นิพนธ์ต้นฉบับ

Original article

Associations of Wealth with Health Status in the Thai Older Persons

Thaworn Sakunphanit, M.D., M.Sc. (Social Policy Financing), Dip. Thai Board of Internal Medicine, Certified Thai Board of Preventive Medicine*

Orawan Prasitsiriphon, M.Sc. (Actuarial Science and Risk Management), Ph.D.**

* Permanent Secretary Office, Ministry of Public Health, Thailand

** Health System Research Institute

Abstract   This study examined the distribution of wealth and associations between wealth and trends in relative health inequalities after adjusting for other socio-economic position indicators among Thai among Thai adults aged 50 and over. We obtained data from the Survey of The Older Persons in Thailand 2017. Two health outcomes, Self-rated health (SRH) and limitation of at least one activity daily living (ADL), were used as dependent variables. Binary logistic regression was conducted to examine the relationships with wealth index, education, place of resident including demographic. Health inequality was estimated using the Relative Index of Inequality (RII). This study found that wealth index, which derived from data of the survey of older person, could be used to provide measures of socioeconomic inequality among Thai older persons and monitoring aging policies when income data was difficult to analyze and consumption expenditure data were not available. The inequality of health status was evident among various wealth groups. The richest tercile of the wealth index was much healthier than the poorest group, and this difference increased with age. Our results also suggested that education was protective factors for health outcome. However, living in rural or urban area were no statistic significant in this study.

Keywords: health inequalities; wealth; older persons

Introduction

Socio-economic position (SEP) is one of social determinant of health, which plays significant impact to health status and inequity in health of older person in high-income, middle-income and low-income countries[1-7]. Individuals with lower SEP exposed to multiple risk factors including health-related be-haviours and are more likely to suffer from numerous morbidity conditions and early mortality[8-13]. SEP also played significant role in development of frailty[14]. Based on these associations, measures to reduce inequities are placed in the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015. More specific policy agendas – such

as active ageing[15], healthy aging[16], social protection floor[17] and universal health coverage[18-20] – are also showed in action reform plans of international organizations and countries[21,22]. SEP is related to social and economic factors. Multiple SEP indicators are usually needed to measure entirely effect of SEP on health across the life course[23,24].

Household income, household consumption expenditure and wealth are directly measure material resources component of SEP, living standard and household economic status. Income affects to health through consumption expenditure of health enhancing goods and services. Wealth is related to income. However, they are not the same meaning. Wealth reflects accumulated assets that can be drawn upon in times of economic instability[25].

Wealth has advantages as indicator of SEP for older person than income and consumption expenditure regarding household economic status in middle-income and low-income countries[1,2,7]. First, household surveys usually do not collect or difficult to collect reliable income and consumption expenditure. In contrast, questions regarding ownership of assets are usually collected and more reliable[26,27]. Second, Well-being of older person depend on the economic status of their household more than individual income. Older people are usually living with family or rely on the support both in cash and in kind from family member, who live not far from them[28]. Third, wealth can be considered as a more permanent indicator than income and consumption expenditure, which may fluctuate from economic shock[29] especially for poor and near poor households, which usually do not have adequate reserve.

The principal component analysis (PCA) based

wealth index have been widely used in household survey[30,31]. It is a composite measure of ownership of durable assets and non-durable assets, housing characteristics and access to public services including public resources. Comparative analysis between wealth indices and income or expenditure indices found that the wealth index is at least as reliable as conventionally measured expenditures in explaining variation in education, fertility, and health[25,31-33]. Research have concluded that wealth has association with health outcome in old age in many countries. self-rate health and functional limitations were frequently used as health outcome indicators, while wealth index was used as one of SEP indicators[1-3].

In Thailand, a research previously conducted using the Surveys of the older population demonstrated association between education, categories income and number of household assets with self-rated health and functional disorders[7]. However, the study used number of household possession, which was not wealth index. The wealth index was constructed and used in other studies. Comparison the PCA-based wealth index with household income and expenditure using data from the 1998, 2000 and 2002 of national Socioeconomic survey (SES) found that correlation between the wealth index and household income/ expenditure was moderate, ranging from 0.52 to 0.54[34]. The wealth index also was constructed using data from the 2014 Thai National Health Examination Survey for analysis socioeconomic inequalities in the association between alcohol use disorder and depressive disorder among Thai adults[13].

This study aims to find association of wealth with health status of older person using wealth index approach, and possibility to use wealth index as a so-

cioeconomic position indicator for monitoring inequity in health and social policies.

Material and Methods

This study uses data from the 2017 Survey of The Older Persons in Thailand, which is a repeated cross-sectional survey by the National Statistical Office (NSO). This survey is conducted every three years. The survey objects are Thai citizens, who are not less than 50 years old. The total sample of older individuals (50 years old and above) of the sixth rounds survey in 2017 ware around 70,000.

We used two dependent variables to measure health status, which is based on self-reported information. The first indicator was self-rated health (SRH), The second indicator was self-reported difficulty performing one or more of the ''activities of daily living'' (ADL). SRH was assessed on a five points scale, which were combined to a dichotomous variable: Answers as "very good", "good", "average" are considered as 0, and "bad" and "very bad" are considered as 1. Another dichotomous variable, which was defined as "dependency" in this analysis, was created using assessment of six basic ADLs - washing, toileting, dressing, feeding, mobility, and transferring. If answer were "could not perform activity" or "can limitation to perform the activity" for at least one activity of the 6 ADLs, a score of 1 was coded, 0 for otherwise.

Independent variable was a wealth index, which was constructed from data of household assets and household characteristic in the survey. This study applied the principal component analysis (PCA) to derive a relative weight to the wealth index[25,30,35]. The PCA technique is a multivariate statistical technique used to reduce a set of correlated variables into a smaller number of uncorrelated "principal components". Filmer and Prichette suggested to use only the first principal component to represent the household's wealth[35]. Factor scores from the first principal component is used to generate a household score. Although first principal component frequently explains substantial proportion but not majority of the total variation, including subsequent higher order component may improve not much explanation of the total variance[32, 35], and higher order components may not association with consumption expenditure[25], which can be explained that each included asset variable may have determinant other than socioeconomic status[30].

Data of housing characteristics, water sources and ownership of household assets from section 9 of the survey were used except 2 questions regarding safety measures for older person. Altogether 20 variables could be classified into two groups: housing characteristics and water supply (5 items; accommodation type, building style, having bathroom/toilet, source of drinking water/ source of water supply in household), possession of durable assets (15 items; television, VCD/DVD, mobile phone, computer, refrigerator, microwave, washing machine, air condition, motorcycle, cable TV, satellite TV, internet, car/pickup truck/van, tractor, wheel-plough). Housing characteristics were converted into dichotomous variable as permanent building/material or non-permanent. According to WHO and UNICEF criteria[36], water supply were recoded into binary variable (no service/unimproved water source and improved water sources). The rest of asset variables were dichotomous having a value of either zero or one.

Control variables are age group (50-59, 60-69

and 70 and over), the personal highest education level (primary school or lower, secondary school, vocational, college or university), type of household (single, couple, more than one generation), place of residence (urban, rural).

The descriptive statistics were used for analysis: the frequency and percentage of each variable. Wealth was divided into terciles – "Poorest", "Middle" and "Richest".

The outcome on SRH and ADL was analysed by binary logistic regression. The result was presented as odds ratio (OR) and 95% confidence interval (CI). The relative index of inequality (RII) was calculated using multinomial logistic regression for assessment an inequality of health according to wealth status, which shows a relative gap between the highest group and the lowest group. All statistical analyses were performed using STATA 11 software. Missing data in any variable were excluded from the analysis.

Results

Wealth index

A wealth index was calculated by using PCA. The first principal component of PCA can predict 21 percent of total variance. Different asset has its factor score and standard deviation (Table 1). Having Air condition, Microwave, Computer, Car/Pickup truck/Van and Internet were top five of factor scores. Changing of wealth index of a household by each asset was calculated from Factor scores/SD. For instance, owning a car/truck/van raised a wealth index of a household by 0.69 units than one that did not. Owning

Table 1 Factor scores and summary statistics of variables

Variable	Mean	Std Dev	Min	Max	Factor Scores	F/SD
Construction materials of dwelling	0.9951	0.06979	0	1	0.0709	1.0159
Bathroom/toilet	0.9601	0.19576	0	1	0.1308	0.6682
Drinking water	0.8401	0.36656	0	1	0.1757	0.4793
Water supply	0.8979	0.30272	0	1	0.0834	0.2755
Television	0.9786	0.14462	0	1	0.1501	1.0379
VCD/DVD	0.3977	0.48943	0	1	0.2928	0.5982
Mobile phone	0.9458	0.22643	0	1	0.1933	0.8537
Computer	0.2223	0.41583	0	1	0.3507	0.8434
Refrigerator	0.9503	0.21725	0	1	0.1927	0.8870
Microwave	0.2565	0.43669	0	1	0.3592	0.8226
Washing machine	0.7474	0.43450	0	1	0.3029	0.6971
Air condition	0.2901	0.45381	0	1	0.3669	0.8085
Motorcycle	0.8000	0.40003	0	1	0.0902	0.2255
Cable TV	0.1057	0.30742	0	1	0.1762	0.5732
Satellite TV	0.7277	0.44515	0	1	0.1027	0.2307
Internet	0.3544	0.47835	0	1	0.3287	0.6872
Car/Pickup truck/Van	0.4572	0.49817	0	1	0.3430	0.6885
Tractor	0.0333	0.17953	0	1	0.0304	0.1693
Wheel-plough	0.1419	0.34897	0	1	-0.0500	-0.1433

wheel-plough was lowers the wealth index by 9.14. Accommodation type was dropped from calculation. Because it had zero variance.

The histogram and kernel-density plot of the distribution of overall wealth index from 20 indicators showed little evidence of clumping, but some truncation at the middle and upper part of the distribution. The mean wealth index score for poorest group, middle group and richest group are -1.83, 0.04 and 2.58 respectively. Households in the richest tercile usually have assets with high factor scores such as having Air condition, Microwave, Computer, Car/Pickup truck/Van and Internet. Small fraction of households in the poorest tercile had such assets. In contrast, higher percentage of poorest households had wheel-plough more than richest tercile. Most of households showed similar distribution pattern of housing characteristics.

Comparing with reported individual income, which was asked as 12 income level range from 0 to more than 500,000 Baht/year: 55% of poorest group reported that their income less than 29,999 Baht/year and 48% of richest group reported that their income more than 70,000 Baht/year. Correlation (Spearman's rho) between reported income and wealth score is 0.4464, p<0.001.

Socio-demographic characteristics

Characteristics of the included participants and health indicators using weighted data were showed in Table 2. The average age of them were 62.1 (men) and 62.6 (women). Most of the participants was aged 50-59 years, men (48.0%) and women (46.8%). The proportion of those over the age of 70 was 20.1% (men) and 22.7% (women), Around 42% were living in urban area, and most of them are married.

Table 2 Demographic, socioeconomic and health behaviour factors by sex

Variables	Men		Women	
	n	%	n	%
Health status				
Self-rated health (SHR)				
Poor	2,644	8.8	3,729	10.9
No poor	27,519	91.2	30,627	89.1
Limitation of activities of daily living				
(1) Disability at least 1 ADL (Dependency)	2,385	7.9	4,334	12.6
No disability	27,778	92.1	30,021	87.4
(2) Disability at least 3 ADL	721	2.4	1,238	3.6
Socioeconomic position				
Wealth group (tercile)				
Poorest	10,869	36.0	13,186	38.4
Middle	9,712	32.2	10,836	31.5
Richest	9,583	31.8	10,333	30.1
Education				
Primary school or lower	22176	73.5	28,239	82.2
Secondary school	4,690	15.5	2,971	8.6
Vocational, college or university	3,298	10.9	3,145	9.2

Table 2 Demographic, socioeconomic and health behaviour factors by sex

Variables	Men		Women	
	n	%	n	%
Demographic characteristics				
Age group				
50–59	14,493	48.0	16,070	46.8
60–69	9,593	31.8	10,477	30.5
70+	6,077	20.1	7,809	22.7
Marital status				
No partner	4,780	15.8	13,025	37.9
Married	25,384	84.2	21,331	62.1
Family type				
Single	2,508	8.3	3,753	10.9
Married couple	7,663	25.4	6,652	19.4
More than 1 household	19,954	66.2	23,863	69.5
Others	40	0.1	88	0.3
Place of residence				
Urban	12,683	42.0	14,695	42.8
Rural	17,480	58.0	19,660	57.2
Health behaviours				
Smoking				
Never	20,894	69.3	33,690	98.1
Seldom	3,330	11.0	292	0.8
Usual	5,939	19.7	374	1.1
Drinking alcohol				
Never	16,316	54.1	31,516	91.7
Seldom	12,028	39.9	2,478	7.2
Usual	1,820	6.0	362	1.1
Physical activity				
Never	5,766	19.1	8,379	24.4
Seldom	13,053	43.3	16,834	49.0
Usual	11,345	37.6	9,143	26.6
Eating fruits and vegetables				
Never	299	1.0	337	1.0
Seldom	9,015	29.9	9,425	27.4
Usual	20,849	69.1	24,594	71.6
Physical examination				
No	21,320	70.7	23,228	67.6
Yes	8,843	29.3	11,128	32.4
Total	**30,163**	**100.0**	**34,356**	**100.0**

Note: Around 10% of data are missing.

Over two thirds of them live in "more than one generational" households, and 8.3% and 10.9% of men and women live alone respectively. Women were in the poorest wealth level was more than men. 74% of men and 82% of women had no formal education or had attained only a primary school level of education.

Of all participants, poor SRH was higher for women rather than men. The prevalence of having limitation of ADL for at least 1 ADL (Dependency) was 7.9% and 12.6% in men and women respectively. Limitation of activities of daily living (ADL) at least 3 ADL was 2.4% in men and 3.6% in women.

The Degree of SHR and limitation of ADL by Wealth Index

The proportion of poor SHR and having limitation of at least 1 ADL (dependency) according to wealth decreased when the wealth level was higher both in men and women of every age groups. The proportion of poor health by SHR and having limitation of ADL (Dependency) increased with age (Table 3). Those aged 70 or above had the highest poor SHR (men 19.7%, women 24.2%). The richest tercile had the

Table 3 Self-rated health and limitation of ADL by wealth group, age groups and sex.

Sex	Age	Wealth group (Tercile)	Poor Health[a]		Disability[b]	
			n	%	n	%
Men	50–59	Poorest	221	5.9	153	4.1
		Middle	176	3.9	132	2.9
		Richest	140	3.5	74	1.8
		Total	537	4.3	359	2.9
	60–68	Poorest	365	10.1	262	7.3
		Middle	265	7.8	202	6.0
		Richest	172	5.9	147	5.1
		Total	802	8.1	611	6.2
	70+	Poorest	723	23.3	801	25.8
		Middle	336	18.2	455	24.7
		Richest	234	14.5	328	20.3
		Total	1,293	19.7	1,584	24.1
Women	50–59	Poorest	310	6.6	214	4.6
		Middle	296	5.4	189	3.4
		Richest	174	3.5	94	1.9
		Total	780	5.1	497	3.3
	60–69	Poorest	595	12.4	527	11.0
		Middle	321	8.6	326	8.7
		High	229	7.1	233	7.2
		Total	1,145	9.7	1,086	9.2
	70+	Poorest	1,111	8.1	1,613	11.8
		Middle	566	4.8	948	8.1
		High	440	4.3	782	7.6
		Total	2,117	24.2	3,343	38.2

a = Self-rated health, b = Limitation of ADL at least 1 ADL

lowest proportion of poor SHR for the same age groups. Dependency also increased with age. The higher the wealth tercile was, the lower the proportion of dependency.

Wealth Index as a tool for assessment inequity on SHR and dependency

The RII index according to wealth group showed consistent and negative association with poor SHR (OR 2.32, 95% CI:1.87-2.88 in men and OR=1.85, 95% CI:1.58-2.16) and dependency (OR=1.57, 95% CI:1.29-1.90 in men and OR=1.26, 95% CI:1.11-1.43). The relative inequality according to wealth level is greater in men than women, the degree of inequality is significant (Table 4).

The results of logistic regression analysis (Tables 5 and 6) showed that wealth index, advanced age groups, living with family (with couple or more than one generation) were associated with higher odds of poor SHR and dependency. Associations between self-rated health and wealth index were strongest among those in the poorest tercile and women in middle tercile. Strong association with SRH and dependency in age group 70 year and above and age group 60-69 years indicated a strong negative influence of aging on health status. Family type of living with only marries couple in men and living with more than 1 household in men and women are associate with poor SRH and dependency. Higher education and married, in contrast, is negative association with poor SHR and dependency. However, place of residence in urban and rural area was no statistic significant.

Table 4. Effects on self-rated health and limitation of activities of daily living (ADL) by gender.

Wealth group	Poor[a]				Disability[b]			
	Men		Women		Men		Women	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
High	1.000	0	1.000		1.000		1.000	
Middle	1.127	0.930-1.367	1.222*	1.056-1.414	1.117	0.926-1.347	1.109	0.968-1.271
Low	1.640*	1.366-1.968	1.551*	1.351-1.780	1.278*	1.063-1.536	1.225*	1.072-1.400
RII	2.317*	1.866-2.877	1.848*	1.580-2.162	1.567*	1.291-1.904	1.258*	1.108-1.430

Note:　　a = Self-rated health, b = Limitation of ADL

　　　　RII: relative index of inequality

　　　　* p<0.05

Table 5　Results from logistic regression odds ratios and 95% confidence intervals (CI) predicting poor health (self-rated health) by gender.

	Men		Women	
	OR	95%CI	OR	95%CI
Socioeconomic position				
Wealth group (Tercile)				
High (Ref.)	1.000		1.000	
Middle	1.127	0.930-1.367	1.222*	1.056-1.414
Low	1.640*	1.366-1.968	1.551*	1.351-1.780

Table 5 Results from logistic regression odds ratios and 95％ confidence intervals（CI）predicting poor health（self-rated health）by gender.（cont.）

	Men		Women	
	OR	95%CI	OR	95%CI
Education				
Primary school or lower (Ref.)	1.000		1.000	
Secondary school	0.826	0.672-1.015	0.818	0.641-1.042
Vocational, college or university	0.457*	0.324-0.644	0.460*	0.332-0.638
Demographic characteristics				
Age group				
50-59 (Ref.)	1.000		1.000	
60-69	1.901*	1.587-2.275	1.916*	1.671-2.197
70+	4.737*	3.965-5.659	4.964*	4.350-5.663
Marital status				
No partner (Ref.)	1.000		1.000	
Married	0.578*	0.488-0.684	0.761*	0.676-0.857
Family type				
Single (Ref.)	1.000		1.000	
Married couple	1.461*	1.052-2.030	1.052	0.845-1.309
More than 1 household	1.766***	1.295-2.409	1.318*	1.119-1.552
Others	1.994	0.451-8.811	1.033	0.426-2.505
Place of residence				
Urban (Ref.)	1.000		1.000	
Rural	0.979	0.861-1.114	1.013	0.918-1.119
Total (n)	30,163		34,356	

* $p<0.05$

Table 6 Results from logistic regression odds ratios and 95％ confidence intervals（CI）predicting limitation of activities daily living by gender.

	Men		Women	
	OR	95%CI	OR	95%CI
Socioeconomic position				
Wealth group (tercile)				
High (Ref.)	1.000		1.000	
Middle	1.117	0.926-1.347	1.109	0.968-1.271
Low	1.278*	1.063-1.536	1.225*	1.072-1.400
Education				
Primary school or lower (Ref.)	1.000		1.000	
Secondary school	0.764*	0.612-0.955	0.709*	0.557-0.903
Vocational, college or university	0.494*	0.365-0.669	0.378*	0.277-0.516

Table 6 **Results from logistic regression odds ratios and 95% confidence intervals (CI) predicting limitation of activities daily living by gender. (cont.)**

	Men		Women	
	OR	95%CI	OR	95%CI
Education				
Primary school or lower (Ref.)	1.000		1.000	
Secondary school	0.764*	0.612-0.955	0.709*	0.557-0.903
Vocational, college or university	0.494*	0.365-0.669	0.378*	0.277-0.516
Demographic characteristics				
Age group				
50-59 (Ref.)	1.000		1.000	
60-69	2.303*	1.913-2.773	2.810*	2.420-3.263
70+	9.940*	8.389-11.780	14.060*	12.200-16.190
Marital status				
No partner (Ref.)	1.000		1.000	
Married	0.497*	0.421-0.586	0.592*	0.529-0.662
Family type				
Single (Ref.)	1.000		1.000	
Married couple	1.595*	1.204-2.113	1.381*	1.126-1.693
More than 1 household	1.689*	1.315-2.170	1.620*	1.400-1.874
Others	0.375	0.080-1.762	1.564	0.730-3.352
Place of residence				
Urban (Ref.)	1.000		1.000	
Rural	0.895	0.786-1.020	1.042	0.947-1.147
Total (N)	**30163**		**34356**	

* p<0.05

Discussion

Analysis found strong association of wealth and health status using wealth index approach. Therefore, wealth index can be a socioeconomic position indicator for monitoring inequity in health and social policies using data from series of the Survey of The Older Persons in Thailand. Socioeconomic gradient from the index can showed different level of SRH and dependency. Regarding the two health outcomes, the relative inequity (RII) against SRH was higher than dependency. The gradient was remarkably high in older people aged 70 years old and above comparing to older people aged 60 – 69 years old. Moreover, the degree of relative inequality differs according to sex, which more research is needed to identify the causal factors.

Education is considered as another SEP indicator; the higher education person is more likely to have better health in this study. Unlike income, consumption expenditure and wealth, which reflect access to material goods and show standard living condition. Education could be considered as the non-material

goods, which is at least partially reflected to different aspect of SEP including different lifestyles behaviours, values, social network and opportunity for occupations[37].

As a cross-section survey, finding that living with family and marital status associated with SRH and dependency are not easy to interpret causal relations between theses finding and health outcome. It might be explained in other way round that opportunity of older persons living alone with poor health status or dependency was low. Nevertheless, it needs more research especially longitudinal study to answer the arguments.

Place of residence was no statistic significant for health outcome in this study. This result was different from other literatures, which showed urban–rural disparities[26,30,38]. It means that the difference in assess to public service, ownership of selected assets and housing characteristic of the same wealth tercile in rural and urban area is not large. This finding can be explained from benefits of people living in rural area from the Rural Infrastructure development projects such as the National Plan for Thailand Accelerated Rural Electrification, the piped water from artesian wells or village waterworks project, mobile phone network and transportation including direct health impacts from public health reform and the Universal Health Converge[39]. Limitation of questionnaires, which could not capture more detail of quantity and quality aspect of assets and household characteristics, were another possible explanation. The quality of services in rural areas have still needed to be improved. For instance, a study of the World Bank found that transportation to health facilities was the most obstacle for access to care of older people especially the poor ones, and older people who do not live with adult children are more likely to have lower utilization of health services[40]. Department of Water Resources has raised the issue of quality of village waterworks[41].

However, there was only mild linkage with income category and wealth index. This finding is compatible with previous study using the Socioeconomic survey[34]. It can be explained from the different perspective of wealth, which reflect more on long term socioeconomic.

There was some limitation on questionnaire regarding assets, which retarded ability of the index to accurately classified wealth index. Revise or add more specific assets – which are different specification and price, may reduce the effect of problem of clumping and truncation[25,42-45], and also have a strong impact on household rankings in a wealth index[32,42]. Second, questions asking for household characteristics, water sources and some durable assets were not having enough detail or quality aspect to differentiate for different level of wealth. For instance, asking only possession of durable asset such as mobile phone, television and other electronic equipment are not enough for differentiate SEP. people in different income (wealth) level can afford to get these durable assets, although the assets buying by people in different income level have different specification and price. Regarding question on household characteristic, household building material were similar for households in rural and urban area and in different wealth level. Detail quantity and quality of characteristics of the housing structure questions – such as number of rooms, number of toilets, type of floor and ownership status – may help for better differentiation.

In addition, this study relied on self-reported of

health status and their performance on daily activity livings. Unlike income or consumption expenditure, which is possible to distribute differently among family members by sex and age groups; wealth in this study had to distributed to all family members equally.

Dependency in this study did not include impairment of cognitive function such as Alzheimer's disease and other dementia. Therefore, prevalence of dependency might be lower than actual dependent.

Recommendations

Wealth index should be used as a SEP indicator using data from the Survey of Older Person in Thailand for monitoring level of health outcomes as proxies of well-being against implementation of aging policies. Further research to construct wealth index using data from other surveys such as the Health and Welfare Survey is recommended to see picture of the whole population. Research is also needed to revise or add assets for appropriated proxies for wealth of the different socioeconomic class. Since, there may be significant changes in household ownership of assets due to change of technology and lifestyle from time to time.

This study showed clearly high gradient of SEP to dependency especially the poor tercile group and older person aged 70 and above. Long term care need can be demonstrated from the prevalence of limitation of 3 ADLs of this study. The limitation of three out of the six Activities of Daily Living (ADLs) has been used as an eligible for claim for the long-term care benefit in Singapore[47] and other countries. Study on insurance for aging society for the Office of Insurance Commission (OIC) Thailand also suggested using the limitation of three out of the six ADLs as an eligible for claim[48]. Evidence from this study can provided

information for urgent social policies including social protection policies – such as income security in old age and long-term care – for older people especially oldest old group. Although the Old Age Allowance program has been expanded to all persons aged 60 and above, who lacked other pension coverage; and the community based Public Health Long Term Care System for Dependent Older People has already launched in 2016; the level of benefits is not adequate[28, 46]. The debates on the universal coverage and targeting approach including how to implement and who should be responsible to implement are far beyond the scope of this study. Nevertheless, the Survey on older person using wealth index and other SEP indicators can be used to monitor the progress of policy implementation against health outcomes.

Acknowledgement

References

1. Smith KV, Goldman N. Socioeconomic differences in health among older adults in Mexico. Social Science & Medicine 2007;65(7):1372-85.

2. Zimmer Z. Poverty, wealth inequality and health among older adults in rural Cambodia. Social Science & Medicine 2008;66(1):57-71.

3. Kumar K, Shukla A, Singh A, Ram F, Kowal P. Association between wealth and health among older adults in

rural China and India. Journal of the Economics of Ageing 2016;7:43-52.

4. Dahl E, Birkelund GE. Health inequalities in later life in a social democratic welfare state. Social Science & Medicine 1997;44(6):871-81.

5. Huisman M, Kunst AE, Mackenbach JP. Socioeconomic inequalities in morbidity among the elderly; a European overview. Social Science & Medicine 2003;57(5):861-73.

6. Mackenbach JP, Bopp M, Deboosere P, Kovacs K, Leinsalu M, Martikainen P, et al. Determinants of the magnitude of socioeconomic inequalities in mortality: a study of 17 European countries. Health & Place 2017;47:44-53.

7. Zimmer Z, Amornsirisomboon P. Socioeconomic status and health among older adults in Thailand: an examination using multiple indicators. Social Science & Medicine 2001;52(8):1297-311.

8. Goldman N, Kimbro RT, Turra CM, Pebley AR. Socioeconomic gradients in health for white and Mexican-origin populations. American Journal Of Public Health 2006;96(12):2186-93.

9. Evans GW, Kim P. Multiple risk exposure as a potential explanatory mechanism for the socioeconomic status-health gradient. Annals of the New York Academy of Sciences 2010;1186(1):174-89.

10. Dow WH, Rehkopf DH. Socioeconomic gradients in health in international and historical context. Annals of the New York Academy of Sciences 2010;1186(1):24-36.

11. Kim S, Symons M, Popkin BM. Contrasting socioeconomic profiles related to healthier lifestyles in China and the United States. American Journal of Epidemiology 2004;159(2):184-91.

12. Stewart-Brown S, Samaraweera PC, Taggart F, Kandala NB, Stranges S. Socioeconomic gradients and mental health: implications for public health. British Journal of Psychiatry 2015;206(6):461-5.

13. Assanangkornchai S, Nontarak J, Aekplakorn W, Chariyalertsak S, Kessomboon P, Taneepanichskul S. Socio-economic inequalities in the association between alcohol use disorder and depressive disorder among Thai adults: a population-based study. BMC Psychiatry 2020;20(1):1-11.

14. Majid Z, Welch C, Davies J, Jackson T. Global frailty: the role of ethnicity, migration and socioeconomic factors. Maturitas 2020;139:33-41.

15. World Health Organisation. Active ageing: a policy framework. Geneva: World Health Organisation; 2002.

16. Bousquet J, Kuh D, Bewick M, Strandberg T, Farrell J, Pengelly R, et al. Operative definition of active and healthy ageing (AHA): Meeting report. Montpellier October 20-21, 2014. European Geriatric Medicine 2015;6(2):196-200.

17. International Labour Organization. Social Protection Floors Recommendation, 2012 (No. 202). Geneva: International Labour Organization; 2012.

18. World Health Organisation. The world health report 2010. Health systems financing: the path to universal coverage. Geneva: World Health Organisation; 2010.

19. World Health Organization and World Bank. Tracking universal health coverage: 2017 global monitoring report. Report No.: 9241513551. Geneva: International Labour Organization; 2017.

20. International Labour Organization. Social Protection Spotlight: towards universal health coverage: social health protection principles. Geneva: International Labour Organization; 2020.

21. Schmitt V, Sakunphanit T, Prasitsiriphon O. Social protection assessment based national dialogue: towards a nationally defined social protection floor in Thailand. Bangkok: ILO on behalf of the United Nations/Royal Thai Government (UN/RTG) Joint Team on Social Protection; 2013.

22. International Labour Organization. Social protection assessment-based national dialogue: A global guide: Joint United Nations response to implement social protection floors and achieve the Sustainable Development Goals. Geneva: International Labour Organization; 2016.

23. Galobardes B, Shaw M, Lawlor DA, Lynch JW, Smith GD. Indicators of socioeconomic position (part 1). Journal of Epidemiology & Community Health 2006;60(1):7-12.

24. Galobardes B, Shaw M, Lawlor DA, Lynch JW. Indicators of socioeconomic position (part 2). Journal of Epidemiology and Community Health 2006;60(2):95.

25. McKenzie DJ. Measuring inequality with asset indicators. Journal of Population Economics 2005;18(2):229-60.

26. Filmer D, Pritchett LH. Estimating wealth effects without expenditure data—or tears: an application to educational enrollments in states of India. Demography 2001;38(1):115-32.

27. Howe LD. The wealth index as a measure of socio-economic position. London: London School of Hygiene & Tropical Medicine; 2009.

28. 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: HelpAge International; 2015.

29. Rutstein SO, Johnson K. The DHS wealth index. DHS comparative reports No. 6. Calverton, MD: ORC Macro; 2004.

30. Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis. Health Policy and Planning 2006;21(6):459-68.

31. Filmer D, Scott K. Assessing asset indices. Washington DC: World Bank; 2008.

32. Howe LD, Hargreaves JR, Huttly SR. Issues in the construction of wealth indices for the measurement of socio-economic position in low-income countries. Emerging Themes in Epidemiology 2008;5(1):3.

33. Rustein SO, Johnson K. The DHS wealth index. Rockville, MD: ORC Macro; 2004.

34. Prakongsai P. An application of the asset index for measuring household living standards in Thailand. Nonthaburi; International Health Policy Program; 2006.

35. Filmer D, Pritchett L, editors. Estimating wealth effects without expenditure data—or tears: An application to educational enrollments in states of India. Demography 2001;38(1):115-32.

36. World Health Organization. Safely managed drinking water: thematic report on drinking water 2017. Report No.: 924156542X. Geneva: World Health Organization; 2017.

37. Liberatos P, Link BG, Kelsey JL. The measurement of social class in epidemiology. Epidemiologic Reviews 1988;10(1):87-121.

38. Poirier MJ, Grépin KA, Grignon M. Approaches and alternatives to the wealth index to measure socioeconomic status using survey data: a critical interpretive synthesis. Social Indicators Research 2020;148(1):1-46.

39. Health Insurance System Research Office. Thailand's universal coverage scheme: achievements and challenges – an independent assessment of the first 10 years (2001-2010). Nonthaburi: Health Systen Research Institute; 2012.

40. World Bank. Qualitative assessment of health equity among the elderly people in Thailand: utilization and financial protection. Washington DC: World Bank; 2015.

41. Department of Water Resources. Information on piped water from artesian wells or village waterworks system Bangkok: Department of Water Resources; 2021.

42. Houweling TA, Kunst AE, Mackenbach JP. Measuring health inequality among children in developing countries: does the choice of the indicator of economic status matter? International Journal for Equity in Health 2003; 2(1):1-12.

43. Cortinovis I, Vella V, Ndiku J. Construction of a socio-economic index to facilitate analysis of health data in developing countries. Social Science & Medicine 1993;36(8):1087-97.

44. Balen J, McManus DP, Li YS, Zhao ZY, Yuan LP, Utzinger J, et al. Comparison of two approaches for measuring household wealth via an asset-based index in rural and peri-urban settings of Hunan province, China. Emerging Themes in Epidemiology 2010;7(1):1-17.

45. Ferguson BD, Tandon A, Gakidou E, Murray CJ. Estimating permanent income using indicator variables. Health systems performance assessment: debates, methods and empiricism. Geneva: World Health Organization; 2003.

46. Asian Development Bank. Country diagnostic study on long-term care in Thailand. Manila: Asian Development Bank; 2020.

47. Ministry of Health Singapore. CareShield Life claims [Internet]. 2020 [cited 2021 Jan 20]. Available from: https://www.careshieldlife.gov.sg/careshield-life/careshield-life-claims.html

48. College of Population Studies Chulalongkorn University. Study on insurance for aging society for the Office of Insurance Commission (OIC). Bangkok: College of Population Studies Chulalongkorn University; 2018.

ความสัมพันธ์ระหว่างความมั่งคั่งกับสถานะทางสุขภาพในผู้สูงอายุไทย

บทคัดย่อ: ความสัมพันธ์ระหว่างความมั่งคั่งกับสถานะทางสุขภาพในผู้สูงอายุไทย

ถาวร สกุลพาณิชย์ พบ., วทม. (การคลังนโยบายสังคม), วว. (อายุรศาสตร์), อว. (เวชศาสตร์ป้อง-กัน)*; อรวรรณ ประสิทธิ์ศิริผล วท.ม. (วิทยาการประกันภัยและการบริหารความเสี่ยง) ศศ.ด. (วิทยาลัยประชากรศาสตร์)**

** สำนักวิชาการ สำนักงานปลัดกระทรวงสาธารณสุข; ** สถาบันวิจัยระบบสาธารณสุข

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาการกระจายตัวของความมั่งคั่งและความสัมพันธ์ระหว่างความมั่งคั่งกับความไม่เป็นธรรมทางสุขภาพแบบสัมพัทธ์ โดยพิจารณาตัวแปรบ่งชี้ตำแหน่งทางเศรษฐกิจสังคมของครัวเรือนของคนไทยที่มีอายุมากกว่า 50 ปีขึ้นไป โดยใช้ข้อมูลจากการสำรวจประชากรผู้สูงอายุในประเทศไทย พ.ศ.2557 ทำการวิเคราะห์การถดถอยโลจิสติคแบบไบนารี ซึ่งตัวแปรตามคือผลการประเมินสุขภาพด้วยตัวเองและการไม่สามารถทำกิจวัตรประจำวันอย่างน้อยหนึ่งอย่าง ตัวแปรต้นประกอบด้วย ดัชนีความมั่งคั่ง ระดับการศึกษาสูงสุด ถิ่นที่อยู่ รวมทั้งตัวแปรทางประชากร สำหรับการวิเคราะห์ความไม่เป็นธรรมทางสุขภาพใช้วิธีการวัดดัชนีความไม่เป็นธรรมแบบสัมพัทธ์ (Relative Index of Inequality – RII) ผลการศึกษาพบว่า ดัชนีความมั่งคั่งซึ่งคำนวนจากข้อมูลการสำรวจประชากรผู้สูงอายุสามารถใช้วัดความไม่เป็นธรรมทางเศรษฐกิจและสังคมของผู้สูงอายุไทย และใช้ในการกำกับติดตามนโยบายผู้สูงอายุในกรณีที่ไม่มีหรือไม่สามารถวิเคราะห์จากข้อมูลรายได้หรือข้อมูลรายจ่าย ความไม่เป็นธรรมทางสุขภาพสามารถเห็นได้จากครัวเรือนที่มีระดับความมั่งคั่งต่างกัน กลุ่มครัวเรือนที่มีความมั่งคั่งระดับ "รวย" นั้นมีสุขภาพดีกว่ากลุ่มครัวเรือนที่มีความมั่งคั่งระดับ "จน" และเพิ่มขึ้นตามอายุ ระดับการศึกษาเป็นปัจจัยที่ทำให้ผลลัพธ์ด้านสุขภาพดีขึ้น แต่การอยู่อาศัยในเขตชนบทหรือเขตเมืองไม่มีผลต่อผลลัพธ์ด้านสุขภาพ

คำสำคัญ: ความไม่เป็นธรรมด้านสุขภาพ; ความมั่งคั่ง; ผู้สูงอายุ