

## ภาวะซึมเศร้า และปัจจัยสัมพันธ์ในผู้ป่วยสูงอายุที่แผนกผู้ป่วยนอก ของโรงพยาบาลสงขลานครินทร์: การศึกษาแบบตัดขวาง

### Depression and Associated Factors among Elderly Outpatients in Songklanagarind Hospital, Thailand: A Cross-Sectional Study

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#### บทคัดย่อ:

**วัตถุประสงค์:** ผู้สูงอายุเป็นวัยที่มักเกิดความเสื่อมถอยของสุขภาพ และมีโรคประจำตัวต่างๆ ซึ่งทำให้ผู้ป่วยมีความเสี่ยงต่อโรคทางจิตเวช โดยเฉพาะภาวะซึมเศร้าตามมาได้ การศึกษานี้มุ่งหวังที่จะหาความชุก และปัจจัยที่สัมพันธ์ของภาวะซึมเศร้าในแผนกผู้ป่วยนอกของโรงพยาบาลสงขลานครินทร์ ซึ่งเป็นโรงพยาบาลระดับตติยภูมิในภาคใต้ของประเทศไทย

**วัสดุและวิธีการ:** การศึกษานี้เป็นการศึกษาเชิงพรรณนาแบบตัดขวาง เก็บข้อมูลจากประชากรผู้สูงอายุ (อายุ 65-99 ปี) ในแผนกผู้ป่วยนอกของโรงพยาบาลสงขลานครินทร์ ในระหว่างวันที่ 1 กันยายน-30 พฤศจิกายน พ.ศ. 2558 ขนาดตัวอย่างคำนวณโดยใช้ Epicalc ในโปรแกรม R การเก็บข้อมูลใช้แบบสอบถาม 15-item Thai Geriatric Depression Scale (TGDS-15) ในการแยกภาวะซึมเศร้า และใช้ multiple logistic regression analysis แบบวิธีย้อนหลังทีละชั้น เพื่อวิเคราะห์ปัจจัยที่น่าจะสัมพันธ์กับภาวะซึมเศร้า

**ผลการศึกษา:** จากกลุ่มตัวอย่าง 408 ราย พบความชุกของภาวะซึมเศร้าจากการใช้ TGDS-15 ด้วยจุดตัดที่มากกว่า 5 ในผู้ป่วยสูงอายุที่แผนกผู้ป่วยนอกของโรงพยาบาลสงขลานครินทร์อยู่ที่ร้อยละ 9.6 แต่จากการวิเคราะห์ multiple regression analysis ไม่พบว่าปัจจัยใดมีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับภาวะซึมเศร้า ทั้งเพศ อายุ สถานะภาพสมรส ระดับการศึกษา และศาสนา

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**สรุป:** ในการศึกษาพบว่าเกือบ 1 ใน 10 ของผู้ป่วยสูงอายุที่แผนกผู้ป่วยนอกของโรงพยาบาลสงขลานครินทร์มีภาวะซึมเศร้า ซึ่งเป็นความชุกที่ค่อนข้างสูง ภาวะซึมเศร้านี้อาจทำให้โรคทางกายหรือภาวะอื่นๆ ที่ผู้ป่วยรักษาติดตามอยู่นั้นถดถอยลง จึงควรมีระบบคัดกรอง และส่งต่อผู้ป่วยที่เป็นรูปแบบ และเคร่งครัดในการดูแลผู้ป่วยกลุ่มนี้

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### Abstract:

**Objective:** Elderly patients with their deteriorating global health are becoming more vulnerable to mental disorders, especially depression. The aim of this study is to determine the prevalence and associated factors of depression amongst patients attending outpatient clinics in Songklanagarind Hospital, a tertiary care center in southern Thailand.

**Material and Method:** This is a cross-sectional descriptive study. Elderly people (65–99 years of age) attending the outpatient department of Songklanagarind Hospital during 1<sup>st</sup> of September–30<sup>th</sup> of November 2015 were included in the study. The sample size was calculated using Epicalc in R program. We used the 15-item Thai Geriatric Depression Scale (TGDS-15) questionnaire to find the prevalence of depression among this group. Associated factors of depression were identified by multiple logistic regression using a backward-stepwise method.

**Results:** The total number of participants in this study was 408. The prevalence of depression based on the TGDS-15, cut-off score of >5, among elderly outpatients in Songklanagarind Hospital was 9.6%. However, regarding multiple regression analysis, no statistically significant factors; sex, age, marital status, educational level, and religion, could be found to be associated with depression.

**Conclusion:** Almost one-tenth of the elderly patients visiting the outpatient clinics within Songklanagarind Hospital had depression. This prevalence was quite high. The depression would worsen their health conditions. Good, rigorous screening coupled with a referral system should be encouraged and then implemented in this hospital.

**Keywords:** depression, elderly, outpatient, prevalence, tertiary hospital

### Introduction

Depression is a state wherein the individual usually suffers from sadness, emptiness, irritable moods, loss of interest or enjoyment (in overall activities), reduced energy levels, which in turn leads to increased fatigability, often accompanied by somatic and cognitive changes that significantly affect the individual's capacity to function.<sup>1,2</sup>

Medical diseases in elderly patients are usually exacerbated by depression, which impairs the neuro-endocrine and immune systems. Depression also causes individual suffering, family disruptions, worsening of the disability and can eventually increase the risk of death.<sup>3,4</sup>

Depression also has an association with many physical illnesses.<sup>5</sup> The ability to identify and treat elderly patients with depression, especially among the elderly, is becoming more important nowadays.

Outpatient departments are the outposts of hospitals, which could be used as screening centers for many subtle disorders, including depression.

Prevalence of depression among elderly outpatient populations, according to various depression scales, varies from 16.5–34.7%.<sup>6</sup> Studies in outpatients at a geriatric medicine clinic, and from those suffering from chronic obstructive pulmonary disease using the Geriatric

Depressive Scale as well as the Brief Assessment Schedule Depressive Card have reported a prevalence of depression among the elderly between 17.8% and 46.0%.<sup>7,8</sup>

According to community studies conducted in Thailand, the prevalence of depression in elderly people, based on the Thai Geriatric Depression Scale (TGDS), ranged from 12.7–15.6%.<sup>9,10</sup> There have been no previous studies on depression in elderly outpatient populations in a general hospital.

Additionally, many previous studies on depression within outpatient settings might be out of date coupled with the fact that the range of the prevalence found, in previous studies, was quite wide.<sup>7,8</sup> Many elderly people with depressive symptoms may be undiagnosed; hence further and more updated information on this topic should be studied.

Songklanagarind Hospital is a major tertiary health-care center in the south of Thailand, which operates with the Faculty of Medicine, Prince of Songkla University. In 2014, this hospital had 807,905 outpatients in which 71,127 people were older than that of 65. The hospital is a referral center for residents from southern parts of Thailand. Hence, the hospital sees a variety of patients with diverse physical and mental illnesses and could be considered a good representative for the majority of patients heralding from the south of Thailand.

Thus, the aim of this study is to find the prevalence and the associated factors of depression among patients attending outpatient clinics at Songklanagarind Hospital. Determining the prevalence of depression among elderly outpatients could bring more awareness of how important this problem is within our society. Furthermore, the information of its associated factors could lead us to pay more attention to specific characteristics of patients who might be at risk of suffering from depression.

## Material and Method

### Ethical consideration

This study was approved by the Ethics Committee of the Faculty of Medicine, Prince of Songkla University (REC: 58–095–03–1).

### Study design and setting

We conducted this cross-sectional study on the elderly patients aged 65–99 years at every outpatient clinic in Songklanagarind Hospital during 1<sup>st</sup> September–30<sup>th</sup> November, 2015. Information concerning age, sex, marital status, residential area, current occupation, religious faith and highest educational level were obtained by face to face interviews.

### Sampling methods

The sample size in this study was calculated using Epicalc in R program. The prevalence of depressive symptoms among elderly outpatients has been reported between 16.5% and 34.7%.<sup>6</sup> Using a precision of 5.0%, the required sample size was 348 participants for this study.

All 11 outpatient clinics in Songklanagarind Hospital were included in this research. The sample sizes for each clinic were calculated proportionally based on the number of the patients for each clinic during January–December, 2014. In 2014, the authors found that there were 71,127 outpatients aged over 65 years old. The largest number of elderly outpatients was within internal medicine; 28,885 patients. The following major clinics were; surgery, ophthalmology, orthopedics, otolaryngology and general practice clinics. These clinics treated between; 3,000–10,000 elderly patients just within 2014. The number of patients who were aged over 65 years of age, in 2014, was used as the calculated sample size for each clinic to meet the expected sample size of the whole study.

After determining the required sample size for each clinic, we selected patients, who were waiting for their physicians, using a convenience sampling. We then informed them about the details of the research and asked for their consent to join the study.

### Inclusion and exclusion criteria

Inclusion criteria were age between 65–99 years of age, visiting Songklanagarind Hospital as outpatients, able to understand the questionnaire and had good communication skills.

### Instruments

TGDS–15 questionnaire was used to determine the prevalence of depression as well as its associated factors. The original version has 30 items, but the shorter version was found to be more reliable and easier to use.<sup>10</sup> TGDS–15 was developed, and tested for its reliability and validity on 130 elderly Thai people in 2010. This test showed a good, internal consistency (Cronbach's alpha was 0.85).<sup>10,11</sup> The questionnaire consists of 15 yes/no questions. Each question is scored either as 0 or 1 point; the maximum score being 15. A total score above 5 is used as the cut-off point for detecting depression and has a sensitivity of 86.0% and specificity of 91.0%.<sup>11</sup>

Elderly patient depressive symptoms may have gone unnoticed, and because some patients had some difficulties on recalling information this may have had an effect on the completion of the questionnaire. With these factors in mind, during the preparation step we trained our interviewers educating them about depression in the elderly, the details required within the questionnaires, along with training them in regards to standardising data collection skills. This was so as in order to ensure that the responses of the volunteers went in the same direction. Additionally, we allowed interviewers to consult

with us about any problems they encountered throughout the data collection phase.

### Statistical analysis

All data were entered into Epidata version 3.1 and analyzed using R version 2.14.2.<sup>12</sup> Associated factors for depression were analyzed by multiple logistic regression using a backward–stepwise method. The statistical significance of variables was assessed if their  $p$ -value < 0.050.

### Results

The total number of patients participating in the study was 408 (response rate 100.0%). Table 1 shows there were slightly more females (57.4%) than males (42.6%). The mean age was 72.6 (S.D.=5.6) years. The majority of elderly patients were Buddhist and currently married. Educational levels were mostly lower than that of a Bachelor degree. Most were retired, housemaids or had no employment. Almost half of the participants were attending the Internal Medicine and General Practice Clinics.

The prevalence of depression in the elderly outpatient population within Songklanagarind Hospital was 9.6% (95% CI=6.7–12.4%). The internal consistency of TGDS–15 in this study was 0.583.

Table 2 compares the prevalence of depression among the various demographic characteristics. Depression was quite frequent among the older participants, those having lower educational levels and those employed in the agricultural industry.

Table 3 shows results of the univariate analysis for determining the association between each level of demographic characteristics and depression. Variables whose  $p$ -values from the chi-square test (as shown in Table 2) were lower than 0.2 were included in the initial multiple logistic regression model. We conducted multiple logistic regression, using a backward–stepwise method,

to analyze association of these factors. The results found no statistically significant association with depression, among the elderly patients at the outpatient clinics of Songklanagarind Hospital.

## Discussion

This study gave us the current situation of depression among the elderly outpatient population. In addition, it studied all outpatient clinics in the general hospital, and is a likely scenario which depicts the day to day situations that are encountered in general hospital practice, in where the patients came in from different outpatient clinics. Although, the results may be less than that of other studies<sup>6-8</sup>, the prevalence of depression among the elderly patients in Songklanagarind Hospital was quite high: one-tenth of all elderly outpatients visiting general hospital. Both the diverse setting and assessment of depression could be an explanation for this difference as well as the difference of lifestyles and social structures. Indeed, this updated information, of the prevalence of depression, made us aware of depression among the elderly with consideration towards these changes in current situations.

Recently, Thailand is becoming an aging society<sup>13</sup>, and due to this the health issues associated with an ageing population (in particular elderly people) should be taken into consideration, more so than in the past. Via the normal aging process, physical functions of the elderly will naturally decline. Whilst Thai people may be living longer they might also be living with many more physical disabilities, which in turn may lead to unavoidable, chronic medical diseases.<sup>5</sup> One-tenth of the elderly outpatients in this study suffered from depression. This alone demonstrated that depression was quite common in the outpatient setting. To follow up, elderly patients with physical illnesses, in the general hospital should receive more attention by the physician in regards to their psychological well-being or possible mental disturbances, especially that of depression.

**Table 1** Demographic characteristic of the elderly outpatients in Songklanagarind Hospital (n=408)

Demographic characteristics	Number (%)
Sex	
Male	174 (42.6)
Female	234 (57.4)
Age (year)	
Mean (S.D.)=72.64 (5.64)	
65-74	256 (62.7)
75-84	137 (33.6)
≥85	15 (3.7)
Marital status	
Single	15 (3.7)
Married	336 (82.3)
Divorced/separated/widowed	57 (14.0)
Religion	
Buddhism	376 (92.2)
Islam	30 (7.3)
Others	2 (0.5)
Highest level of education	
No education	24 (5.9)
Primary school	238 (58.3)
Junior high school	24 (5.9)
Senior high school	37 (9.1)
Vocational certificate	21 (5.1)
Bachelor degree	54 (13.2)
More than bachelor degree	9 (2.2)
Unknown	1 (0.3)
Current occupation	
Employee	3 (0.8)
Merchant	25 (6.1)
Retired	88 (21.6)
Farmer	91 (22.3)
Personal business	9 (2.2)
No job/finding job/house maid	169 (41.4)
Others	23 (5.6)
Type of outpatient clinic	
Internal medicine and general practice	191 (46.8)
Surgical based departments (surgery, obstetrics and gynecology, orthopedics)	104 (25.5)
Others	113 (27.7)

S.D.=standard deviation

**Table 2** Prevalence of depression (TGDS>5) by demographic characteristics

Characteristic	Number (%)		Chi-square P-value
	TGDS>5	TGDS≤5	
Sex			0.964
Male	17 (9.8)	157 (90.2)	
Female	22 (9.4)	212 (90.6)	
Age (year)			0.173
65–74	20 (7.8)	236 (92.2)	
75–84	16 (11.7)	121 (88.3)	
≥85	3 (20.0)	12 (80.0)	
Marital status			0.866
Married	33 (9.8)	303 (90.2)	
Single/divorced/separated/widowed	6 (8.3)	66 (91.7)	
Religion			0.343 <sup>a</sup>
Buddhism	38 (10.1)	338 (89.9)	
Islam/others	1 (3.1)	31 (96.9)	
Highest level of education			0.041
No education	4 (16.7)	20 (83.3)	
Primary school	29 (12.2)	209 (87.8)	
Junior, senior high school, and vocational certificate	3 (3.7)	79 (96.3)	
Bachelor degree or higher	3 (4.8)	60 (95.2)	
Current occupation			0.025
No job/finding job/house maid	17 (10.1)	152 (89.9)	
Farmer	15 (16.5)	76 (83.5)	
Retired	5 (5.7)	83 (94.3)	
Others (including merchant, personal business, employee and not available)	2 (3.3)	56 (96.7)	

<sup>a</sup>p-value from Fisher's exact test, TGDS=Thai Geriatric Depression Scale

**Table 3** Logistic regression analyses for association between characteristics and depression

Characteristic	Crude odds ratio (95% confidence interval)	P-value (Wald's test)	P-value (LR-test)
Sex			0.900
Female	ref		
Male	1.04 (0.54, 2.03)	0.900	
Age (year)			0.211
65–74	ref		
75–84	1.56 (0.78, 3.12)	0.208	
≥85	2.95 (0.77, 11.32)	0.115	
Marital status			0.692
Married	ref		
Single/divorced/separated/widowed	0.83 (0.34, 2.07)	0.697	
Religion			0.142
Buddhism	ref		
Islam/others	0.29 (0.04, 2.16)	0.226	
Highest level of education			0.012
Primary school or less	ref		
Junior, senior high school, and vocational certificate	0.26 (0.08, 0.88)	0.031	
Bachelor degree or higher	0.35 (0.1, 1.17)	0.088	
Current occupation			0.023
No job/finding job/house maid	ref		
Farmer	1.76 (0.84, 3.72)	0.136	
Retired	0.54 (0.19, 1.51)	0.240	
Others (including merchant, personal business, employee and not available)	0.31 (0.07, 1.38)	0.123	

ref=reference group, LR=likelihood ratio

In the oldest ages of our study, those over 85 years old, (although we found no statistically significance of being at risk of depression), these people are usually faced with a more stressful life and associated events than those younger in age such as; significant, progressive physical impairment, multiple loss of significant persons, and especially several chronic medical illnesses. The lack of association of age with depression, as found in three previous studies<sup>5,14,15</sup>, was probably due to the small sample size in this group.

Participants with lower educational levels in this study had a higher rate of depression although the difference was not statistically significant. This was consistent with previous studies, which found that education was a protective factor against depression.<sup>16-18</sup> Higher levels of education, of the now elderly, are usually associated with a better quality of life during their early years, and this factor is associated with then having better physical health, a higher socioeconomic status and consequently less depression.

In contrast to many previous studies those who were still employed tended to be less depressed than those who were retired or unemployed.<sup>19-21</sup> Although, it was not statistically significant elderly patients, who currently work as employee or agriculturists, in this study, tended to have more depression than those who were unemployed. Indeed, this research was focused on the patients who definitely had some physical or mental illnesses, so they would be at risk for depression. However, some patients might have had some unavoidable reasons for continuing their occupations for example having medical expenditures, lacking of financial support or being the main income source of the family.

We found no difference in the prevalence of depression among elderly patients living with or without a partner. This finding differed from previous studies, which

found that being alone (single/divorced/separated/widowed) was associated with a higher prevalence of depression.<sup>21-23</sup> This was contrary to Thai families that still lived as extended families, those being elderly patients who currently had no partners, but were supported by other family members or relatives.<sup>24</sup> Even those who had lost their spouses but still lived with their children, and who were taught since a young age, to make repayment for their parents kindness according to cultural norms as well as religious doctrines.<sup>25-27</sup> The elderly patients living without their partners, in this study, would have less depression than those in the previous studies.

The cross-sectional design of this study limited the results because the cause-effect could not be inferred. During data collection, there were some problems in communication with the elderly patients such as difficulty in understanding the questions, and recalling the symptoms. The results in this study could be affected by this. Concerning administration of the questionnaire, the authors preferred that the participants completed the questionnaire by themselves. We trained the interviewers to encourage participants to read and fill in these questionnaires by themselves, and some participants were able to do so. However, this study assessed the participants with a number of questionnaires, and due to this fact most participants actually preferred us to read them and then subsequently fill it out for them.

Prospective, or meta-analysis studies are needed to find the associated factors of prevalence of depression among the elderly at outpatient clinics. Eventually, we could establish policies to detect depression and intervene to avoid these factors. Then, such elderly patients would receive proper treatment, have lesser degrees of depression, which in course would lead to better health and quality of life for their remaining years.

## Conclusion

**Almost one-tenth of elderly patients visiting the outpatient clinics in the tertiary healthcare center had depression. This prevalence was quite high. The effects of having depression in these patients could worsen their physical illnesses. Good, rigorous screening and a referral system should be encouraged and then implemented, not only within the outpatient clinics, but throughout the hospital as a whole.**

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## References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorder. 5<sup>th</sup> ed. Arlington: American Psychiatric Association; 2013.
- World Health Organization. The ICD-10 classification of mental and behavioral disorders – clinical descriptions and diagnostic guidelines. Geneva: World Health Organization Press; 2011 [cited 2014 Dec 24]. Available from: <http://www.who.int/classifications/icd/en/bluebook.pdf>
- Alexopoulos GS, Buckwalter K, Olin J, Martinez R, Waincott C, Krishnan KR. Comorbidity of late-life depression: an opportunity for research in mechanisms and treatment. *Biol Psychiatry* 2002; 52: 543 – 58.
- Alexopoulos GS. Depression in the elderly. *Lancet* 2005; 365: 1961 – 70.
- Forester BP, Gatchel JR. Medical co-morbidity, brain disease and the future of geriatric psychiatry. *Am J Geriatr Psychiatry* 2014; 22: 1061 – 5.
- Doetch TM, Alger BH, Glasser M, Levenstein J. Detecting depression in elderly outpatient: findings from depression symptom scales and the Dartmouth COOP charts. *Fam Med* 1994; 26: 519 – 23.
- Neal RM, Baldwin RC. Screening for anxiety and depression in elderly medical outpatients. *Age Ageing* 1994; 23: 461 – 4.
- Yohannes Am, Roomi J, Baldwin RC, Connolly MJ. Depression in elderly outpatients with disabling chronic obstructive pulmonary disease. *Age Ageing* 1998; 27: 155 – 60.
- Thongtang O, Sukhatunga K, Ngamthipwatthana T, Chulakadabba S, Vuthiganond S, Pooviboonsuk P, et al. Prevalence and incidence of depression in the Thai elderly. *J Med Assoc Thai* 2002; 85: 540 – 44.
- Wongpakaran N, Wongpakaran T. Prevalence of major depressive disorders and suicide in long-term care facilities: a report from northern Thailand. *Psychogeriatrics* 2012; 12: 11 – 7.
- Wongpakaran N, Wongpakaran T, Reekum RV. The use of GDS-15 in detecting MDD: a comparison between residents in a Thai long-term care home and geriatric outpatients. *J Clin Med Res* 2013; 5: 101 – 11.
- R Development Core Team. R: a language and environment for statistical computing. Vienna: R Foundation for Statistical Computing; 2012.
- United Nation. Department of Economic and Social Affairs. Population Division. World population prospects: the 2012 revision. Vol 1. New York: United Nation; 2013.
- Brown PJ, Roose SP, Fieo R, Liu X, Rantanen T, Sneed JR, et al. Frailty and depression in older adults: a high-risk clinical population. *Am J Geriatr Psychiatry* 2014; 22: 1083 – 95.
- Rocca WA, Boyd CM, Grossardt BR, Bobo WV, Rutten LJF, Roger VL, et al. Prevalence of multimorbidity in a geographically defined American population: pattern by age, sex and race/ethnicity. *Mayo Clin Proc* 2014; 89: 1336 – 49.
- Opdebeek C, Quinn C, Nelis SM, Clare L. Is cognitive lifestyle associated with depressive thoughts and self-reported depressive symptoms in later life? *Eur J Ageing* 2016; 13: 63 – 73.
- Bjelland I, Krokstad S, Mykletun A, Dahl AA, Tell GS, Tambs K. Does a higher educational level protect against anxiety and depression? The HUNT study. *Soc Sci Med* 2008; 66: 1334 – 45.
- Ross CE, Mirowsky J. Gender and the health benefits of education. *Sociol Q* 2010; 51: 1 – 19.
- Dingemans E, Henkens K. How do retirement dynamics influence mental well-being in later life? A 10-year panel study. *Scand J Work Environ Health* 2015; 41: 16 – 23.
- Supranowicz P. Occupational activity and health of Warsaw inhabitants. Part II. Work in retirement age: a preliminary analysis. *Przeql Epidemiol* 2014; 68: 487 – 91.
- Sadock BJ, Sadock VA, Ruiz P. Kaplan and Sadock's synopsis of psychiatry behavioral sciences/clinical psychiatry. 11<sup>th</sup> ed. Philadelphia: Wolters Kluwer; 2015.

22. Waite IJ, Gallagher M. Case for marriage: why married people are happier, healthier, and better off financially. New York: Doubleday; 2001.
23. Aylaz R, Akturk U, Erci B, Ozturk H, Aslan H. Relationship between depression and loneliness in elderly and examination of influential factors. Arch Gerontol Geriatr 2012; 55: 548 – 54.
24. Foster BL. Continuity and change in rural Thai family structure. J Anthropol Res 1975; 31: 34 – 50.
25. Choowattanapakorn T. The social situation in Thailand: the impact on elderly people. Int J Nurs Pract 1999; 5: 95 – 9.
26. Caffrey RA. Family care of the elderly in Northeast Thailand: changing patterns. J Cross Cult Gerontol 1992; 7: 105 – 16.
27. Knodel J, Saengtienchai C, Sittitrai W. Living arrangements of the elderly in Thailand: views of the populace. J Cross Cult Gerontol 1995; 10: 79 – 111.