ORIGINAL ARTICLE

WELL-BEING OF THE ELDERLY IN THAILAND: A SCOPING SYSTEMATIC REVIEW

Pattaraporn Khongboon[1,2], Sathirakorn Pongpanich[1*]and Viroj Tangcharoensatien[3]

[1]College of Public Health Sciences, Chulalongkorn University, Pathumwan, Bangkok, 10330 Thailand
[2]Prince Mahidol Award Foundation under the Royal Patronage, Faculty of Medicine, Siriraj Hospital, Bangkoknoi, Bangkok, 10700 Thailand
[3]International Health Policy Program, Ministry of Public Health, Nonthaburi, 11000 Thailand

***Corresponding author**
E-mail: gingsath@yahoo.com

ABSTRACT

Thailand is now developing very swiftly into an old aged society and therefore the demands for social and health services are increasing day by day. This present topic is a systemic review on the lives of the aged people of Thailand. A critical analysis has been made on the people of Thailand aged more than or equals to fifty. This review has been done by using data, recovered through Pub Med, Scopus and ISI Web of science. The point of this analysis was about these six below mentioned outcomes such as- health and well-being, living arrangements, use of health facilities, process-related health outcomes, income, or support. Seventy-two studies were published about this included this review within 1994 to 2016. Different methods and techniques such as quantitative, qualitative and mixed methods were used in these studies. In 51.4 % cases Probability sampling methods and in 44.5% cases purposive sampling methods were used. 31.9% of the information was taken from the national survey data. The data sources of these studies were taken primarily from the outpatients of the hospitals and secondarily from the primary health care centers who acted as the participants. These studies and analysis have determined different types of outcomes. Some outcomes indicate that the public health policies and programs on aging are not acting as a whole development program. On the other hand, some outcomes indicate on healthy life expectancy, which is the outcome of heath care. Imbalances can be noticed among the needs and the provided health care.

Keywords: elderly, policy, quality of life, scoping review, Thailand, well-being

INTRODUCTION

Thailand is becoming a gray society, a demographic transition occurring as rapidly as anywhere in the world[1-3], and an epidemiological transition towards non-communicable diseases is evident[4-6]. Both the demographic and the epidemiological transitions put heavy pressure on the healthcare system, increasing the demand for health care and other social services and causing a rise in health care costs.

The increase in the proportion of the elderly among the population and a decline in fertility results in a high dependency ratio. This, combined with the drastic change in the demographic structure, requires appropriate responses in terms of policy and system reform. Hence, a huge collection of scientific articles addressing different issues have been published in the emerging field of aging research. This volume of research makes it difficult to identify knowledge gaps and to use the scientific literature as a source of information. Due to the globalization of the internet, English language is used for communication in most scientific fields. To gain a wide audience internationally, it is necessary to publish public health research projects in English. The authors have made an effort to identify publications in the international databases that concern Thai elderly, to provide a fresh perspective.

Well-being is associated with numerous health-, job-, family-, and economically-related benefits. There is no consensus around a single definition of well-being as it is associated with numerous health, family, and economically-related benefits. However, there is general agreement that at minimum, well-being includes economic status, freedom, and physical health[7]. It tells us that people perceive that their lives are going well. Good living conditions (e.g. housing, employment) are fundamental to well-being.
In this study, the well-being of the elderly was everything that matters[8] in which based on the main sections of questionnaire Surveys of Thai Elderly[9,10], which cover a variety of demographic, socio-economic, health characteristics, and management of elderly

METHODOLOGY

Search strategy

A search was conducted from the earliest records available until December 2016 (Table 1). Several search terms was used in Scopus, PubMed, and ISI Web of Science. The population included in the studies was specified using the Medical Subject

Heading (MeSH) term "aged" OR "elderly" OR "aging," and this was combined with a term specifying the outcome, such as "demographic transition," "health transition," "household arrangement," "employment situation," "caregivers," "income," "support," or "policy." To specify the geographical area of study, the term "Thailand" OR "Thai" were included. The search terms for population, outcome, and area of study were combined with AND, resulting in the final search.

The inclusion criteria required studies to report original, empirical research of any study type, mainly involving elderly Thai people aged ≥ 50. Additionally, studies had to address at least one of the following outcomes: health and well-being (e.g., physical and mental health status or quality of life), living arrangements, use of health facilities, process-related health outcomes, income, or support. The basis for choosing these outcomes was based on the main sections of questionnaire Surveys of Thai Elderly, which cover a variety of demographic, socio-economic, health characteristics, and management of elderly. The survey also covered people aged 50 and above. Full-text articles were retrieved from the databases. No additional searching was performed within the reference lists of the articles or other resources. No attempt was made to access unpublished studies or other "gray" literature. All data were stored in EndNote X7. The strengths and weaknesses of the databases used have been assessed in previous work[9,10].

A three-step process were used to identify relevant articles from the literature. First, the titles of the articles were reviewed using the criteria of inclusion or exclusion, and the authors worked in pairs as they did this. Second, the authors, still working in pairs, did further evaluation of articles that met the inclusion/exclusion criteria, reviewing the abstracts to ensure that the titles indeed met the criteria. Third, the articles that were identified were obtained and further evaluation was performed by the authors of the original pair. The paired authors categorized the articles on the basis of outcome, and then extracted the pertinent information from those articles and put it together on a review table. The review table had the following column variables: pair of authors and year, research design, objectives of the study, results, instruments, and conclusion. The rows in the table represented the different articles. The articles were not selected based on their quality.

RESULTS

Included studies

A total of 1,835 records were initially retrieved from the databases. After 795 duplicate records were removed, 1,040 records remained. The titles and abstracts of these records were screened, resulting in the exclusion of 820 records that were not relevant to the elderly. As it was not possible to obtain the full text of 118 of these articles, a total of 102 full texts were retrieved for detailed assessment. After detailed assessment, 30 articles were excluded by the following criteria: age < 50 years (n = 10); conducted outside Thailand (n = 4); dissertation/theses, which can be considered "gray" literature (n = 5); subjects were caregivers (n = 7); and subjects were non-Thai citizens (n = 4). The final number of articles included in the review was 72 (see Table 2 and Figure 1).

The 72 documents included in this study were published between 1994 and December 2016. All of the publications were journal articles. As Table 3 shows, the research designs varied across the studies. The quantitative studies consisted of 48 cross-sectional studies[13-59], eight cohort studies[60-67], two randomized controlled trials[68-69], one quasi-experiment[70], one meta-analysis[71], and two comparative study[72-73]. Seven qualitative studies[74-80] and three mixed methods studies [81-83] were included.

Table 1. Search strategies

Database	**PubMed**
ID	Search
#1	"aged"[MeSH Terms] OR "aged"[All Fields] OR "elderly"[All Fields]
#2	"Thailand"[MeSH Terms] OR "Thailand"[All Fields]
#3	#1 AND #2
#4	"family characteristics"[MeSH Terms] OR ("family"[All Fields] AND "characteristics"[All Fields]) OR "family characteristics"[All Fields] OR "household"[All Fields]
#5	life"[MeSH Terms] OR "life"[All Fields] OR "living"[All Fields]
#6	"policy"[MeSH Terms] OR "policy"[All Fields]
#7	"caregivers"[MeSH Terms] OR "caregivers"[All Fields] OR "caregiver"[All Fields]
#8	"employment"[MeSH Terms] OR "employment"[All Fields]
#9	"health"[MeSH Terms] OR "health"[All Fields] AND "trends"[All Fields]) OR "health trends"[All Fields]
#10	#3 AND #4 Limited to English
#11	#3 AND #5 Limited to English
#12	#3 AND #6 Limited to English
#13	#3 AND #7 Limited to English
#14	#3 AND #8 Limited to English
#15	#3 AND #9 Limited to English
Database: SCOPUS	
#1	(TITLE-ABS-KEY(elderly thailand) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#2	(TITLE-ABS-KEY (elderly thailand)) AND (demographic) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#3	(TITLE-ABS-KEY(elderly thailand)) AND (health situation) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#4	(TITLE-ABS-KEY(elderly thailand)) AND (income) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#5	(TITLE-ABS-KEY(elderly thailand)) AND (policy) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#6	(TITLE-ABS-KEY(elderly thailand)) AND (household) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#7	(TITLE-ABS-KEY(elderly thailand)) AND (employment) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#8	(TITLE-ABS-KEY(elderly thailand)) AND (caregiver) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#9	(TITLE-ABS-KEY(elderly thailand)) AND (family) AND (LIMIT-TO(EXACTKEYWORD, "Thailand"))
#10	(TITLE-ABS-KEY(elderly thailand)) AND (health expectancy) AND (LIMIT-TO(AFFILCOUNTRY, "Thailand"))
Database: ISI Web of Science	
#1	Topic= ("aged") OR Title= ("aged") OR Topic= (“elderly”) OR Title=(“elderly”)
#2	Topic=(“Thailand”) OR Title=(“Thailand”) OR Topic = (“Thailand”) OR Title = (“Thailand”)
#3	#1AND #2
#4	Topic = (“family characteristics”) OR Title = (“Family characteristics) OR Topic = (“household”) OR Title = (“ household”)
#5	Topic = (“life”) OR Title= (“life) OR Topic = (“living”) OR Title = (“living”)
#6	Topic = (“policy”) OR Title = (“Policy”)
#7	Topic = (“caregivers”) OR Title = (“caregivers”)
#8	Topic= (“employment”) OR Title =(“employment”)
#9	Topic = (“health”) OR Title = (“health”) OR Topic = (“health trends”) OR Title =(“health trends”)
#10	#3 AND #4 Limited to English
#11	#3 AND #5 Limited to English
#12	#3 AND #6 Limited to English
#13	#3 AND #7 Limited to English
#14	#3 AND #8 Limited to English
#15	#3 AND # 9 Limited to English

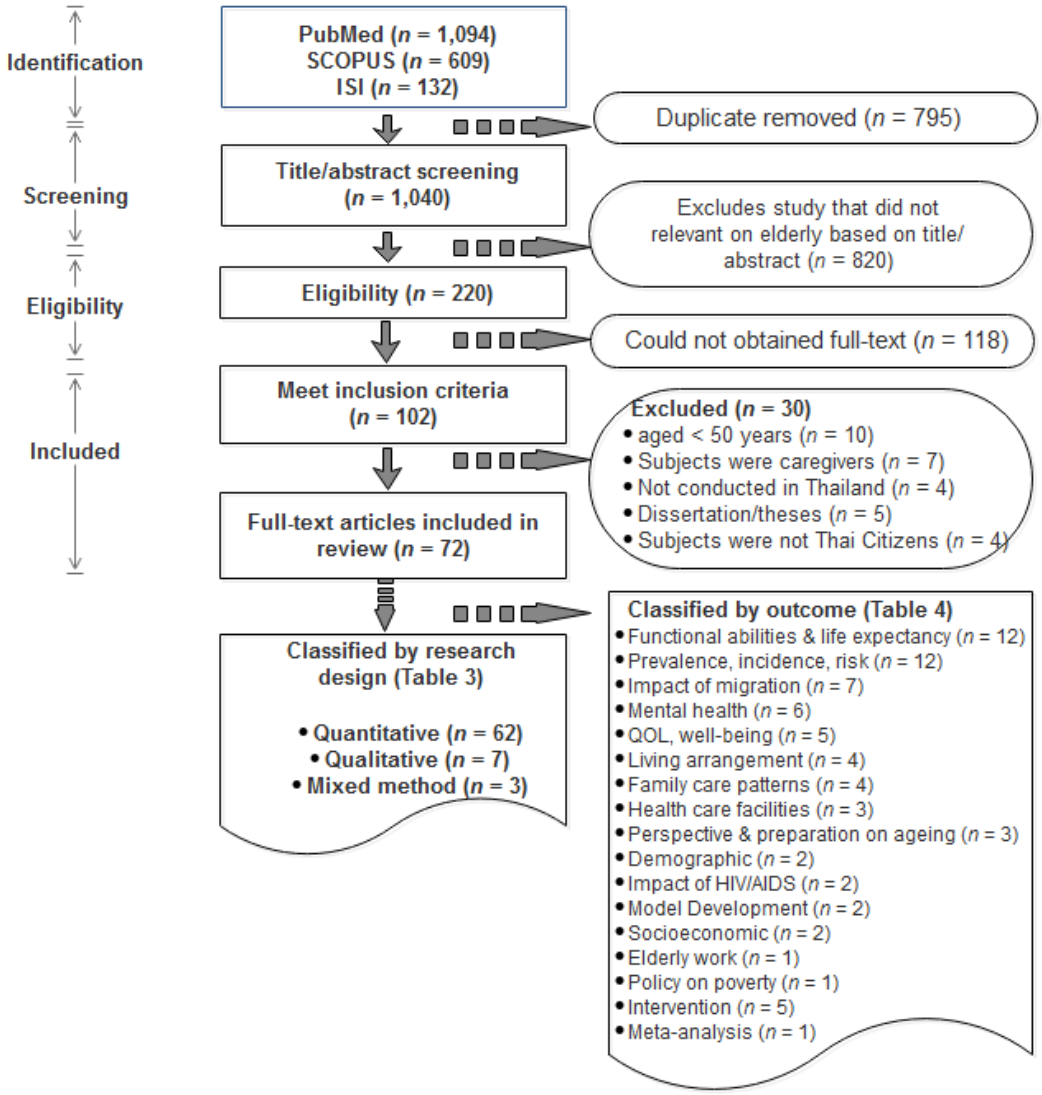

Table 4 shows the outcomes in the 72 included studies. Twelve studies evaluated functional ability and life expectancy[14-21,51-52,56,63]; Twelve articles examined the prevalence, incidence, and risk of disease[22-28,53-54,59,64-66], seven explored the impact of migration[29-30,60-62,65]; six evaluated mental health[31-34,78,84]; five examined quality of life, well-being of elderly[50,55,57-58,67] and four focused on the living arrangements of the elderly[35-37,75]. Four studies explored family care patterns[38,77,82-83]; three studies each explored health care utilization[39-41], and perspectives on and preparation for aging [76,79,85].

Two studies each examined the demographics of the elderly[44-45], the impact of HIV/AIDS[42,81], model development[13,43], and socioeconomic status[46-47]. One study examined the employment status of the elderly[49], and one evaluated policy on poverty[84].

Five intervention studies were included: two that addressed the prevention of falls[68-69], two examined nutrition[70,73] and one that studied smoking cessation in community[72]. Only one of the included articles was a meta-analysis[71].

Table 2 - Results from each database, classified by specific area

	Search Terms [title, abstract, keyword}	PubMed	SCOPUS	ISI web of Science
Demographic	"Elderly" AND "Thailand" AND "Demographic"	122	78	25
Household/living arrangement	"Elderly" AND "Thailand" AND "Household" OR "Living" OR "arrangement"	192	72	8
Income/support	"Elderly" AND "Thailand" AND "income" OR "support"	167	55	27
Caregiver	"Elderly" AND "Thailand" AND "caregiver"	103	25	22
Family structure	"Elderly" AND "Thailand" AND "family" AND "structure"	30	120	8
Employment	"Elderly" AND "Thailand" AND "Employment" OR "labor"	72	48	15
Health transition	"Elderly" AND "Thailand" AND "health" AND "transition"	35	50	2
Health situation	"Elderly" AND "Thailand" AND "health" AND "situation"	88	42	8
Health expectancy	"Elderly" AND "Thailand" AND "Health Expectancy"	40	30	5
Policy	"Elderly" AND "Thailand" AND "Policy"	245	89	12
Total		**1,094**	**609**	**132**

*Limit: English

Table 3- Total studies selected for review, classified by research design

	Quantitative ***n*** **= 62**	**Qualitative** ***n*** **= 7**	**Mixed method** ***n*** **= 3**	**TOTAL** ***n*** **= 72**
Observation				
Cross-sectional	*n* = 48	*n* = 5	*n* =3	**56**
Cohort	*n* = 8	-	-	**8**
Case study	-	*n* =1	-	**1**
Focus group		*n* =1		**1**
Experimental				
Quasi	*n* = 1	-	-	**1**
Randomization	*n* = 2	-	-	**2**
Comparative	*n* = 2			**2**
Meta-analysis	*n* =1			**1**

Characteristics

The sample sizes in the included studies varied from 7 to 654 subjects in the qualitative articles, and from 81 to 30,427 subjects in the quantitative studies. The mean age of subjects ranged from 53 to 76.79 years. In 37 studies (51.4%), probability sampling methods were used, 32 studies (44.5%) applied purposive sampling, and three studies (4.1%) did not specify the sampling technique.

The selected studies used several data sources, with national survey data being used in the largest number of studies (*n* = 23, 31.9%). Most of the studies recruited hospital outpatients as participants (*n* = 10, 13.9%), followed by primary health care center patients (*n* = 9, 12.5%) and mix resources (*n* = 9, 12.5%) (Table 5).

Table 4 - Total studies selected for review, classified by outcome

Outcome	N =72 (%)	Author
Functional abilities & Life expectancy	12 (16.7)	Haseen F, et al. (2010), Jitapunkul S., et al. (2000), Jitapunkul S., et al. (2003), Jitapunkul S., et al. (2003), Ethisan P., et al. (2016), Jiawiwatkul U., et al. (2012), Putthinoi S., et al. (2016), Karcharnubarn, et al. (2013), Kuptniratsaikul V. (1996), Kuptniratsaikul V, et al.(2007), Muangpaisan W, et al. (2011), Senanarong V, et al. (2013)
Prevalence, incidence, risk	12 (16.7)	Assantachai, et al. (2007), Bourne RRA., et al. (2003), Khongboon P., et al. (2016),Srisilapanan P., et al. (2001), Sukhatunga K, et al., (1999), Taboonpong S., et al. (2008), Tuchinda P., et al. (2014), Wongpakaran N., et al. (2012), Wongtriratanachai P., et al.(2013), Yamwong P., et al. (1999), Porapakkham Y., et al. (2008), Aekplakorn W., et al. (2011)
Impact of migration	7 (9.7)	Abas M., et al., (2013), Adhikari R., et al. (2011), Knodel J., et al., (2010), Knodel J., et al. (2007), Qin M., et al. (2008)[60], Sudnongbua S., et al. (2010), Zimmer Z., et al. (2010)
Mental Health	6 (8.3)	Gray RS., et al., (2008), Othaganont P., et al. (2002) Sumngern C., et al. (2010), Thanakwang K. (2009) Thanakwang K., et al. (2012), Thanakwang K., et al. (2011)
Quality of life, well-being	5 (6.9)	Rojpaisarnkit K. (2016), Samnieng P., et al. (2016), Hongthong D., et al. (2015), Srisilapanan P., et al.(2016), Somsak K., et al. (2016)
Living arrangement	4 (5.6)	Buasri V., et al. (2005), Knodel J., et al. (1995) Siriboon S., et al. (1994), Sophonratanapokin B, et al. (2012)
Family care patterns	4 (5.6)	Knodel J., et al. (2012), Laubunjong C., et al. (2008) Moriki Y. (2011), Rittirong J., et al. (2014)
Health care facilities /utilization	3 (4.2)	Jitapunkul S., et al. (1999),Somkotra T. (2013a), Somkotra T. (2013b)
Perspective and preparation on ageing	3 (4.2)	Danyuthasilpe C., et al. (2009) Rattanamongkolgul D., et al. (2012), Thanakwang K., et al. (2012)
Demographic	2 (2.8)	Choowattanapakorn T (1999), Sasat S, et al. (2013)
Impact of HIV/AIDS	2 (2.8)	Im-em W., et al. (2002), Knodel J., et al. (2005)
Model development	2 (2.8)	Jampawai S., et al. (2011), Piboon K., et al. (2012)
Socioeconomic	2 (2.8)	Zimmer Z., et al. (2001), Zimmer Z., et al. (2012)
Elderly work	1 (1.4)	Adhikari R., et al. (2011)
Policy on poverty	1 (1.4)	Suwanrada W. (2009)
Intervention		
Falls prevention	2 (2.8)	Janyacharoen T., et al. (2013), Kuptniratsaikul V., et al.(2011)
Nutrition	2 (2.8)	Boonyasopun U., et al. (2008), Leelarungrayub J, et al. (2016)
Continuous abstinence rate	1 (1.4)	Pothirat C., et al. (2015)
A meta-analysis	1 (1.4)	Klainin, et al. (2010)

Outcome variables

Articles focusing on functional abilities and life expectancy made up the highest percentage of the included outcomes (n = 12, 16.9%)[14-21,51-52,56,63]. Results indicated that women spent proportionately more of their longer life expectancy in a disabled state than did men, and elderly people with long-term disabilities also reported having at least one chronic disease[17]. Overall, at National level, the age-standardized prevalence of disability among older men decreased from 9.8% in 1997 to 3.6% in 2004, whereas that of older women decreased from 13.0% in 1997 to 5.2% in 2004[54]. The older women had significantly higher prevalence of ADL disabilities in almost every age group compared with older men[52]. Almost half of the rural Thai

elderly were physically inactive. Also, male and wealthy elderly were less likely to be engaged in physical activity[56]. Furthermore, aging with neurological diseases tended to reduce the independence of the elderly more than aging with musculoskeletal diseases[20].

With respect to health, 12 articles (16.7%) investigated health prevalence and incidences using different outcomes and instruments. According to the National Health Examination Survey III, aged-adjusted prevalence of hypertension was 51.1%, diabetes mellitus 14.0% and diabetes mellitus with hypertension 8.0%[53]. Also, age-standardized prevalence of diabetes slightly increased from year 2004 to 2009. The proportions of all diabetes cases with concomitant hypertension did not significantly decrease in 2009 in both sexes[54]. One study[59] sought to determine the disability risk factors of six disabilities (eating, dressing, squatting, lifting a 5-kg object, ease of stair use and being able to travel by bus) amongst Thai aged population in 2002, 2007 and 2011[59].
The outcomes assessed included cognitive impairments to measure dementia and depression [22-24]. The health outcome of Body Mass Index[25] showed an increased trend of overweight and obesity among older people. In addition, poor oral health was shown to affect older people's quality of life[26]. Glaucoma was the second most common cause of severe unilateral visual loss[27]. Low financial status was identified as an important risk factor for vitamin deficiency[28]. Additionally, one cohort study investigated the incidence of hip fractures in the elderly, finding that the highest incidence of hip fractures was observed among people older than 85 years old[64].

Seven studies (11.6%) evaluated migration as it relates to quality of life of the elderly [29-30,60-62,65,74]. The authors concluded that poor mental health in the elderly was highly associated with having a child living at a distance from the parent, but having a child who migrated away from the elderly parent was not associated with higher utilization of health facilities. Pertaining to psychological health, six studies (10.5%) investigated mental health and social relationships. Among these articles, three explored the level of happiness in older people[31-32,78], and three examined the impact of social relationships on mental health[33-34,84].

Five studies (7.0%) focused on the well-being and quality of life among Thai Older. There were two of them studies the factors affecting quality of life in elderly living in rural area of Thailand[50,58]. Three studies evaluated the relationship between quality of life and oral health status[55,57,67]. There were four studies (6.6%) on living arrangements, including two qualitative studies[35,75]. One study was based on Roger's theory on the diffusion of innovations, gathering data using self-administered questionnaires[36]. Another study examined the association between home hazards and falls or accidents[37]. In terms of family care, four studies (6.6%) focused on patterns of family caregivers who provide care and support to the elderly[38,77,82-83].

Three quantitative studies examined the patterns of health service use among elderly Thai people[39-41]. Three studies focused on perceptions, attitudes, and how people prepared themselves for old age[76,79,85]. Two studies (3.3%) each addressed a description of the social situation and demographics of the elderly in Thailand[46-47]; the impact of HIV/AIDS among the elderly[44,83]; the development a model for improving elderly people's health outcomes[13,43]; and an examination of the association between socioeconomic status and health using national data survey[53-54]. One reported (1.6%) the prevalence of labor force participation among the elderly[49], and one study (1.6%) focused on policy in terms of the poverty and financial security of the elderly[84].

Five experimental articles examined the effectiveness of interventions on the elderly, with two studies evaluating activities intended to reduce the risk of falling[68-69], one using a quasi-experiment to investigate the effect of nutrition promotion in hyperlipidemic elderly people[70], and one study the effects of star fruit consumption on antioxidant and lipid status in elderly Thai individual[73]. In addition, one comparative study of behavioral group therapy program in relation to education alone for elderly smokers[74].

In addition, one meta-analysis summarized the research findings relating to self-care among the elderly in Thailand. This meta-analysis applied a systematic method and included both published and unpublished ("gray") literature, finding that elderly Thai people who received higher levels of social support were more likely to adhere to self-care actions than those who had lower levels of support[71].

Table 5 - Total studies selected for review, classified by data source

Data resources	N =72 (%)	Author/year
National survey data	*n* = 23 (31.9%)	Adhikari R., et al. (2011), Adhikari R., et al. (2011) Assantachai, et al. (2007), Haseen F, et al. (2010) Jitapunkul S., et al. (1999), Jitapunkul S., et al. (2000), Jitapunkul S., et al. (2003a), Jitapunkul S., et al. (2003b), Karcharnubarn, et al. (2013), Knodel J., et al., (2010), Knodel J., et al. (2012), Siriboon S., et al. (1994), Somkotra T. (2013a),Somkotra T. (2013b), Sophonratanapokin B, et al. (2012) Thanakwang K. (2009), Zimmer Z., et al. (2001) Zimmer Z., et al. (2010), Zimmer Z., et al. (2012) Porapakkham Y., et al. (2008),Aekplakorn W., et al. (2011), Jiawiwatkul U., et al. (2012)
Tertiary care/ Hospital (OPD)	*n* = 10 (13.9%)	Bourne RRA., et al., (2003), Janyacharoen T., et al. (2013), Kuptniratsaikul V., et al.(2011) Kuptniratsaikul V. (1996),Kuptniratsaikul V, et al.(2007),Muangpaisan W, et al. (2011),Senanarong V, et al. (2013),Srisilapanan P., et al. (2001),Tuchinda P., et al. (2014) Wongtriratanachai P., et al.(2013)
Primary Health centers	*n* = 10 (13.9%)	Boonyasopun U., et al. (2008),Gray RS., et al., (2008) Jampawai S., et al. (2011),Piboon K., et al. (2012) Rittirong J., et al. (2014),Sudnongbua S., et al. (2010),Sukhatunga K, et al. (1999),Taboonpong S., et al. (2008),Yamwong P., et al. (1999)[23], Putthinoi S., et al. (2016)[49]
Mixed resources	*n* = 9 (12.5%)	Im-em W., et al. (2002),Klainin, et al. (2010)(69), Knodel J., et al. (1995), Knodel J., et al. (2005),Laubunjong C., et al. (2008), Moriki Y. (2011),Sasat S, et al. (2013),Thanakwang K., et al. (2012), Thanakwang K., et al. (2011)
Community	*n* = 9 (12.5%)	Danyuthasilpe C., et al. (2009),Rattanamongkolgul D., et al. (2012),Thanakwang K., et al. (2012) Srisilapanan P., et al. (2016),Hongthong D., et al. (2015),Rojpaisarnkit K. (2016),Samnieng P., et al. (2016) Leelarungrayub J., et al. (2016),Ethisan P., et al. (2016)
Data base province	*n* = 3 (4.2%)	Abas M., et al., (2013),Knodel J., et al. (2007),Qin M., et al. (2008)
Elderly clubs	*n* = 3 (4.2%)	Othaganont P., et al. (2002) Sumngern C., et al. (2010), Pothirat C., et al. (2015)
n/a	*n* = 2 (2.8 %)	Choowattanapakorn T (1999),Suwanrada W. (2009)
Faculty of University	*n* = 2 (2.8%)	Buasri V., et al. (2005),Somsak K., et al. (2016)
Long term care facilities	*n* = 1 (1.4%)	Wongprakaran N., et al. (2012)

SYNTHESIS OF FINDINGS

In Thailand, the women spent a greater proportion of the remaining life with disability. The proportion of active life for both genders also increased from time to time suggesting an evidence of the compression of morbidity in Thai older people[18,52]. However, given the aging population, it is likely that the absolute number of older people living with disability is still substantial. The characteristics with greatest positive impact on disability prevalence were not working over the past week (average impact 61.2%), age (53.7% per decade), and suffering from one or more chronic illnesses (46.3%)[59]. Thus, adequate preparation for caring elderly who are in active state needs to be addressed at the family, community, and country level.

Health status of and care for the elderly.
As the Thai National Health Examination Survey IV in 2009, it reported that the high prevalence of diabetes with higher proportions of obesity and dyslipidemia as well as suboptimal control of blood glucose, high blood pressure, and serum cholesterol signifies the burden imposed on the health system[54].

Vision and hearing loss are common health problems experienced by the elderly, and these problems are especially common among women and rural populations[10]. One-fifth of the elderly experienced cataracts, and one-third were hearing impaired. As a result of the Universal Health Coverage policy, access to cataract lens replacement significantly improved, but untreated cataracts are more frequently reported in rural families[9-10]. Inequalities in the access to health care persist among elderly Thai people[40-41]. In 2011, the five major chronic diseases affecting the Thai elderly were hypertension, high lipidemia and/or high cholesterol (33.7%), diabetes mellitus (15%), rheumatism (10%), heart disease (4.8%), and paralysis (4.8%). In addition, falls are frequent home accidents, especially where there are steps, in the bathroom, and in areas with inadequate light[37]. Thus, there is a clear need for a long-term healthcare system due to the increasing proportion of aged, disabled, and chronically ill patients[1,19,22].

Inevitably, the elderly face increased risks of developing mental health problems, especially in cases where they are in long term-care institutional facilities or have been left behind by children who migrated to another location for work[22,24,63,85]. Over half of the elderly (55%) used public hospitals to solve their health problems, 32% used community health centers, and 13% went to private hospitals[10,39].

Living arrangements and social participations.
The average household size has continued to shrink[76,88]. The trend of "skipped-generation households," in which grandparents raise one or more grandchildren without support from the parents of the grandchildren, has increased dramatically, rising from 2.3% in 1990 to 7.2% in 2007[88,89]. The percentage of elderly people living alone increased from 3.6% in 1994 to 6.3% in 2002 and 7.7% in 2007[10]. More than half of those who live alone indicated that they rarely had problems, but around one-fifth reported loneliness, 12.2% had no caretaker when they suffered from an illness, and 7% indicated that their income was inadequate[84]. Clearly, these situations pose a serious threat to the Thai elderly.

Economic activity.
Elderly participation in the labor force increased from 38.6% in 2010 to 39.4% in 2012[91]. Most elderly workers are married men, aged between 60 and 64, self-employed, and poorly educated. They tend to live in non-municipal areas and work in the agricultural and informal sectors[91]. Furthermore, there is an increasing trend of elderly women participating in the labor force, with 8% of elderly women aged ≥ 60 working as of 2012[89].

The employment decisions of elderly Thai people depend on various factors, such as their area of residence, poverty status, age, gender, health condition, household size, sector of employment, living arrangements, and pension benefits, as well as the roles of other members in their household and the number of income recipients and earners[49,91]. Married people and household heads are more inclined to work longer because they feel morally responsible for supporting their families.
Predictably, older people with good health tend to work more than those who are unhealthy. Children, relatives, and the Old Age Allowance are more often reported as sources of income by women than by men. However, in 2011, more than half of the elderly reported that they were satisfied with their financial status[92]. Despite the support they received, elderly people still had to struggle for a comfortable living due to financial difficulties[93].

Traditionally, the elderly received primary informal care provided by their family members. Children looked after their elderly parents at home[45,94]. When they are ill, many elderly people prefer support from their children, followed by support from their partners[29]. However, the caregiver role may be linked with burden and stress and also with hidden costs such as travel expenses[96]. Consequently, several families now hire trained caregivers to take care of the aged. Elderly care centers are being established with the sole purpose of providing health care to the elderly, but those

centers do not have registration or licensing criteria to verify the quality of services provided.

Policy response in Thailand

Currently, the Elderly Act B.E. 2546 (2003 AD)[97] and the Second National Long-Term Plan for Older Persons (2002–2021) are in place and being implemented. Various initiatives and policies have been instituted for the benefit of the elderly. For example, the elderly monthly allowances program was introduced in 1993 to provide financial support to elderly people who could not work and had no one to look after them. In principle, elderly people or their authorized representatives must register with the local authorities. Initially, locating the eligible aged and underprivileged people was the task of the community welfare committee. Later, the provincial committee appointed to select people for the program checked the eligibility of those who enrolled. The lists of names were then passed on to the governor for authorization. In the first year of the program, only 20,000 people were recipients of the program, receiving 200 Baht per months[98]. By 1999, the amount had increased to 300 Baht per month for each person, and 400,000 people were reached under the program.

In 2007, the elderly were given the chance to register to receive a monthly allowance of 500 Baht. Those receiving any other assistance from state enterprises or the government were ineligible. According to the Department of Local Administration, coverage of the population aged 60 and above increased from 6.4% in 2003 to 24.9% in 2007 and had reached 77.5% in fiscal year 2010. Prior to 2000, the elderly could receive cash themselves or designate an authorized representative to receive cash directly from the local authority office. Beginning in 2000, direct cash transfers to their bank accounts were available. In 2012, the system changed to include multiple rates; people aged 60–69, 70–79, 80–89 and 90 or above will be provided with 600, 700, 800, and 1,000 Baht per month, respectively[98]. Registration is conducted each November at the local government office. Universal Health Coverage, which launched in 2002, also provides huge benefits to the elderly in terms of facilitating better health.

DISCUSSION

In the cultural context of Thailand, the well-being of the elderly was found to be affected by the community and family relationships and religious and cultural activities. Community and family relationships in Thailand support the concept of extended family and living in a caring and Buddhist communities.

The quality of life that people of a country live till they die is the main criteria that can be used to judge the success of any government. During life transitions, questions on well-being are usually raised because of the frame of reference that such transitions provide. It is at this time that the well-being of a person is assessed given that many changes in patterns of activity is observed. For half a century now, there have been proposals for assessment of well-being to be done on a continuing basis. However, such proposals and additional work by scholars to date have not had any meaningful impact given that no consensus has been reached on conceptual definition, levels, or measurement of well-being.

The literature search showed an imbalance on issues relating to aging. It yielded extensive articles on functional abilities, prevalence of diseases but very limited results on intervention studies, elderly employment, and policy on poverty. The majority of the articles (16.7%) included in this analysis provided evidence of health trends by evaluating the healthy life expectancy. Self-rated health was the focus of the majority of health researchers who attempted to measure health status, whereas disability was determined by considering limitations in the activities of daily life. Migration, as it relates to quality of life, was the subject of 9.7% of the articles evaluated. There was some evidence of mental health investigations in aging people.

Many initiatives and aging policies emphasize the significance of older individuals having control and choice over different aspects of their lives. In terms of social and health care policy, a great deal of importance is placed on endorsing choice and dignity. The present debate on planning for an aged society does not adequately contemplate the need for various types of support that may not be dealt with by a “one size fits all” policy. Much of the present debate on the policy agenda concerns problems related to social care spending and capacity linked with increasing numbers of aged individuals who, it is supposed, will require assistance in the coming years. This debate does not reflect or explore the differences in the aged population, or how and why elderly people differ in well-being, disability, and health, and how they consequently need various types of support.

The current policy debate also does not elucidate the aspirations of elderly individuals or acknowledge their demands and rights for choice, greater control, and equality, irrespective of their need for assistance on a daily basis. Conversely, the debate also does not say much about the contributions of elderly individuals to the lives of others through family, social networks, employment, and various other types of social and

economic participation. There is not enough evidence demonstrating elderly people's preferences for types of supported housing, or other modifications, when their present home arrangements are no longer desirable or suitable. The only article[53] drawing on person-centered methods in the study of elderly individuals focused on non-traditional retirement housing, and it was concerned mainly with practitioners, care delivery, and academic theories, rather than with the lives of elderly individuals. There is no policy framework in place to provide the needed for aged individuals with high maintenance needs. One of the largest issues in long-term care policy is the lack of a trained workforce, in terms of both health care workers and social care givers. The qualifications of caregivers need to be upgraded by setting up courses and regulations for this group. Additionally, the increasing vulnerability of women, as revealed by the demographic data, needs to be taken into account.

There is a great need for policy action supporting the employability of older workers and examining employment practices and rules for adapting the workplace to the elderly. Different care and support models are required to offer more than a simple choice between "promote independence" and "residential maintenance." Interventions may be more effective if they are rooted in Buddhist culture. The other challenge faced by policymakers is that the educational profile of the new cohort of aged individuals in the future will be higher than that of the current cohort of aged individuals.
Disagreements between the community and policymakers on readiness for aging presently focus on the old and the young. This can be seen, at best, as distracting, and, at worst, hazardous. A focus on the consequences for all generations needs to be reviewed to enable an honest, fair, and evidence-based discussion on the elderly, and all generations need to be included. Various generations live together, sharing workplaces and neighborhoods. This will only increase as individuals live longer and extend their working lives.

The efficiency of present policies and the role of the national health policy formulation committees require evaluation, so that they may mobilize and revive the available national resources. The formation of a comprehensive database for planning interventions under the current policy is needed. Establishing a national association of aged people would contribute to giving elderly people the power of influence over the programs, policies, and the budget support that is meant for them. It is also necessary to create a mechanism for implementing policy and monitoring its impact. There is a need to review and support the formal and informal training and education courses for elderly individuals who need to be economically productive.

This study is the first scoping systematic review of existing evidence relating to elderly Thai people. This review has covered all aspects of the lives of elderly people, and it can positively guide policy formulation and implementation for policymakers, strategic planners, and researchers. The validity and reliability of this review needs to be considered carefully, due to several limitations. The major limitation of this study is the exclusion of approximately 54% of eligible articles that were not available as full-text. This may lead to misinterpretation of the results. Secondly, it was difficult to identify the optimum keywords for the databases searched. Some relevant articles may not include the chosen keywords. Thirdly, our searches were limited to articles published in English, and this may lead to relevant studies being missed. Lastly, a number of studies may have been missed because of the inadequacy of the databases available in Thailand. Future research should explore each aspect of the lives of the elderly in more depth, and with a data collection strategy that aims for completeness.

CONCLUSIONS

This systematic review of literature showed that aging research in Thailand is highly uneven relative to other areas. As such, there is need for not only effective policies but also programmes for this population. Such policies and programmes will increase the contributions of the elderly to the society and reduce the negative effects associated with old age. The policies and program should look at deeper issues other than life expectancy. They should consider the realities that come with budgeting and understand the bureaucratic operations of the government. Fortunately, in Thailand the situation is changing as the government has started looking seriously into these issues. It has come up with committees and working groups which comprise academic scholars, bureaucrats, policy makers, and stakeholders. The groups provide the best avenues for the development of programmes and policies for the elderly. The findings of this report are important and can assist in policy making. The recommendations provided in this paper can provide the appropriate stimulation for such government initiatives. Furthermore, it should be noted that some of the findings of this paper are being considered while others are awaiting implementation.

Elderly women who are household heads or live alone in Thailand, like in other countries in the developing world, experience more difficulty in the

elderly life. The level of difficulty is even higher when their socioeconomic status is low. With such challenges, these women have to work more hours so as to have savings for their old age. The existence of programmes such as Old Age Allowances and Universal Health Care Coverage has still not alleviated the burden on old people especially in rural areas. Elderly people in rural areas continue living in poverty than those in urban areas.

With the increase in challenges for the elderly, it is of great importance that policymakers, researchers, and other relevant stakeholders to take action aiming at resolving and making the future better. To achieve these goals, Thailand need to put more money in researching old age issues. Encouragement should also be provided to researchers to carry out intervention studies aimed at improving the well-being of elderly people in the society.

Competing interests
The authors declare that they have no competing interests.

Authors' contributions
PK contributed to the development of the search strategy, conducted the search, analyzed the articles, and drafted the manuscript. VT provided advice, contributed to the conceptualization, and helped to draft the manuscript. SP provided suggestions and guidance on the data collection and helped to draft the manuscript. All of the authors approved the final manuscript.

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REFERENCES

1. Humphreys G. The health-care challenges posed by population ageing. *Bull World Health Organ*. 2012;90(2):82-3.

2. Jitapunkul S, Bunnag S, Ebrahim S. Health care for elderly people in developing countries: a case study of Thailand. *Age Ageing*. 1993;22(5):377-81.

3. National Statistical Office. Population and Housing Census 2010. Thailand: Statistical Forecasting Burea, National Statistical Office (NSO), 2011.

4. Kaufman ND, Chasombat S, Tanomsingh S, Rajataramya B, Potempa K. Public health in Thailand: emerging focus on non-communicable diseases. *Int J Health Plann Manage*. 2011;26(3):e197-212.

5. Promthet S, Saranrittichai K, Kamsa-ard S, Senarak W, Vatanasapt P, Wiangnon S, et al. Situation analysis of risk factors related to non-communicable diseases in Khon Kaen Province, Thailand. *Asian Pac J Cancer Prev*. 2011;12(5):1337-40.

6. Bundhamcharoen K, Odton P, Phulkerd S, Tangcharoensathien V. Burden of disease in Thailand: changes in health gap between 1999 and 2004. BMC Public Health. 2011;11(1):53.

7. Steptoe A, Deaton A, Stone AA. Psychological wellbeing, health and ageing. *Lancet*. 2015;385(9968):640-8.

8. Fillenbaum GG, Organization WH. The wellbeing of the elderly: approaches to multidimensional assessment. 1984.

9. National Statistical Office. Survey of Elderly in Thailand 2011. Thailand: National Statistical Office, 2011.

10. National Statistical Office. Survey of Elderly in Thailand 2007. Thailand: National Statistical Office, 2007.

11. Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *FASEB J*. 2008;22(2):338-42.

12. Giustini D, Boulos M, N. Google Scholar is not enough to be used alone for systematic reviews.*J Public Health Inform*. 2013;5(2):214.

13. Jampawai S, Pothinam S, Kanato M, Tongkrajai P, Homjumpa P. Model development for health promotion in the elderly participating in communities. *Am J Appl Sci* 2011;8(9):843.

14. Haseen F, Adhikari R, Soonthorndhada K. Self-assessed health among Thai elderly. *BMC Geriatrics* 2010;10:30.

15. Jitapunkul S, Chayovan N. Healthy life expectancy of Thai elderly: did it improve during the soap-bubble economic period? *J Med Assoc Thai* 2000;83(8):861-4.

16. Jitapunkul S, Kunanusont C, Phoolcharoen W, Suriyawongpaisal P, Ebrahim S. Determining public health priorities for an ageing population: the value of a disability survey. *Southeast Asian J Trop Med Public Health* 2003;34(4):929-36.

17. Jitapunkul S, Kunanusont C, Phoolcharoen W, Suriyawongpaisal P, Ebrahim S. Disability-free life expectancy of elderly people in a population undergoing demographic and epidemiologic transition. *Age Ageing* 2003;32(4):401-5.

18. Karcharnubarn R, Rees P, Gould M. Healthy life expectancy changes in Thailand, 2002–2007. *Health Place* 2013;24(0):1-10.

19. Kuptniratsaikul V. Functional Assessment in Thai Elderly Patients. *SMJ* 1996;48(11):976-82.

20. Kuptniratsaikul V, Smathajitt A, Danputipong P, Ratanachoti P, Graisorn N, Marktuam S, et al. Disability assessment in elderly orthopedic patients. *J Med Assoc Thai* 2007;90(10):2192-7.

21. Muangpaisan W, Assantachai P, Intalapaporn S, Richardson K, Brayne C. Health expectancies in the older Thai population. *Arch Gerontol Geriatr* 2011;53(1):3-7.

22. Sukhatunga K, Phattarayuttawat S, Luckom M, Chantra J, Chaiyasit W, Bunnagulrote K. Depression and Dementia in Thai Elderly in Urban and Rural Communities. *SMJ* 1999;51(4):232-43.

23. Taboonpong S, Chailungka P, Aassanangkornchai S. Factors related to cognitive status among elders in southern Thailand. *Nurs Health Sci* 2008;10(3):188-94.

24. Wongpakaran N, Wongpakaran T. Prevalence of major depressive disorders and suicide in long-term care facilities: a report from northern Thailand. *Psychogeriatrics* 2012;12(1):11-7.

25. Yamwong P, Assantachai P, Chokeviwatwanich S. Body Mass Index of the Elderly in Rural Area of Central Part of Thailand. *SMJ* 1999;51(11):866-71.

26. Srisilapanan P, Sheiham A. The prevalence of dental impacts on daily performances in older people in Northern Thailand. *GER Gerodontology* 2001;18(2):102-3.

27. Bourne R, R, A., Sukudom P, Foster P, J., Tantisevi V, Jitapunkul S, Lee P, S., et al. Prevalence of glaucoma in Thailand: a population based survey in Rom Klao District, Bangkok. *Br J Ophthalmol* 2003;87(9):1069-74.

28. Assantachai P, Lekhakula S. Epidemiological survey of vitamin deficiencies in older Thai adults: Implications for national policy planning. *Public Health Nutr* 2007;10(1):65-70.

29. Adhikari R, Jampaklay A, Chamratrithirong A. Impact of children's migration on health and health care-seeking behavior of elderly left behind. *BMC Public Health* 2011;11.

30. Sudnongbua S, LaGrow S, Boddy J. Feelings of abandonment and quality of life among older persons in rural northeast Thailand. *J Cross Cult Gerontol* 2010;25(3):257-69.

31. Othaganont P, Sinthuvorakan C, Jensupakarn P. Daily living practice of the life-satisfied Thai elderly. *J Transcult Nurs* 2002;13(1):24-9.

32. Sumngern C, Azeredo Z, Subgranon R, Sungvorawongphana N, Matos E. Happiness among the elderly in communities: a study in senior clubs of Chonburi Province, Thailand. *Jpn J Nurs Sci* 2010;7(1):47-54.

33. Thanakwang K. Social relationships influencing positive perceived health among Thai older persons: a secondary data analysis using the National Elderly Survey. *Nurs Health Sci* 2009;11(2):144 - 9.

34. Thanakwang K, Soonthorndhada K. Mechanisms by Which Social Support Networks Influence Healthy Aging Among Thai Community-Dwelling Elderly. *J Aging Health* 2011;23(8):1352-78.

35. Siriboon S, Knodel J. Thai elderly who do not coreside with their children. *J Cross Cult Gerontol* 1994;9(1):21-38.

36. Buasri V, Steggell C, Burns L. Innovativeness and acceptance of retirement housing in Thailand. Housing and Society. 2005;32:53-70.

37. Sophonratanapokin B, Sawangdee Y, Soonthorndhada K. Effect of the living environment on falls among the elderly in Thailand. *Southeast Asian J Trop Med Public Health* 2012;43(6):1537-47.

38. Knodel J, Chayoyan N. Inter-generational family care for and by older people in Thailand. *Int J Sociol Soc Policy* 2012;32(11/12):682-94.

39. Jitapunkul S, Na Songkhla M, Chayovan N, Chirawatkul A, Choprapawon C, Kachondham Y, et al. A national survey of health-service use in Thai elders. *Age Ageing* 1999;28(1):67-71.

40. Somkotra T. Experience of socioeconomic-related inequality in dental care utilization among Thai elderly under universal coverage. *Geriatr Gerontol Int* 2013;13(2):298-306.

41. Somkotra T. Inequality in oral health-care utilisation exists among older Thais despite a universal coverage policy. *Australas J Ageing*. 2013;32(2):110-4.

42. Im-em W, VanLandingham M, Knodel J, Saengtienchai C. HIV/AIDS-Related Knowledge and Attitudes: A Comparison of Older Persons and Young Adults in Thailand. *AIDS Educ Prev* 2002;14(3):246-62.

43. Piboon K, Subgranon R, Hengudomsub P, Wongnam P, Louise Callen B. A Causal Model of Depression Among Older Adults in Chon Buri Province, Thailand. *Issues Ment Health Nurs* 2012;33(2):118-26.

44. Choowattanapakorn T. The social situation in Thailand: the impact on elderly people. *Int J Nurs Pract* 1999;5(2):95-9.

45. Sasat S, Bowers B. Spotlight Thailand. The Gerontologist. 2013. doi: 10.1093/geront/gnt038.

46. Zimmer Z, Amornsirisomboon P. Socioeconomic status and health among older adults in Thailand: an examination using multiple indicators. *Soc Sci Med* 2001;52:1297-311.

47. Zimmer Z, Prachuabmoh V. Comparing the socioeconomic status-Health gradient among adults 50 and older across rural and urban areas of Thailand in 1994 and 2007. *Soc Sci Med* 2012;74:1921-8.

48. Suwanrada W., Sasat S., Kamruangrit S. Financing Long Term Care Services for the Elderly in the Bangkok Metropolitan Administration. Foundation of Thai Gerontology Research and Development Institute (TGRI) and Thai Health Promotion Foundation., 2009.

49. Adhikari R, Soonthorndhada K, Haseen F. Labor force participation in later life: evidence from a cross-sectional study in Thailand. *BMC Geriatrics*. 2011;11:15.

50. Hongthong D, Somrongthong R, Ward P. Factors Influencing the Quality of Life (Qol) Among Thai Older People in a Rural Area of Thailand. *Iran J Public Health* 2015;44(4):479-85.

51. Putthinoi S, Lersilp S, Chakpitak N. Performance in Daily Living Activities of the Elderly While Living at Home or Being Home-bound in a Thai Suburban Community. Procedia Environmental Sciences. 2016;36:74-7.

52. Jiawiwatkul U, Aekplakorn W, Vapattanawong P, Prasartkul P, Porapakkham Y. Changes in active life expectancy among older thais: results from the 1997 and 2004 national health examination surveys. *Asia Pac J Public Health* 2012;24(6):915-22.

53. Porapakkham Y, Pattaraarchachai J, Aekplakorn W. Prevalence, awareness, treatment and control of hypertension and diabetes mellitus among the elderly: the 2004 National Health Examination Survey III, Thailand. *Singapore Med J* 2008;49(11):868-73.

54. Aekplakorn W, Chariyalertsak S, Kessomboon P, Sangthong R, Inthawong R, Putwatana P, et al. Prevalence and management of diabetes and metabolic risk factors in Thai adults: the Thai National Health Examination Survey IV, 2009. *Diabetes care*. 2011;34(9):1980-5.

55. Srisilapanan P, Korwanich N, Jienmaneechotchai S, Dalodom S, Veerachai N, Vejvitee W, et al. Estimate of Impact on the Oral Health-Related Quality of Life of Older Thai People by the Provision of Dentures through the Royal Project. International Journal of Dentistry. 2016;2016:7.

56. Ethisan P, Somrongthong R, Ahmed J, Kumar R, Chapman RS. Factors Related to Physical Activity Among the Elderly Population in Rural Thailand. *J Prim Care Community Health* 2016.

57. Samnieng P, Lekatana H. Oral Health and Quality of Life Among Elderly in Thailand. *J Dent Indones* 2016;23(2):40-7.

58. Rojpaisarnkit K. Factors Influencing Well-Being in the Elderly Living in the Rural Areas of Eastern Thailand. *Int J Behav Sci* 2016;11(2):31-50.

59. Khongboon P, Pongpanich S, Chapman RS. Risk Factors for Six Types of Disability among the Older People in Thailand in 2002, 2007, and 2011. *J Aging Res* 2016;2016:6475029.

60. Abas M, Tangchonlatip K, Punpuing S, Jirapramukpitak T, Darawuttimaprakorn N, Prince M, et al. Migration of children and impact on depression in older parents in rural thailand, southeast asia. JAMA Psychiatry. 2013;70(2):226-33.

61. Knodel J, Kespichayawattana J, Saengtienchai C, Wiwatwanich S. How left behind are rural parents of migrant children? Evidence from Thailand. *Ageing Soc* 2010;30(5):811-41.

62. Qin M, Punpuing S, Guest P, Prasartkul P. Labour migration and change in older people's living arrangements: the case of Kanchanaburi Demographic Surveillance System (KDSS), Thailand. PSP Population, Space and Place. 2008;14(5):419-32.

63. Senanarong V, Harnphadungkit K, Poungvarin N, Vannasaeng S, Chongwisal S, Chakorn T, et al. The Dementia and Disability Project in Thai Elderly: rational, design, methodology and early results. *BMC Neurol*. 2013;13:3.

64. Wongtriratanachai P, Luevitoonvechkij S, Songpatanasilp T, Sribunditkul S, Leerapun T, Phadungkiat S, et al. Increasing incidence of hip fracture in Chiang Mai, Thailand. *J Clin Densitom*. 2013;16(3):347-52.

65. Zimmer Z, Knodel J. Return migration and the health of older aged parents: evidence from rural Thailand. J Aging Health. 2010;22(7):955-76.

66. Tuchinda P, Chularojanamontri L, Sukakul T, Thanomkitti K, Nitayavardhana S, Jongjarearnprasert K, et al. Cutaneous adverse drug reactions in the elderly: a retrospective analysis in Thailand. *Drug Aging* 2014;31(11):815-24.

67. Somsak K, Kaewplung O. The effects of the number of natural teeth and posterior occluding pairs on the oral health-related quality of life in elderly dental patients. *Gerodontology*. 2016;33(1):52-60.

68. Janyacharoen T, Laophosri M, Kanpittaya J, Auvichayapat P, Sawanyawisuth K. Physical performance in recently aged adults after 6 weeks traditional Thai dance: a randomized controlled trial. *Clin Interv Aging* 2013;8:855-9.

69. Kuptniratsaikul V, Praditsuwan R, Assantachai P, Ploypetch T, Udompunturak S, Pooliam J. Effectiveness of simple balancing training program in elderly patients with history of frequent falls. *Clin Interv Aging* 2011;6:111-7.

70. Boonyasopun U, Aree P, Avant KC. Effect of an empowerment-based nutrition promotion program on food consumption and serum lipid levels in hyperlipidemic Thai elderly. *Nurs Health Sci* 2008;10(2):93-100.

71. Klainin P, Ounnapiruk L. A meta-analysis of self-care behavior research on elders in Thailand: an update. *Nurs Sci Q* 2010;23(2):156-63.

72. Pothirat C, Phetsuk N, Liwsrisakun C, Deesomchok A. Real-world comparative study of behavioral group therapy program vs education program implemented for smoking cessation in community-dwelling elderly smokers. *Clin Interv Aging* 2015;10:725-30.

73. Leelarungrayub J, Yankai A, Pinkaew D, Puntumetakul R, Laskin JJ, Bloomer RJ. A preliminary study on the effects of star

fruit consumption on antioxidant and lipid status in elderly Thai individuals. *Clin Interv Aging* 2016;11:1183-92.

74. Knodel J, Saengtienchai C. Rural parents with urban children: social and economic implications of migration for the rural elderly in Thailand. Population, Space and Place. 2007;13(3):193-210.

75. Knodel J, Saengtienchal C, Sittitrai W. Living arrangements of the elderly in Thailand: Views of the populace. *J Cross Cult Gerontol* 1995;10(1-2):79-111.

76. Rattanamongkolgul D, Sritanyarat W, Manderson L. Preparing for aging among older villagers in northeastern Thailand. *Nurs Health Sci* 2012;14(4):446-51.

77. Rittirong J, Prasartkul P, Rindfuss RR. From whom do older persons prefer support? The case of rural Thailand. *J Aging Stud* 2014;31:171-81.

78. Gray RS, Rukumnuaykit P, Kittisuksathit S, Thongthai V. Inner happiness among Thai elderly. *J Cross Cult Gerontol* 2008;23(3):211-24.

79. Danyuthasilpe C, Amnatsatsue K, Tanasugarn C, Kerdmongkol P, Steckler AB. Ways of healthy aging: a case study of elderly people in a Northern Thai village. *Health Promot Int* 2009;24(4):394-403.

80. Rittirong J, Prasartkul P, Rindfuss RR. From whom do older persons prefer support? The case of rural Thailand. *J Aging Stud* 2014;31(0):171-81.

81. Knodel J, Saengtienchai C. Older-Aged Parents: The Final Safety Net for Adult Sons and Daughters With AIDS in Thailand. *J Fam Issues* 2005;26(5):665-98.

82. Laubunjong C, Phlainoi N, Graisurapong S, Kongsuriyanavin W. The Pattern of Caregiving to the Elderly by Their Families in Rural Communities of Suratthani Province. ABAC Journal. 2008;28(2).

83. Moriki Y. Co-Residence Among Bangkok Elderly: Implications of Children's Marital Status. *Marriage Fam Rev* 2011;47(8):529-47.

84. Thanakwang K, Ingersoll-Dayton B, Soonthorndhada K. The relationships among family, friends, and psychological well-being for Thai elderly. *Aging Ment Health* 2012;16(8):993-1003.

85. Thanakwang K, Soonthorndhada K, Mongkolprasoet J. Perspectives on healthy aging among Thai elderly: A qualitative study. *Nurs Health Sci* 2012;14(4):472-9.

86. Suwanrada W. Poverty and Financial Security of the Elderly in Thailand. *Ageing Int* 2009;33(1-4):50-61.

87. Yiengprugsawan V, Harley D, Seubsman S, Sleigh AC. Physical and mental health among caregivers: findings from a cross-sectional study of Open University students in Thailand. *BMC Public Health* 2012;12(1):1111-9.

88. Knodel J, Saengtienchai C. Studying living arrangements of the elderly: Lessons from a quasi-qualitative case study approach in Thailand. *J Cross Cult Gerontol* 1999;14(3):197-220.

89. National Statistical Office. Household Socio-Economic Survey 2007. Thailand: National Statisitcal Office, 2008.

90. Piotrowski M. Intergenerational relations in a context of industrial transition: a study of agricultural labor from migrants in Nang Rong, Thailand. *J Cross Cult Gerontol* 2008;23(1):17-38.

91. National Statistical Office. Labour Force Participation among elderly in Thailand 2012. Thailand: Statistical Forecasting Bureau, 2013.

92. National Statistical Office. Survey of Elderly in Thailand 2014. Thailand: National Statistical Office, 2014.

93. Smuseneeto A, Soonthorndhada K. The Impact of Health Factors on Financial Security Among The Thai Elderly : in 2002 and 2007. *J Health Res* 2011;25(1):11-4.

94. Ratanakul P. Reflections on Aging in Buddhist Thailand. *J Relig Spiritual Aging* 2012;25(1):12-9.

95. Limpawattana P, Theeranut A, Chindaprasirt J, Sawanyawisuth K, Pimporm J. Caregivers Burden of Older Adults with Chronic Illnesses in the

Community: A Cross-Sectional Study. *J Commun Health* 2013;38(1):40-5.

96. Muangpaisan W, Praditsuwan R, Assanasen J, Srinonprasert V, Assantachai P, Intalapaporn S, et al. Caregiver burden and needs of dementia caregivers in Thailand: a cross-sectional study. *J Med Assoc Thai* 2010;93(5):601-7.

97. Government of the Kingdom of Thailand. The Act on Older Persons B.E. 2546 (2003 A.D.). Thailand 2003.

98. Suwanrada W. The Challenges of the Old-age Allowance system in Thailand. International Policy Center of inclusive Growth (IPC-IG): United Nation Development Program, 2013 September. Report No.: Contract No.: 217.