



RESEARCH ARTICLE

REVISED Stress and associated risk factors among the elderly: a cross-sectional study from rural area of Thailand [version 2; peer review: 2 approved]

Previously titled: Stress and associated risk factors among the elderly: a cross-sectional study from rural Thailand

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v2 First published: 13 May 2019, 8:655 (<https://doi.org/10.12688/f1000research.17903.1>)
 Latest published: 01 Apr 2020, 8:655 (<https://doi.org/10.12688/f1000research.17903.2>)

Abstract

Background. Stress is a common mental health problem of the elderly population that affects their quality of life. The objective of this study was to determine the level of stress and associated factors among the elderly living in rural areas of Thailand.

Methods. This was a cross-sectional study conducted in two sub-districts of rural Thailand and interviewed 403 elderly persons. We used simple random sampling technique from a list of registered elderly individuals and conducted face-to-face interviews using a questionnaire. The questionnaire were piloted, validated and pretested beforehand. Multiple linear regression was applied for data analysis. This study was approved by the Ethical Review Committee of the University of Phayao, Thailand.

Results. The mean age of the participants was 68 and two thirds (67%) were female. Less than 43% of the participants had moderate, and one third (34%) had high levels of stress. More than half of participants had low level stress management. Stress was significantly associated with alcohol and illness with a predictive power of 3.0% [(R = 0.173, R Square = 0.030) (p<0.05)].

Conclusion. We conclude that risk factors such as alcohol and illness affect elderly population living in rural areas of Thailand to a major extent in terms of stress.

Keywords

Evaluation factors, stress, elderly rural, risk factors, association

Open Peer Review

Reviewer Status ✓✓

	Invited Reviewers	
	1	2
version 2 (revision) 01 Apr 2020	✓ report	✓ report
version 1 13 May 2019	↑ ? report	↑ ? report

- Thant Zaw Lwin**, Union Solidarity and Development Party, Nay Pyi Taw, Myanmar
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Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: **Seangpraw K:** Conceptualization, Data Curation, Formal Analysis; **Auttama N:** Formal Analysis, Investigation, Methodology; **Kumar R:** Writing – Original Draft Preparation, Writing – Review & Editing; **Somrongthong R:** Resources, Software, Supervision; **Tonchoy P:** Investigation, Validation, Visualization; **Panta P:** Formal Analysis, Project Administration, Resources, Software

Competing interests: No competing interests were disclosed.

Grant information: This work was supported by the University of Phayao (Grant No.RD61058) and the Rachadapisek Sompote Fund for Postdoctoral Fellowships, Chulalongkorn University Thailand to RK.

The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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How to cite this article: Seangpraw K, Auttama N, Kumar R *et al.* **Stress and associated risk factors among the elderly: a cross-sectional study from rural area of Thailand [version 2; peer review: 2 approved]** F1000Research 2020, 8:655 (<https://doi.org/10.12688/f1000research.17903.2>)

First published: 13 May 2019, 8:655 (<https://doi.org/10.12688/f1000research.17903.1>)

REVISED Amendments from Version 1

We have revised this paper in the light of comments received from worthy reviewers. Detail on sampling technique and validity of tool has been included. A few typo errors in result section have been updated. Title of the study has been revised by putting "area of" as per the reviewer's suggestion to get more clarity. We have included more detail in discussion part in the light of reviewer's comments. However, clarification of each individual comment has been responded in detail.

Any further responses from the reviewers can be found at the end of the article

Introduction

Globally, 15% of the elderly population is suffering from mental disorders, and stress is one major mental health problem affecting a sizeable proportion (10–55%) of the elderly population^{1,2}. The prevalence of stress and anxiety among the elderly population is gradually increasing and expected to reach double in the next one decade¹. About one fifth of the world's aging population lives in Thailand, and their number will increase by 28% in the coming ten years³.

In Thailand, recent surveys have reportedly identified increasing stress and mental health issues. Hospital based data complements this by showing increasing burden of stress and anxiety among the elderly⁴. Recent research has also suggested that the prevalence of stress is associated with age and the chances of getting this condition has increased in the aging population^{3,4}.

Secondary data from rural Thailand depicts a high proportion of the elderly population suffering from mental health disorders^{5,6}. Research suggests that common factors affecting stress among the elderly are family relationship, financial status, social or community environment, physical health and chronic illness^{7–10}. Nonetheless, the factors associated with stress need further exploration. Hence, we conducted this research to determine the factors affecting stress among the elderly in rural Thailand.

Methods**Study design**

This was a cross-sectional study carried out between January and April 2017 in Muang District, Phayao Province of Thailand.

Sample size and selection

The study sample size was calculated by using confidence level of 95%, the coefficient of the error = 5% and population proportion of 0.05^{11,12}. Hence, 403 elderly people were interviewed in this study by simple random sampling method from a list of promoting hospitals¹ registering elderly patients. Our tool was based on Pender's theory of health promotion model and stress assessment^{13,14}. We included male and female elderly persons who were above 60 years old, living in the study area for more than

one year and able to communicate. However, those who were admitted with other associated diseases were excluded in this study.

Data collection

Data collectors were trained and briefed on the study prior to conducting this survey. Face to face interviews of 40 minutes per participant were conducted by adopting the simple random sampling method and the data collectors guided interview. The questionnaire was piloted and pretested on 35 elderly living in outside from the study area with similar settings. Cronbach's alpha coefficient of the questionnaire was calculated as 0.80 and content validity, a Kuder-Richardson 20 coefficient, was assessed as 0.79. There were three parts of the questionnaire; socio-economic characteristics (age, sex, income, education, marital status etc), the stress assessment test composed of 20 items from Suangprung Stress test-20, and the stress management score (10 items may rating scale on four point Likert scale)^{13,14}. The stress management section was adapted to the elderly community with questions pertaining to the following; "Feeling desperate in life", "Cannot stay focused", "Cannot sleep due to stress or overthinking", and "Muscle pain in the back or shoulders". The mean score was calculated from their responses; less stress (0 – 23), moderate stress (24 – 41), high stress (42 – 61) and severe stress (>62)¹⁴. The total scores were divided into three levels including low scores (0–30), moderate scores (31–39) and high scores (40–50)¹⁴. The questionnaire was piloted and pretested on 35 elderly living in outside from the study area with similar settings. Cronbach's alpha coefficient of the questionnaire was calculated as 0.80 and content validity, a Kuder-Richardson 20 coefficient, was assessed as 0.79.

Statistical analysis

Data was analyzed using SPSS Statistics version 20.0. Descriptive and multiple stepwise linear regression analysis was used to investigate the potential predictors of stress among the elderly. The analysis we put in the model 1 is alcohol consumption and the model 2 is present illness like; hypertension, musculoskeletal disorders and diabetes as these were the main variables as per our objectives.. The level of significance for all statistical tests was set at p-value <0.05.

Ethical statement

All participants were informed regarding the research objectives and procedures of the study and a written informed consent was obtained from all the participants prior to start of the study. All the information of participants was kept confidential. This study was approved by the Ethics Review Committee for research involving human research subjects at the University of Phayao Thailand (No. 2/101/59). Administrative approval was gained from the head of the hospitals before to the study began.

Results**Baseline characteristics**

The mean age of study participants was 68±7, and more than half (67%) of participants were women. About half (50%) of the participants were single, having no education (62%), received monthly income less than 100 US\$ (73%). Present illness was

¹Hospitals in Thailand are operated by both the public and private sector to provide medical services for prevention, cure and rehabilitation of patients with medical and health-related conditions

defined as having a chronic illness at time of sampling (Hypertension, musculoskeletal disease and hypertension). Around two thirds (63%) of the respondents reported a present illness; hypertension (52%), musculoskeletal disorders (29%), and diabetes mellitus (19%). About two thirds (69%) of participants lived with family members. Almost half of study participants consumed alcohol (45%) and 27% smoked cigarettes (Table 1).

Table 2 shows stress levels among elderly people during the last three months as calculated using the Suangprung Stress test-20 stress assessment test. Almost half of these participants experienced a moderate level of stress (43%). Around 34% experienced a high level of stress and 18% had a low level of stress.

In term of stress management during the last three months, the results showed that more than half of participants had a low level of stress management (59%), followed by moderate and high levels of stress management (33% and 8%, respectively) (Table 3).

Relationship between personal factors and stress among elderly people

There was statistically significant relationship between alcohol consumption and present illness with stress levels,

as calculated using the Suangprung Stress test-20 stress assessment test (Table 4).

The stress scores is 2.95 points higher (*b* coefficient, Table 5) than the elderly who drink alcohol than those who did not use alcohol. This indicates use of alcohol among elderly is positively associated with their current illness, likely due to their perception that the alcohol will help with mental relaxation. In contrast, if the elderly continue consuming alcohol, the present illness will result in increased stress for the participants. (Table 5).

Discussion

In the present study, the majority of elderly people had moderate and high levels of stress during the last three months. This level of stress among the elderly population could negatively affect their health and well-being^{7,15}. Other studies elsewhere have shown stress's drafting effects, indicating that stress would directly effect mental and physical status among the elderly^{3,15}. Our findings are consistent with a previous study¹⁵. Further according to the wear and tear theory, when the elderly population are experiencing poor physical and mental health, they would more likely to develop anxiety^{16,17}. Chronic diseases and economic problems are the major causes of stress among the elderly. Moreover, long term stress and anxiety can also lead to depression and suicidal tendencies among the elderly^{9,17}.

Table 1. Socio-demographic characteristics of elderly (n=403).

Socio-economic factors		
Variables	Categories	N (%)
Age (min= 60, max= 89, mean= 68.04, S.D= 7)	60–79	376 (93.3)
	≥ 80	27 (6.7)
Gender	Male	132 (32.8)
	Female	271 (67.2)
Education	No education	250 (62.0)
	Higher than primary school	153 (38.0)
Marital status	Single (widowed/divorced/separate)	205 (50.9)
	Married	198 (49.1)
Income (per month US\$)	≤100	294 (73.0)
	≥101	109 (27.0)
Present illness among elderly (252 out of 403)		252 (62.5)
Hypertension		131 (52.0)
Musculoskeletal diseases		73 (29.0)
Diabetes mellitus		48 (19.0)
Living arrangement	Living alone	125 (31.0)
	Living with family (Spouse and / or children)	278 (69.0)
Alcohol consumption	Never consumed	220 (54.6)
	Has consumed	183 (45.4)
Smoking status	Non-smoker	293 (72.7)
	Smoker	110 (27.3)

Table 2. Number and percentage of stress level among elderly as calculated using the Suangprung Stress test-20 stress assessment test (n=403).

Stress	n	%
Low level (0–23 scores)	74	18.3
Moderate level (24–41 scores)	172	42.7
High level (42–61 scores)	137	34.0
Severe level (≥62 scores)	20	5.0

Table 3. Number and percentage of stress management level among elderly (n=403).

Stress management	n	%
Low level (0–30 scores)	238	59.1
Moderate level (31–39 scores)	133	33.0
High level (40–50 scores)	32	7.9

Studies in South Korea and Denmark found that higher levels of perceived stress were associated with higher mortality^{18–20}.

Those elderly participants had a low level of stress management were living with their grandchildren. Hence, the elderly living in joint family and took responsibilities including household, grandchildren and financial support to the family found low level of stress as compare to those who live alone^{3,15}. However, few studies shows that these responsibilities would tend to develop stress and anxiety among elderly. Contrary on other hand study showing emotional attachment was a major contributing factor leading to mental health problems among the elderly¹⁷.

In the present study, the two main factors associated with stress among the elderly were alcohol consumption and present illness. Stressed elderly individuals usually prefer alcohol to achieve mental relaxation²¹. Research shows that negative feelings including stress, disappointment, hatred and unsuccessful can lead to drinking behavior²¹. Previous research show a strong

Table 4. Multiple linear regression analysis of alcohol consumption (model 1) and present illness (model 2).

Source Variance	df	SS	MS	F	p-value
Model 1					
Regression	2	1021.555	1021.555	8.155	<.01
Residual	401	125.262	125.262		
Total	403	51251.752			
Model 2					
Regression	2	1526.017	763.008	6.138	<.01
Residual	401	49725.735	124.314		
Total	403	51251.752			

Model 1 R = 0.141, R2 Square = 0.020, S.E = 11.192, n = 403, Model 2 R = 0.173, R2 Square = 0.030, S.E = 11.149, n = 403

Table 5. Constant and regression coefficient of alcohol consumption and present illness.

Variables	b	SE.	Beta	t	p-value
Model 1					
Constant	38.573	0.755	-	51.119	<0.001
Alcohol consumption	3.198	1.120	.141	2.856	<0.001
Model 2					
Constant	37.230	1.005	-	37.063	<0.001
Alcohol consumption	2.952	1.122	0.130	2.630	<0.01
Present illness	2.325	1.154	-100	2.014	<0.05

Present illness: no (0), yes (1); Alcohol consumption: no (0), yes (1). * = significant p-value

positive correlation between stress and drinking alcohol, especially among the elderly population²². Moreover, present illness is a predictive power of stress among the elderly where current illness could influence daily life activities. Mental health problems and living in a stressful condition could impact their physical health, sleeping and quality of life²³. The literature compliments our findings that chronic illnesses might affect the level of stress among elderly people^{24,25}. A study performed on elderly people living with hypertension showed that there was a statistically significant relationship between chronic illness and stress²⁶. Our findings are also consistent with a studies on elderly people with diabetes leading to anxiety and stress, ultimately developing depression among this aging population^{27,28}.

Conclusion

This study provides an understanding of current mental health situations and factors affecting stress, such as alcohol consumption and illness, of elderly people living in rural communities of Thailand. Non-communicable diseases including hypertension, diabetes, and musculoskeletal disorders are the leading factors shown to develop stress and anxiety.

Data availability

Underlying data

Open Science Framework: Stress and associated risk factors among the elderly: a cross sectional study from rural Thailand study, <https://www.doi.org/10.17605/OSF.IO/XVKSW28>

This project contains the following underlying data:

- Data dictionary for statistic analysis plan.doc (data dictionary)
- Update Data set.xls (Participant data)

Extended data

Open Science Framework: Stress and associated risk factors among the elderly: a cross sectional study from rural Thailand study, <https://www.doi.org/10.17605/OSF.IO/XVKSW28>

This project contains the following extended data:

- questionnaire_stress.doc (study questionnaire)

Data are available under the terms of the [Creative Commons Zero “No rights reserved” data waiver](#) (CC0 1.0 Public domain dedication).

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<http://www.doi.org/10.17605/OSF.IO/XVKSW>

Open Peer Review

Current Peer Review Status:  

Version 2

Reviewer Report 02 April 2020

<https://doi.org/10.5256/f1000research.25465.r61907>

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Kraichat Tantrakarnapa 

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It seems to be fine as the authors responded to the comments.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health, Environmental Health, Tropical medicine. Climate change and health impacts.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 01 April 2020

<https://doi.org/10.5256/f1000research.25465.r61906>

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Thant Zaw Lwin

Department of Public Health, Union Solidarity and Development Party, Nay Pyi Taw, Myanmar

I approve this article.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 24 September 2019

<https://doi.org/10.5256/f1000research.19579.r53600>

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Kraichat Tantrakarnapa

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Research Title:

1. It seems to be clear. However, it was conducted only in sub-districts in one province of Thailand. The title is a big one; how can this study represent the rural area of Thailand? There were 7,435 sub-districts in 2018. Only two sub-districts were selected as the representative of the rural area.

Introduction:

1. "Hence, we conducted this research to determine the factors affecting stress among the elderly in rural Thailand." It was indicated in the manuscript. The title and the significance of this study focus on the overview of Thailand, whereas the study areas examined were only 2 sub-districts and Muang District (city). Can they be representatives for rural areas? As indicated in Research methodology.

Methods:

1. "The study sample size was calculated by using a confidence level of 95%, the coefficient of the error = 5% and the population proportion of 0.05." Authors got 403 sample size. What is the formula for sample size calculation?
2. "Hence, 403 elderly people were interviewed in this study by simple random sampling method from a list of promoting hospitals registering elderly patients". Do the researchers collect only elderly patients? Can they be the representatives for elderly people there?
3. Are the subjects Thai nationality? In this province, there might be some migrants who lived in this province for more than one year and they can communicate in Thai?
4. "Face to face interviews of 40 minutes per participant were conducted". Is it a digit for interviewing time? Time is used for controlling the interview.
5. Authors indicated that the tools were tested prior to usage. Is IOC used for testing the content validity? For example, "Cannot sleep due to stress or overthinking", the question was asked

directly to the point of stress, is it biased?

6. Cronbach's alpha coefficient of the questionnaire was calculated as 0.80. It might be the total score of a questionnaire?
7. "Kuder-Richardson 20 coefficient, was assessed as 0.79." Please clarify the meaning of this statement.
8. Data were analyzed using SPSS Statistics version 20.0. Is this a licensed software?
9. Model 2 is a present illness like; hypertension, musculoskeletal disorders and diabetes. Does this variable count for "existing illness" and "no existing illness" or consider the number of existed diseases for a regression analysis?
10. Administrative approval was gained from the head of the hospitals before the study began. Does this study focus on the elderly in the hospital?

Results:

1. Having no education, could the authors use another word replacing "no education"?
2. Income (per month US\$).
3. The researchers did it during 2017, at that time the Thai Baht value is different from the current situation (please specify the exchange rate).
4. Smoking and alcohol drinking status, the authors classified only 2 categories "Yes" and "No" at the interviewing time. The experience of consumption or smoking were not considered. Some just quit or stop smoking or drinking, are they influencing the stress?
5. In term of stress management as indicated in the manuscript. Please describe more details of this issue. What are they? For example; low level of management, what does it mean?
6. "This indicates the use of alcohol among the elderly is positively associated with their current illness, likely due to their perception that the alcohol will help with mental relaxation." Is there any scientific information supporting this statement?
7. For the results indicated in Table 5, are there any perception variables used in the model? Because of drinking, are they facing the stress or they have stress then they decided to release it by drinking?

Conclusion:

1. It is not clear for the conclusion and recommendation is not available there.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?

Partly

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health, Environmental Health, Tropical medicine. Climate change and health impacts.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 10 Jan 2020

Ramesh Kumar, Health Services Academy, Islamabad, Pakistan

Title and introduction: we have selected two sub-rural districts in the study randomly that was truly representative of this rural population.

Methods:

1. We used the confidence level of 95%, the coefficient of the error = 5% and population proportion of 0.05.
2. Yes, only elderly population were included in this study.
3. Yes only Thai national were included.
4. Yes we agree.
5. No, we have asked only those questions were included in the tool.
6. Yes this was Cronbach's alpha coefficient of the questionnaire was calculated as 0.80.
7. Kuder-Richardson 20 coefficient, was assessed as 0.79 was used to check validity of the questionnaire.
8. Yes that was licence software.
9. Only existing illness.
10. Administrative approval from hospital was sought to include elderly population in the study from the registered record available with them.

Results:

1. No.
2. Yes converted thai bath in the US\$
3. Conversion rate was taken at that time.
4. Included those who were actively smoking or not
5. We have categorised the stress level and measured accordingly.

6. This information supported in the discussion part.

7. Yes.

Conclusion: We have achieved our objectives and concluded accordingly and did not included the recommendation as per the Journal's criteria.

Competing Interests: NA

Reviewer Report 29 May 2019

<https://doi.org/10.5256/f1000research.19579.r48413>

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Thant Zaw Lwin

Department of Public Health, Union Solidarity and Development Party, Nay Pyi Taw, Myanmar

In Abstract

There was no recommendation in conclusion section, or is there a word limit for the abstract? In the keywords: there was no mention of "evaluation factors" in the abstract, and what do you mean by "Elderly rural" or "association"?

In Introduction

2nd paragraph; "In Thailand, recent surveys ..." and last line in that paragraph "Recent research ...", these two lines should shift to the conclusion section.

In Methods

What about the sampling procedure?

In Data Collection

Face to face interviews of 40 minutes and the results showed that 62% have no education, is it possible that it took too much time to get the right answers. What about their responses?

This survey was pre-tested and validated outside of the study, so what are the operational definitions from this?

In Results

67% of participants were women (meaning that 33% were men). But in Table 1, alcohol consumption was 45.4%. Does this mean all the men has alcohol consumption and few of elderly women has alcohol consumption?

50% of the participants were single but in the discussion, more than half of the elderly participants had a low level of stress management and were living with their grandchildren. And in the results about two thirds (69%) of participants lived with family members. What about these two connections?

In Table 4, why the sample is 402 and why not 403?

In Conclusion

No recommendation or other relevant evidence for association?

How about recommendations for the next study?

In References

No. 28 reference is where citations in manuscript?

Overall Conclusions

Please answer my questions and correct for some facts. Its just minor corrections.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Partly

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Environmental Health and Occupational Health, Health Care Management, Biostatistics, Epidemiology, Project Evaluation, Quantitative and Qualitative Research, Health Economic, Maternal and Child Health, Drug Addictions Problems.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 10 Jan 2020

Ramesh Kumar, Health Services Academy, Islamabad, Pakistan

Abstract: Recommendations are included in the main paper, here we can not include due to word limit. Evaluating factors are not included in our objectives, elderly rural are the key words.

Introduction: Recent does not mean about this research, we are talking about other recent research to triangulate with our work. Hence it is possible to move in conclusion section.

Methods: Simple random sampling method was adopted. Face to face interview was guided by the data collectors and findings were included in the result section. The questionnaire was piloted and pretested on 35 elderly living in outside from the study area with similar settings. Cronbach's alpha

coefficient of the questionnaire was calculated as 0.80 and content validity, a Kuder-Richardson 20 coefficient, was assessed as 0.79.

Results: Table 1 findings are truly representing our findings. We have mentioned 50% like nearly half in the results. Typo error will be corrected by 403 in table 4.

Conclusion: Recommendations are not included as per the Journal's criteria.

References: 28 will be added with 27 in the list

Competing Interests: NA

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