

"After the welfare reform in 1990s, a great number of private nursing homes is on the rise, mostly emerge in large cities [7]. One study found that the rate of institutionalization of Chinese elderly is on the rise rapidly which may be related to elderly's increasing need for institutional care is on the rise.[13, 14] Previous studies have demonstrated the elderly's attitudes towards institutional care and its predictors. One study found that the seniors' living arrangements and their assessment of the cost involved for elder care were related to seniors' willingness to stay in elder care homes [15]. Another study found that elders' knowledge about elder care homes were positively associated with their willingness for institutional care [16].A previous study

showed that the empty-nest elderly, in comparison with their counterparts, had less social support and caring networks [17, 18] which indicates that more attention should be paid to such people. However, no studies have examined empty-nesters' attitudes and preferences towards institutional care. To remedy this situation, the present study aims to compare utilization willingness of institutional care between empty-nest and non-empty-nest seniors in China. To do so, we have following specific objectives. First, we will compare the willingness for institutional care between empty-nest and non-empty nest elderly. Second, we will identify the associated factors for institutional care among the empty-nest and non-empty-nest elderly. Our study is an empirical study and it's not guided by theory."

5.Methods: "districts and counties in Shandong province were stratified into three groups on the ground of GDP." Explain further.

Response: Thank you so much for your comments, and we have to say sorry we have not yet explained the sampling process clearly. In response, we have added some information to try our best to explain this more clearly. The new sentence now reads as follows:

"Firstly, all districts and counties in Shandong province were stratified into three groups on the ground of GDP per capita (2011) separately (high, middle and low GDP per capita). "

6.Data collection, lines 11-16: What is the procedure following quality supervisor end-of-day questionnaire checks? Do they return to the field to complete missing data? Do they discard questionnaires with missing data? What is the specific purpose(s) of the quality checks?

Response: Thank you so much for your comments. We have to say sorry for the confusion. When conducting the field survey, we divided the interviewers into several groups, and in each group one interviewer was appointed as the leader. The leader acted as the quality supervisor. At the end of each day, the leader would check in the field the questionnaires the interviewers in his or her group had completed on that day, and if there was some missing data, the interviewer would then go back to the participants' households again to make up the missing data.

7.Variables and measures, line 26: Willingness to institutionalize is identified as the independent variable, but is actually the dependent variable.

Response: A good catch! We have to say sorry for our carelessness. In response, we have updated the error in the paragraph, and the new paragraph now reads as follows:

> "The dependent variable was seniors' willingness for institutionalization which was evaluated on the ground of interviewees' answers to 'which endowment way are you willing for?' If the response was 'institutional care', the willingness for institutional care could be coded as 'yes'. On the contrary, if the answer was 'home-based care', 'community endowment' or 'others', willingness for institutional care could be coded as 'no'."

8.Numeric coding for each variable in the study should be identified. For example, gender is coded male vs female but the numeric coding in now provided. This information is needed to interpret the statistical analyses. The authors may consider adding a tables that summarizes this information for all variables, if allowed by BMJ Open.

Response: Many thanks for your advice. We've added a new table as an appendix to present the numeric coding for each variable,

Appendix 1: Variables and assignments

Variables	**Code**
Gender	
Male	0
Female	1
Age	
60-	1
70-	2
80-	3
Education	
Illiteracy or semiliterate	1
Primary school	2
Junior school or above	3
Past occupation	

Farmer	1
Others	2
Marital Status	
Single [a]	1
Couple	2
Number of children	
0-3	1
>3	2
Relationship with children	
Good or normal	1
Poor	2
Residence	
Urban	1
Rural	2
Self-reported health status	
Good	1
Normal	2
Psychological stress	-
ADL	
Ⅰ	1
Ⅱ	2
Ⅲ	3
NCD	
Yes	1
No	2
Household income	
Q1 [b]	1
Q2	2
Q3	3
Q4	4
Per-capita living space	-

9.Statistical analysis, line 50: Please be more specific with the alpha level that determines statistical significance. Here, an alpha of .05 is given but in the results we see that a p-value of exactly .05 is calculated for set of two variables (page 8, line 47: "Empty-nest singles who had greater psychological stress (p=0.050)…). Did the authors mean that their alpha is less than or equal to .05? Clarification is needed.

Response: Many thanks for your helpful comments. Yes, an alpha of less than 0.05 is regarded as significant level. In this study, we used two models to identify factors associated with willingness of institutional care among different types of the seniors. Firstly, we used univariate logistic regression model to explore those single factors associated (P<0.05) with willingness of institutional care. Secondly, only those identified factors were included in the final mutli-variate logistic regression model to explore the factors associated with willingness of institutional care. One thing needs to be explained here is that, when we conducted the multi-logistic regression model analysis, we found that a P-value of one variable (psychological stress) was exactly 0.05 when conducting univariate analysis. In the previous similar cases, we would still include the variable whose P-value equals 0.05 into the multi-variate logistic regression. This thus we included the variable of psychological stress into the final regression model in the current study. In response, we added a note to the Table 4 to explain for that. The note is presented as below:

"[a] We also included "Psychological stress" into multi-variate logistice regression model."

10.Were the assumptions for logistic regression satisfied? – independence of observations, lack of multicollinearity, independent variables related to log odds?

Response: A good point, and we are happy to follow. In response, we conducted a Collinearity Statistics, and found that VIF of these variables were all smaller than 10, thus there was no multicollinearity. We presented here the output of the Collinearity Statistics as follows:

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

	(Constant)	.103	.063		1.642	.101		
	Household composition	-.046	.008	-.105	-5.651	.000	.739	1.354
	Gender	.014	.010	.026	1.474	.140	.827	1.209
1	Age	.003	.009	.006	.329	.742	.709	1.411
	Education	.018	.007	.053	2.683	.007	.649	1.541
	Past occupation	.022	.013	.038	1.669	.095	.486	2.059
	Marital Status	-.019	.012	-.027	-1.558	.119	.852	1.173
	Number of children	-.020	.010	-.034	-1.940	.052	.826	1.211
	Relation with children	.078	.018	.073	4.419	.000	.937	1.067
	Residence	-.043	.013	-.077	-3.432	.001	.513	1.948
	Self-reported health	.003	.010	.005	.297	.766	.795	1.258
	Psychological stress	.000	.001	-.005	-.274	.784	.862	1.160
	ADL	-.013	.008	-.031	-1.717	.086	.763	1.311
	NCD	-.003	.010	-.005	-.304	.761	.819	1.221
	Household income	.016	.005	.067	3.157	.002	.575	1.738
	Per-capita living space	-.001	.000	-.052	-2.993	.003	.846	1.182

a. Dependent Variable: Willingness of institutionalization

11.In the first paragraph of the results, K10 scores are presented as 15.8+/- 6.0 and per capita living space as 33.9 +/- 23.1. Are these means and confidence limits or means and standard deviations?

Response: Thank you so much for you comments. These are means and standard deviations. In response, we have added two brackets to indicate Means±SD. The new paragraph now reads as follows:

"Table 1 showed basic information of the 3923 seniors. About 8.5% seniors had willingness for institutional care. Non-empty-nesters accounted for 40.7% of the participants, empty-nest singles accounted for 10.0%, and empty-nest couples accounted for 49.3%. Generally speaking, the majority of the elderly were female (53.6%), between the ages of 60 and 69 (65.5%), illiterate or semiliterate (44.5%), farmers (64.2%), couple (79.1%), having 0 to 3 children (67.4%), having good or normal relationship with children (92.8%), rural (54.9%), having good self-reported health status (52.1%), having mild dysfunction

(72.7%), and having NCDs (65.9%). The elderly's K10 score was

15.8±6.0 **(M±SD)** and their per-capita living space was 33.9±23.1 **(M±SD)** square meters."

12.The discussion and conclusion are well done and relevant.

Response: Thank you so much for you comments and careful read.

VERSION 2 – REVIEW

REVIEWER	Zhiyong Lin University of Maryland, College Park
REVIEW RETURNED	20-May-2018

GENERAL COMMENTS	This is a much improved version of the paper! I look forward to seeing the paper published, pending a final edit to correct a number of minor typos (e.g., insitutional on page1; assoicated on page7; and some others) found throughout the manuscript.

REVIEWER	R. Colin Reid University of British Columbia - Okanagan campus, Canada
REVIEW RETURNED	01-Jun-2018

GENERAL COMMENTS	The authors have adequately addressed my main concerns.