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Self-rated physical and mental health among older adults 80 years and older: cross-sectional results from a National community sample in Thailand

Supa Pengpid^{1,2,3} and Karl Peltzer^{1,4,5*}

Abstract

Background The aim of this study was to assess the self-reported physical health (SRPH) and self-reported mental health (SRMH) of older adults 80 years and older in Thailand.

Methods We analyze national cross-sectional data from the Health, Aging and Retirement in Thailand (HART) in 2015. Physical and mental health status was assessed by self-report.

Results The sample included 927 participants (excluding 101 proxy interviews), 80–117 years, median age 84 years [interquartile range (IQR) 81–86 years]. The median SRPH was 70.0 (IQR = 50.0–80.0), and median SRMH was 80.0 (IQR = 70.0 to 90.0). The prevalence of (good) SRPH was 53.3%, and the prevalence of (good) SRMH was 59.9%. In the final adjusted model, low or no income, living in the Northeastern, Northern and Southern region, daily activity limitations, moderate/severe pain, having one or two or more physical conditions, and low cognitive functioning were negatively associated, and higher physical activity was positively associated with good SRPH. No or low income, residing in the northern region of the country, daily activity limitations, low cognitive functioning, and probable depression were negatively associated with good SRMH, and physical activity was positively associated with good SRMH.

Conclusion SRPH and SRMH was relatively high rated among the oldest old in Thailand, and influenced by various social, economic, and health-related factors. Special attention should be given to those with no or low income, those living in the non-central regions and those having no or low formal social engagement. Health care and other services should improve physical activity, financial support, and physical and mental care management to promote physical and mental well-being of older adults 80 years and older in Thailand.

Keywords Older adults 80 years and older, Physical health, Mental health, Thailand

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Introduction

In Thailand the proportion of older adults (≥ 60 years) increased from 2 million in 1970 to 12 million in 2020, which is 18% of the total population [1]. In 2020, the life expectancy at 60 years for Thailand was 22.7 years; the older adults 80 years and older, 1.4 million (1.9% of the total population), will increase rapidly at the rate of 7% per year [2] to 3 million in 2039 [3]. In the older adults 80 years and older population, functional disability, multimorbidity and health care needs and costs are likely much higher than in younger population groups [4]. Therefore, it is of particular importance to assess the effectiveness of health care for the older adults 80 years and older [5]. Health care assessment commonly includes the evaluation of the health status, often assessed with a simple and generic instrument to evaluate the health status independent of specific diseases [5]. Self-reported physical health (SRPH) and self-reported mental health (SRMH) are important predictors of future morbidity and mortality and are important indicators for assessing health services and policy for the older adults 80 years and older [6–9]. Theories that may explain these findings may include that (1) Self-rated health (SRH) may represent ill-health that is difficult to assess using bio-medical means, (2) SRH may refer health risk behaviour and psychosocial context affecting health negatively, and (3) personality factors such as fatalism may influence health perceptions [10–12]. Based on previous studies [7, 13–17] on a conceptual model describing determinants of SRPH and SRMH, we propose socioeconomic status, sex, age, social capital, physical chronic diseases, body pain, functional status, mobility limitations, sensory deficits, cognitive impairment, depression, and health risk behaviours.

SRPH and SRMH (or health-related quality of life) may decrease with increasing age [18–20]. Among older adults 80 years and older in Sao Paulo, Brazil, 50.4% (0–100) had reported physical health summary and 43.4% (0–100) reported mental health summary [7]. Among older adults 80 years and older in Thailand in 2014, 34.4% rated their physical health as poor or very poor, the mean happiness score was 7.1 (0–10), and 22% had any daily activity limitations [21], and among older adults 80 years and older in Thailand in 2017 67% rated their physical health as good or very good [4].

Factors associated with better SRPH among older adults 80 years and older, include sociodemographic variables, including male sex [7, 22], older age [22], younger age (80–89 versus ≥ 90 years) [7], higher subjective economic status, and region [22]. Health-related variables associated with higher SRPH are no, or lower activities of daily living [22], adequate access to medical service, no falls history in the past 12 months [7], good self-rated vision [7], physical mobility, physical activity [23], exercise [22], no pain, no anxiety/depression, no chronic

illness [23], drinking alcohol [22] and adequate cognitive functioning [22]. Social and demographic factors associated with better SRMH (or subjective well-being) among older adults 80 years and older include age ≥ 100 (versus 80–89), female sex, higher education, ethnic majority group (versus minority), urban residence, number of children, financial independence, and access to adequate medical services [24]. Health-related variables associated with higher SRMH among older adults 80 years and older include leisure activities [24], good sleep quality [7], better self-rated health, lower functional disability score, no vision loss, no hearing loss [24], no medication use [7], exercising, past smoking (versus never smoking), current alcohol use (versus never drinking [24]), and adequate cognitive functioning [7].

Socioeconomic and regional differences may influence physical and mental health among older adults 80 years and older in Thailand. The gross regional product (GRP) was, for example, in the Northeast region 86,233 (Baht/year) GRP per capita, while in the Central region the GRP per capita was 265,663 (Baht/year) in 2020 [25]. The Human Development Index of 2019 in the four regions of Thailand was the highest in the central region 0.781 (Bangkok 0.841), followed by the southern region (0.766), the northern region (0.762), and the lowest in the northeastern region (0.758) [26]. Among older adults in Thailand, income distribution by region is highly unequal. Gini coefficient is highest in the northeastern region (0.64613), while lowest in the south (0.59334) [27]. Historically, although already the 1921 primary education Act established a three-year compulsory education within the primary level of seven years, which was enforced nationwide in 1935, enrolment was still low with an adult literacy of about 50% in the 1950s, this changed significantly after in 1951 the 1st National Scheme of Education (NSE) was adopted and a new National Education Plan was introduced in 1960 reaching adult literacy of more than 85.5% in the mid-1980s [28–30].

The Thailand Second National Plan for Older Adults (2002–2021) includes promoting “positive attitudes toward the elderly; strengthen health and economic services; and engage families, communities, and the private sector.” In terms of economics, establish an Older Adults Fund, pension fund for employees, and Old Age Allowance for the poor. Health services included “commitment to quality health and long-term care (LTC), with universal free health care, priority (‘green lane’) access to outpatient services for older adults, and establishment of dedicated older adult clinics in hospitals.” “The Plan introduced multidisciplinary home health-care teams; initiated the Community Volunteer Caregivers for the Older Adults project; established multipurpose Senior Citizen Centers, homes for older adults, and community learning centers; and initiated development of a

community-based, integrated health care and social welfare services model for older adults” [31]. “Community hospitals provide treatment, while sub-district health promotion hospitals focus on preventative and restorative care. Care managers conduct a needs assessment based on the Barthel daily activity limitation index and develop a care plan for older people in their locality, and are then referred for LTC services, including home care” [4].

However, there is a lack of knowledge about the prevalence and associated factors of SRPH and SRMH among older adults 80 years and older in Thailand, which are needed to design health services and policies for the older adults 80 years and older [21]. To address this research gap, the aim of this study was to assess the SRPH and SRMH of older adults 80 years and older in Thailand in a cross-sectional study.

Methods

Sample and procedure

We analyze national cross-sectional data of older adults 80 years and older from the Health, Aging, and Retirement in Thailand (HART) study in 2015. In a three-stage (region, province, blocks or villages) stratified random sampling in each household, one person (≥ 45 years) was randomly selected, being the inclusion criterium. For frail respondents proxy interviews were administered [32, 33]. We restricted our analytical sample to those 80 years and older ($N=927$), excluding 101 proxy interviews. The study received ethical approval from the “Ethics Committee in Human Research, National Institute of Development Administration – ECNIDA (ECNIDA 2020/00012)”, and participants provided written informed consent.

Measures

Outcome variables

Self-rated physical health status was measured with the item, “In general, how would you rate your physical health status?” reported on a 0 (=very poor) to 100 (=excellent) visual analogue scale. Self-rated (good) physical health was defined as 70.0–100 (70.0 being the median).

The self-rated mental health status was assessed with the question, “In general, how would you rate your mental health status?” reported on a 0 (=very poor) to 100 (=excellent) visual analogue scale. Self-rated (good) mental health was defined as 80.0–100 (80.0 being the median). The rating from 0 to 100 of the single item self-rated health status has been used and validated in previous studies [34–37] and found to have high predictive validity for mortality [8].

Social and demographic covariates

Variables included age, sex, education, marital status, region, religion, self or spouse owning a house, having a life insurance, and having private health insurance.

No or low income was calculated based on “annual income from employment, own business, agricultural / livestock / fishing business, short-term or contract work, financial support from family, remuneration/pension income from the government fund, occupational pension fund, private pension fund, social security / welfare income, income from government living allowance, veteran’s welfare benefit, other welfare assistance income, and income from other sources, and defined as the lowest quartile 0 to $< 13,000$ Thai Baht (average exchange rate in 2015: 1 US\$=34.2 Baht)” [33].

Low formal social engagement (defined as absence of activity) was measured with 6 items on “religious, occupational, cultural organization, alumni or parent association or association of people from the same hometown, volunteer, and political organization” The question was, “In the past year, how often do you participate in these activities? Response options were “day, week, month, year, never.” [33, 38–40]. Responses were coded “1=daily to at least once a month and 0=once a year or never.” [40].

Low informal social engagement was asked with two items, (1) “In the past year, do you have any close friends or relatives who live nearby and have a close relationship with? (Please refer to the only person whom you meet most often); and (2) “If so, how often do you meet with them in person (number of times per day, week, month, year, other, never)?” “Low informal social engagement was defined as 1=not having a close friend or relative or meeting a close friend less than once a month in the past year, and 0=having a close friend or relative who lives nearby and has a close relationship with, and having met that person at least once in a month in the past year” [33].

Health-related covariates

Daily activity limitations were measured based on eating, bathing, dressing, and washing [41]. The response options ranged from 0= “able to do it all by myself” to 3 = “need help for all steps”. “Daily activity limitations were defined as any of the four items unable to do all by him or herself” (Cronbach’s $\alpha=0.96$).

Body pain. Past-month pain in 13 body parts (“the head, shoulders, arms, wrists, fingers, chest, abdomen, waist, hips, legs, knees, ankles, and toes” by asking the following question, “Did you feel any pain or ache in the following body parts in the last month?” The response options were none, mild, moderate, or severe. We defined moderate or severe pain in the past 4 weeks in one or more of the 13 body parts as “body pain” [42].

Chronic physical conditions (0, 1, 2 or more) were evaluated by self-reported health care provider diagnosed conditions, including “hypertension, diabetes, lung diseases, emphysema, cardiovascular diseases, heart disease, heart failure, rheumatism, arthritis, bone diseases, low bone density, osteoporosis, kidney diseases, cancer, and liver diseases” [43].

Vision impairment was determined from any of three questions, 1) “Have you been diagnosed by a doctor with visual impairment?” (Yes/No), 2) Have you ever been diagnosed from a doctor with blind (1 eye), blind (2 eyes) (Yes/No), and 3) “How would you rate your current vision/eyesight?” from 0=very poor to 100=excellent, poor was classified as 0–50 and good as 60–100.

Hearing impairment was determined from any of three questions, 1) “Have you been diagnosed by a doctor with hearing impairment?” (Yes/No), 2) Are you using a hearing device or aid? (Yes/No), and 3) “How would you rate your current hearing ability?” from 0=very poor to 100=excellent, poor was classified as 0–50 and good as 60–100.

Cognitive functioning was assessed with two tasks (i) word recall (immediate and delayed word recall tasks), and (ii) numeracy (serial-7), giving a total score of correct answers between 0 and 6. Low cognitive functioning was defined as 0–1 scores and high cognitive functioning 2–6 scores.

Probable depression (≥ 10 scores) was measured with the Center for Epidemiologic Studies Depression (CES-D-10) scale [44]. (Cronbach’s $\alpha = 0.80$).

The history of falls that affect physical health was assessed in the last 2 years.

Tobacco smoking was assessed with the question, “Have you ever smoked cigarettes?” (response options: “1=yes, and still smoke now, 2=yes, but quit smoking, and 3=never”).

Alcohol use was assessed with the question, “Have you ever drunk alcoholic beverages such as liquor, beer or wine?” (response options: 1=yes, and still drinking now, 2=yes, but do not drink now, and 3=never).

Physical activity was sourced from questions on the frequency and duration of any type of exercise in the past week [45], and categorized as “none=inactivity, 1–149 min/week=low activity, and ≥ 150 min/week=high activity” [46].

Data analysis

Frequency and percentage distribution were calculated to describe the sample, and Pearson chi-square tests were used to test for differences in proportions. Logistic regression was used to estimate odds ratios and confidence intervals (95% CI) of SRPH and SRMH. Variables significant ($p < 0.05$) in univariable analysis were subsequently included in the multivariable model. Covariates

were selected based on a previous literature review [7, 22–24]. All statistical analyses were performed with StataSE 15.0 (College Station, TX, USA). $P < 0.05$ was accepted as significant, and only complete cases were included in the analyses. Missing cases were $< 2\%$, except for depressive symptoms ($> 5\%$), therefore imputing the individual’s mean was applied to depressive symptoms. The variance inflation factor (VIF) was calculated to check for multicollinearity, and none was found between the study variables.

Results

Sample characteristics

The older adults 80 years and older sample included 927 participants (excluding 101 proxy interviews), 80–117 years, median age 84 years [interquartile range (IQR) 81–86 years]. The median SRPH was 70.0 (IQR=50.0–80.0), and median SRMH was 80.0 (IQR=70.0 to 90.0). The prevalence of (good) SRPH was 53.3%, and the prevalence of (good) SRMH was 59.9%. Univariable analysis showed that higher education, higher income, and region were associated with good SRPH and SRMH, and male sex was associated with good SRPH. Having a life insurance was negatively associated good SRPH. Low formal social engagement was negatively associated with good SRPH and SRMH (see Table 1).

Daily activity limitations, moderate/severe pain, hearing impairment, low cognitive functioning, probable depression, and no physical activity were negatively associated with both good SRPH and SRMH. Higher number of physical conditions and visual impairment were negatively associated with SRPH (see Table 2).

Associations with self-rated physical health

In the final adjusted model, low or no income, living in the Northeastern, Northern and Southern region, daily activity limitations, moderate/severe pain, having one or two or more physical conditions, and low cognitive functioning were negatively associated, and higher physical activity was positively associated with good SRPH (see Table 3).

Associations with self-rated mental health

In the final adjusted model, no or low income, residing in the northern region of the country, daily activity limitations, low cognitive functioning, and probable depression were negatively associated with good SRMH, and physical activity was positively associated with good SRMH (see Table 4).

Discussion

This study aimed for the first time to provide national data on SRPH and SRMH among older adults 80 years and older in Thailand. We found a high median of SRPH

Table 1 Sample characteristics by social and demographic factors, HART 2015

Variable	Sample	Self-rated physical health		Self-rated mental health	
	N (%)	N (%)	p-value	N (%)	p-value
All	927	484 (53.3)		543 (59.9)	
Age (in years)	813 (87.7)	425 (53.4)	0.887	483 (60.7)	0.219
80–89	114 (12.3)	59 (52.7)		60 (54.5)	
90 or more					
Sex	489 (52.8)	234 (48.9)	0.004	284 (59.4)	0.736
Female	438 (47.2)	250 (58.3)		259 (50.5)	
Male					
Married/cohabiting	311 (34.1)	154 (50.7)	0.368	182 (59.9)	0.703
Divorced/separated/never married	48 (5.3)	25 (52.1)		26 (54.2)	
Widowed	553 (60.6)	301 (55.6)		326 (60.4)	
Education	152 (16.4)	61 (41.5)	0.003	72 (48.6)	0.009
No education	719 (77.7)	390 (55.2)		438 (62.2)	
Elementary	54 (5.8)	33 (63.5)		32 (61.5)	
>Elementary					
Own house	101 (10.9)	47 (48.0)	0.261	50 (51.0)	0.057
No	826 (89.1)	437 (54.0)		493 (61.0)	
Yes					
Life insurance	788 (85.0)	423 (54.9)	0.025	464 (60.3)	0.556
No	139 (15.0)	61 (44.5)		79 (57.7)	
Yes					
Private health insurance	872 (95.5)	454 (53.1)	0.492	513 (60.1)	0.838
No	41 (4.5)	24 (58.5)		24 (58.5)	
Yes					
Religion	55 (5.9)	26 (48.1)	0.428	31 (57.4)	0.688
Muslim and other	871 (94.1)	458 (53.7)		512 (60.2)	
Buddhist					
Low formal social engagement	239 (25.8)	138 (59.2)	0.034	153 (65.9)	0.029
No	687 (78.8)	345 (51.2)		389 (57.8)	
Yes					
Low informal social engagement	786 (85.0)	415 (54.0)	0.309	457 (59.5)	0.577
No	139 (15.0)	68 (49.3)		85 (62.0)	
Yes					
Low or no income	587 (63.3)	132 (65.7)	< 0.001	142 (70.3)	< 0.001
No	340 (36.7)	352 (49.8)		401 (57.0)	
Yes					
Region	357 (38.5)	217 (61.0)	< 0.001	234 (66.3)	0.013
Central	281 (30.3)	147 (53.3)		159 (57.2)	
North	141 (15.2)	60 (43.2)		78 (56.9)	
Northeast	148 (16.0)	60 (43.8)		72 (52.2)	
South					

(70.0) and median of SRMH (80.0). The latter may be compared to the mean happiness score of 7.1 (0–10) among older adults 80 years and older in Thailand [21] and the former with 67% of very good or good rated physical health among older adults 80 years and older in Thailand [4]. SRPH and SRMH seem to be higher in Thailand than among older adults 80 years and older in Sao Paulo, Brazil (50.4% physical health summary and 43.4% mental health summary) [7]. It is possible that some of these differences may be related to different forms of SRPH and SRMH measurements (in Thailand, a single item measure, and in Brazil a multi-item measure).

Furthermore, we found that low or no income, living in the Northeastern, Northern and Southern region, daily activity limitations, moderate/severe pain, having one

or two or more physical conditions, visual impairment and low cognitive functioning decreased the odds, and higher physical activity increased the odds of good SRPH. No or low income, residing in the northern region of the country, daily activity limitations, hearing impairment, low cognitive functioning, and probable depression decreased the odds of good SRMH, and physical activity increased the odds of good SRMH.

Consistent with previous studies [22], we found among older adults 80 years and older that lower economic status and not residing in the central region had poorer SRPH. Some studies found that male sex and age [7, 22] were associated with good SRPH, while this study showed this association with male sex but not with age in univariable analysis. The latter was also found in a study among

Table 2 Sample characteristics by health-related factors, HART 2015

Variable	Sample	Self-rated physical health		Self-rated mental health	
	N (%)	N (%)	p-value	N (%)	p-value
Daily Activity Limitation	831 (90.9)	461 (56.6)	<0.001	515 (63.4)	<0.001
No	83 (9.1)	20 (24.1)		24 (28.9)	
Yes					
Moderate/severe pain	561 (60.5)	324 (58.9)	<0.001	346 (63.0)	0.019
No	366 (39.5)	160 (44.7)		197 (55.2)	
Yes					
Physical chronic condition	390 (42.1)	231 (60.9)	<0.001	233 (61.5)	0.210
0	338 (36.5)	172 (51.5)		205 (61.4)	
1	199 (21.5)	81 (41.5)		105 (54.4)	
2 or more					
Visual impairment	571 (61.6)	350 (62.9)	<0.001	358 (64.5)	<0.001
No	356 (38.4)	134 (38.1)		185 (52.7)	
Yes					
Hearing impairment	689 (74.3)	393 (58.5)	<0.001	435 (64.7)	<0.001
No	238 (25.7)	91 (38.6)		108 (46.2)	
Yes					
Cognitive functioning	705 (78.5)	412 (59.4)	<0.001	461 (66.6)	<0.001
High	193 (21.5)	64 (34.0)		69 (36.9)	
Low					
Probable depression	789 (85.1)	434 (56.7)	<0.001	484 (63.4)	<0.001
No	138 (14.9)	50 (35.2)		59 (41.3)	
Yes					
Falls	837 (90.3)	444 (54.2)	0.098	488 (59.7)	0.605
No	90 (9.7)	40 (44.9)		55 (62.5)	
Yes					
Smoking tobacco	800 (86.3)	416 (53.3)	0.871	480 (61.5)	0.046
Never	89 (9.6)	49 (55.1)		45 (51.1)	
Past	38 (4.1)	19 (50.0)		18 (47.4)	
Current					
Alcohol use	836 (90.2)	437 (53.5)	0.130	498 (61.0)	0.029
Never	68 (7.3)	31 (45.6)		30 (44.8)	
Past	23 (2.5)	16 (69.6)		15 (65.2)	
Current					
Physical activity	609 (65.7)	286 (47.8)	<0.001	324 (54.6)	<0.001
None	212 (22.9)	120 (58.8)		140 (67.6)	
1-149 min/week	106 (11.4)	78 (73.6)		79 (74.5)	
≥ 150 min/week					

Table 3 Adjusted logistic regression with self-rated physical health, HART 2015

Variable	AOR (95% CI)	p-value
Social and demographic factors		
Sex	1 (Reference)	0.073
Female	1.33 (0.97 to 1.81)	
Male		
Education	1 (Reference)	0.290
No education	1.27 (0.82 to 1.97)	0.735
Elementary	1.14 (0.53 to 2.89)	
>Elementary		
Life insurance	0.63 (0.41 to 0.97)	0.038
Low formal social engagement	0.81 (0.55 to 1.17)	0.259
Low or no income	0.63 (0.45 to 0.88)	0.006
Region	1 (Reference)	0.011
Central	0.60 (0.40 to 0.89)	<0.001
North	0.40 (0.24 to 0.65)	0.022
Northeast	0.54 (0.31 to 0.91)	
South		
Health-related factors		
Daily Activity Limitation	0.41 (0.23 to 0.74)	0.003
Moderate/severe pain	0.63 (0.46 to 0.86)	0.004
Physical chronic condition	1 (Reference)	0.007
0	0.61 (0.43 to 0.87)	<0.001
1	0.36 (0.24 to 0.55)	
2 or more		
Visual impairment	0.41 (0.29 to 0.56)	<0.001
Hearing impairment	0.77 (0.53 to 1.11)	0.162
Low cognitive functioning	0.51 (0.34 to 0.76)	0.005
Probable depression	0.69 (0.45 to 1.08)	0.109
Physical activity	1 (Reference)	0.164
None	1.30 (0.90 to 1.89)	0.016
1-149 min/week	1.92 (1.13 to 3.27)	
≥ 150 min/week		

AOR= Adjusted Odds Ratio

older adults 80 years and older in Sweden [23]. Regarding health-related variables, we found in agreement with previous research [7, 22, 23] that daily activity limitations, physical comorbidity, including vision impairment, body pain, and low cognitive functioning decreased the odds of SRPH and physical activity increased the odds of SRPH. Vision difficulties may adversely affect activities of daily living and thus impact negatively on SRPH. Although a previous study [23] found an association between anxiety/depression and lower SRPH, we found this to be true for probable depression only in the univariate analysis. We did not find an association between smoking, alcohol use and SRPH, as this was found in some previous research [22].

Consistent with some previous findings [7, 24], this study showed that a lower prevalence of SRMH in older adults 80 years and older with lower economic status, residing in the northern region of the country, daily activity limitations, physical comorbidity, including hearing impairment, lower cognitive functioning, probable depression and lower physical activity. Low formal social

Table 4 Logistic regression with self-rated mental health, HART 2015

Variable	AOR (95% CI)	p-value
Social and demographic factors		
Education	1 (Reference)	0.384
No education	1.21 (0.79 to 1.86)	0.414
Elementary	0.74 (0.35 to 1.54)	
>Elementary		
Low formal social engagement	0.67 (0.45 to 1.01)	0.056
Low or no income	0.58 (0.41 to 0.80)	<0.001
Region	1 (Reference)	0.011
Central	0.61 (0.42 to 0.89)	0.058
North	0.64 (0.40 to 1.02)	0.090
Northeast	0.63 (0.36 to 1.08)	
South		
Health-related factors		
Daily Activity Limitation	0.46 (0.26 to 0.82)	<0.001
Moderate/severe pain	0.76 (0.55 to 1.05)	0.092
Visual impairment	0.78 (0.56 to 1.08)	0.130
Hearing impairment	0.68 (0.47 to 0.97)	0.038
Low cognitive functioning	0.37 (0.25 to 0.54)	<0.001
Probable depression	0.54 (0.34 to 0.85)	0.008
Smoking tobacco	1 (Reference)	0.341
Never	0.71 (0.35 to 1.44)	0.481
Past	0.74 (0.32 to 1.72)	
Current		
Alcohol use	1 (Reference)	0.215
Never	0.61 (0.27 to 1.34)	0.953
Past	1.03 (0.34 to 3.12)	
Current		
Physical activity	1 (Reference)	0.107
None	1.38 (0.93 to 2.03)	0.024
1-149 min/week	1.91 (1.09 to 3.34)	
≥ 150 min/week		

AOR= Adjusted Odds Ratio

engagement decreased the odds of SRMH in univariate analysis. In a study among older adults (≥ 80 years) social functioning was associated with greater positive affect or better SRMH [47]. Hearing difficulties can adversely affect interpersonal communication and may trigger symptoms of anxiety and fear, inability to hear and/or see, thus negatively impacting SRMH [25]. Contrary to some previous research [24], we did not find any significant differences in the prevalence of SRMH regarding age, sex, ethnicity or religion, smoking and alcohol use. Higher education was associated with better SRMH in China [24], while we only found this in univariable analysis. Lower socioeconomic status can be considered as a chronic stressor, as lower socioeconomic status may perpetrate various adverse social and environmental conditions [48]. Lower educational attainment likely affects health both through a higher-stress lifestyle and through material deprivation.” [49]. In terms of educational attainment in Thailand, there was low school enrollment in the 1960s [29], meaning that the older generation had

less educational opportunities. In our study, 17.7% of the older adults 80 years and older had no formal education.

We found regional differences in the prevalence of SRPH and SRMH, with the northeast region, northern and southern regions scoring lower than the central region in both SRPH and SRMH. These differences seem to be reflected in regional socioeconomic inequities, with the northeastern region having the lowest GRP, lowest Human Development Index and highest Gini coefficient, and the central region having the highest GRP and highest Human Development Index [25–27], and the central region including Bangkok having a lower poverty rate than all other regions [4]. Implications of these findings are that health care planning for older adults 80 years and older should consider these regional differences. Lower cognitive functioning decreased both SRPH and SRMH. Cognitive loss may lead to a decrease in autonomy and social interaction, negatively affecting SRPH and SRMH [7]. Physical activity was found to positively affect both SRPH and SRMH, which may be linked to the release of emotion-related neurotransmitters [45], and should be promoted among older adults 80 years and older. The Thai government may want to increase its “pension coverage and benefits to address the income insecurity of older people. The universal allowance for older people should relate to the national subsistence level and the poverty line.” [50].

Study limitations

The survey excluded institutionalised older adults 80 years and older. SRPH and SRMH were only assessed with single items. Cognition was only assessed with two components, and future studies should include multi-component cognitive measures. Depression was only assessed with a screening instrument. Nutrition may influence health problems among older adults 80 years and older, but this was not assessed in this study and should be part of future research.

Conclusion

SRPH and SRMH was relatively high rated among the oldest old in Thailand, and influenced by various social, economic, and health-related factors. Special attention should be paid to those without or low income, those living in non-central regions, and those who have no or low formal social participation. Health care and other services should improve physical activity, financial support, and physical and mental care management to promote physical and mental well-being of the older adults 80 years and older in Thailand. For example, physical activity interventions could include ≥ 150 min/week moderate intensity activity such as brisk walking, ≥ 2 days/week muscle strengthen activities, and activities such as standing on one foot to improve balance, and in terms of

mental health, interventions can include active screening for depression and home-based depression care management.

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Authors' contributions

"All authors fulfill the criteria for authorship. SP and KP conceived and designed the research, performed statistical analysis, drafted the manuscript and made critical revision of the manuscript for key intellectual content. All authors read and approved the final version of the manuscript and have agreed to authorship and order of authorship for this manuscript."

Data Availability

Data is publicly available at Gateway to Global Ageing Data, Health, Aging, and Retirement in Thailand: <https://g2aging.org/?section=study&studyid=44>.

Declarations

Ethics approval and consent to participate

The study received ethical approval from the "Ethics Committee in Human Research, National Institute of Development Administration – ECNIDA (ECNIDA 2020/00012)", and participants provided written informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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References

- Pongpaiboon N. Situation of Thai older persons, 2020. https://www.dop.go.th/download/knowledge/th1635826412-975_0.pdf (accessed 5 August 2022).
- World Data Atlas. Thailand - Life expectancy at age 60 years for both sexes combined., 2020. <https://knoema.com/atlas/Thailand/topics/Demographics/Age/Life-expectancy-at-age-60-years> (accessed 5 August 2022).
- Foundation of Thai Gerontology Research and Development Institute (TGRI). The situation of the elderly, Thailand., 2019. https://www.dop.go.th/download/knowledge/th1610945020-322_1.pdf (accessed 5 August 2022).
- Glinskaya E, Walker T, Wanniarachchi T. Caring for Thailand's Aging Population. Washington, D.C.: World Bank; 2021.
- König HH, Brettschneider C, Lühmann D, et al. EQ-5D-3L health status and health state utilities of the oldest-old (85+) in Germany: results from the AgeCoDe-AgeQualiDe study. *Qual Life Res.* 2020;29:3223–32. <https://doi.org/10.1007/s11136-020-02597-0>.
- Fan Y, He D. Self-rated health, socioeconomic status and all-cause mortality in Chinese middle-aged and elderly adults. *Sci Rep.* 2022 Jun 3;12(1):9309. <https://doi.org/10.1038/s41598-022-13502-9>.
- Freitas JLGDS, Silva JMM, Nóbrega JCL, Simões RFM, Medeiros JB, Alves RO, Santos JLF, Duarte YAO, Zatz M, Matheson D, Menezes TN, Santos S. Health-Related Quality of Life and Associated factors: Regional differences among Oldest-Old in Brazil. *Inquiry.* 2022;59:469580221086922. <https://doi.org/10.1177/00469580221086922>.
- Schnittker J, Bacak V. The increasing predictive validity of self-rated health. *PLoS One.* 2014 Jan 22;9(1):e84933. <https://doi.org/10.1371/journal.pone.0084933>.
- Mossey JM, Shapiro E. Self-rated health: a predictor of mortality among the elderly. *Am J Public Health.* 1982;72:800–08.
- Eriksson I, Undén AL, Elofsson S. Self-rated health. Comparisons between three different measures. Results from a population study. *Int J Epidemiol.* 2001 Apr;30(2):326–33. <https://doi.org/10.1093/ije/30.2.326>. PMID: 11369738.
- Appels A, Bosma H, Grabauskas V, Gostautas A, Sturmans F. Self-rated health and mortality in a Lithuanian and a Dutch population. *Soc Sci Med.* 1996;28:681–90.
- Idler EL, Kasl S. Health perceptions and survival: do global evaluations of health status really predict mortality? *J Gerontol.* 1991;46(2):55–65. <https://doi.org/10.1093/geronj/46.2.s55>.
- Li Y, Nima Q, Yu B, Xiao X, Zeng P, Suolang D, He R, Ciren Z, Wangqing P, Laba C, Silang Y, Song L, Kangzhu Y, Li J. Determinants of self-rated health among an older Tibetan population in a Chinese plateau area: analysis based on the conceptual framework for determinants of health. *BMC Public Health.* 2021 Mar 11;21(1):489. <https://doi.org/10.1186/s12889-021-10359-x>.
- Lisko I, Törmäkangas T, Jylhä M. Structure of self-rated health among the oldest old: analyses in the total population and those living with dementia. *SSM Popul Health* 2020 Mar 18;11:100567. <https://doi.org/10.1016/j.ssmph.2020.100567>. PMID: 32258355; PMCID: PMC7110410.
- Jylhä M. What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Soc Sci Med.* 2009 Aug;69(3):307–16. <https://doi.org/10.1016/j.socscimed.2009.05.013>.
- French DJ, Sargent-Cox K, Luszcz MA. Correlates of subjective health across the aging lifespan: understanding self-rated health in the oldest old. *J Aging Health* 2012 Dec;24(8):1449–69. <https://doi.org/10.1177/0898264312461151>.
- Nyqvist F, Gustavsson J, Gustafsson Y. Social Capital and Health in the Oldest Old: The Umeå 85+ Study. *International Journal of Ageing and Later Life*, 2006 1(1): 91–114. of health status really predict mortality? *J Gerontol* 1991;46:55–65.
- World Health Organization. 10 facts on ageing and health., 2017. <https://www.who.int/news-room/fact-sheets/detail/10-facts-on-ageing-and-health> (accessed 5 August 2022).
- Kessler RC, Birnbaum HG, Shahly V, Bromet E, Hwang I, McLaughlin KA, Sampson N, Andrade LH, de Girolamo G, Demeyttenaere K, Haro JM, Karam AN, Kostyuchenko S, Kovess V, Lara C, Levinson D, Matschinger H, Nakane Y, Browne MO, Ormel J, Posada-Villa J, Sagar R, Stein DJ. Age differences in the prevalence and co-morbidity of DSM-IV major depressive episodes: results from the WHO World Mental Health Survey Initiative. *Depress Anxiety.* 2010;27(4):351–64. <https://doi.org/10.1002/da.20634>.
- Park EJ, Cho SI, Jang SN. Poor health in the Korean older population: age effect or adverse socioeconomic position. *Arch Gerontol Geriatr.* 2012;55(3):599–604. <https://doi.org/10.1016/j.archger.2012.06.001>.
- Knodel J, Teerawichitchainan B, Prachuabmoh V, Pothisiri W. The situation of Thailand's older population: an update based on the 2014 survey of older persons in Thailand. Chiang Mai: Help Age International, East Asia/Pacific Regional Office; 2015.
- Gu L, Cheng Y, Phillips DR, Rosenberg M. Understanding the wellbeing of the Oldest-Old in China: a study of Socio-Economic and geographical variations based on CLHLS Data. *Int J Environ Res Public Health.* 2019;16(4):601. <https://doi.org/10.3390/ijerph16040601>.
- Simonsson B, Molarius A. Self-rated health and associated factors among the oldest-old: results from a cross-sectional study in Sweden. *Arch Public Health.* 2020;78:6. <https://doi.org/10.1186/s13690-020-0389-2>.
- Cheng G, Yan Y. Sociodemographic, health-related, and social predictors of subjective well-being among Chinese oldest-old: a national community-based cohort study. *BMC Geriatr.* 2021;21(1):124. <https://doi.org/10.1186/s12877-021-02071-7>.
- National Economic and Social Development Council (NESDC) Gross Regional and Provincial Product Chain Volume Measures. 2020 Edition. 2020. https://www.nesdc.go.th/main.php?filename=gross_regional (accessed 5 August 2022).
- Global Data Lab, Subregional HDI, Thailand. 2020. https://globaldatalab.org/shdi/shdi/THA/?levels=12B4&interpolation=1&extrapolation=0&near_est_real=0&years=2019 (accessed 5 August 2022).
- Anantanasuwong D. Income Distribution and Socio-economic Disparity in Aging Society in Thailand. 03-Dararatt様.indd(<https://www.ritsumei.ac.jp>) (accessed 5 August 2022).
- Michel S. The Burgeoning of Education in Thailand: a quantitative success. Mounier; Alain; Tangchuang; Phasina. Education and knowledge in Thailand: the quality controversy, silkworm books, 11–37, 2010. fhal-02911422 f.

29. Facts and details. Education in Thailand: history, literacy, women, universities problems, improvements, 2014. https://factsanddetails.com/southeast-asia/Thailand/sub5_8g/entry-3297.html#chapter-2 (accessed 5 August 2022).
30. Sirindhorn PMahaC, H.R.H. History and development of Thai Education. In: Fry G, editor. Education in Thailand. Education in the Asia-Pacific Region: issues, concerns and prospects. Volume 42. Singapore: Springer; 2018. https://doi.org/10.1007/978-981-10-7857-6_1.
31. Jitapunkul S, Wivatvanit S. National Policies and Programs for the Aging Population in Thailand. *Ageing Int.* 2009;33:62–74.
32. Anantanasuwong D, Theerawanviwat D, Siripanich P. Panel survey and study on health and gerontology and population aging. Cham: Springer; 2019.
33. Anantanasuwong D, Pengpid S, Peltzer K. Prevalence and associated factors of successful ageing among people 50 years and older in a national community sample in Thailand. *Int J Environ Res Public Health*, 19, 10705. <https://doi.org/10.3390/ijerph191710705>.
34. Meng Q, Xie Z, Zhang T. A single-item self-rated health measure correlates with objective health status in the elderly: a survey in suburban Beijing. *Front Public Health* 2014 Apr 10;2:27. <https://doi.org/10.3389/fpubh.2014.00027>.
35. Lin YH, Chen HC, Hsu NW, Chou P. Validation of global self-rated Health and Happiness Measures among older people in the Yilan Study, Taiwan. *Front Public Health* 2020 Jul 31;8:346. <https://doi.org/10.3389/fpubh.2020.00346>.
36. Feng Y, Parkin D, Devlin NJ. Assessing the performance of the EQ-VAS in the NHS PROMs programme. *Qual Life Res.* 2014 Apr;23(3):977–89. <https://doi.org/10.1007/s11136-013-0537-z>. Epub 2013 Oct 1. PMID: 24081873; PMCID: PMC4287662.
37. EuroQol Group. EuroQol—a new facility for the measurement of health-related quality of life. *Health Policy.* 1990;16(3):199–208. [https://doi.org/10.1016/0168-8510\(90\)90421-9](https://doi.org/10.1016/0168-8510(90)90421-9).
38. Chung S, Jeon H, Song A, Kim JH. Developmental trajectories and predictors of social exclusion among older Koreans: exploring the multidimensional nature of social exclusion. *Soc Indic Res.* 2019;144:97–112.
39. Lee S. Social Exclusion and Subjective Well-being Among Older Adults in Europe: Findings From the European Social Survey. *J Gerontol B Psychol Sci Soc Sci.* 2021 Jan 18;76(2):425–434. <https://doi.org/10.1093/geronb/gbaa172>.
40. Berkman LF, Sekher TV, Capistrant B, Zheng Y. Social networks, family, and care giving among older adults in India. In *Aging in Asia: Findings from New and Emerging Data Initiatives*; Smith, J.P., Majmundar, M., Eds.; The National Academic Press: Washington, DC, USA, 2012; pp. 261–278.
41. Katz S, Ford AB, Heiple KG, Newill VA. Studies of illness in the aged: recovery after fracture of the hip. *J Gerontol.* 1964 Jul;19:285–93. <https://doi.org/10.1093/geronj/19.3.285>.
42. Pengpid S, Peltzer K. A cross-sectional and longitudinal study of Pain among Middle-Aged and older adults in Thailand. *Pain Res Manag* 2023 Mar 9;2023:1158899. <https://doi.org/10.1155/2023/1158899>.
43. Pengpid S, Peltzer K, Anantanasuwong D. Bidirectional Association between probable Depression and Multimorbidity among Middle-Aged and older adults in Thailand. *J Multidiscip Healthc* 2023 Jan 7;16:11–9. <https://doi.org/10.2147/JMDH.S394078>. PMID: 36644708; PMCID: PMC9832925.
44. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas.* 1977;1(3):385–401.
45. Kim JH. Regular physical exercise and its association with depression: a population-based study short title: Exercise and depression. *Psychiatry Res.* 2022;309:114406. <https://doi.org/10.1016/j.psychres.2022.114406>.
46. Huffman MD, Capewell S, Ning H. Cardiovascular health behavior and health factor changes (1988–2008) and projections to 2020: results from the National health and nutrition examination surveys. *Circulation.* 2012;125:2595–602.
47. Margrett JA, Daugherty K, Martin P, MacDonald M, Davey A, Woodard JL, Miller LS, Siegler IC, Poon LW. Affect and loneliness among centenarians and the oldest old: the role of individual and social resources. *Aging Ment Health.* 2011 Apr;15(3):385–96. <https://doi.org/10.1080/13607863.2010.519327>.
48. Colman I, Ataullahjan A. Life course perspectives on the epidemiology of depression. *Can J Psychiatry.* 2010;55(10):622–32. <https://doi.org/10.1177/070674371005501002>.
49. Muennig P. Education and Health, Editor(s): Peterson P, Baker E, McGaw B. *International Encyclopedia of Education (Third Edition)*, Elsevier, 2010, Pages 169–177.
50. Paweenawat SW, Liao L. 2021. Labor Supply of Older Workers in Thailand: The Role of Co-residence, Health, and Pensions. ADBI Working Paper 1224. Tokyo: Asian Development Bank Institute. <https://www.adb.org/sites/default/files/publication/687656/adbi-wp1224.pdf> (accessed 5 August 2022).

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