

Regional Differences in Health Expectancies

across the Disablement Process among Older Thais

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Introduction

Thailand's population has aged as a result of the demographic transition [1]. As a consequence of declining mortality, life expectancy at birth of the Thai population has risen continuously [2,3]. Longer life expectancy and the increase in non-communicable diseases have raised a question of the quality of years lived. Health expectancy is an index of population health, representing the increasing focus on quality of life lived rather than on the quantity, as measured by life expectancy [4]. Basically, health expectancies are the combination of life expectancy with health concepts, which make it possible to calculate years lived in different states of health [4]. The most appropriate framework to elucidate more detailed health measures for the older population is the disablement process [5].

Most studies of health expectancies in Asian countries have concentrated on disability rather than earlier stages in the chain of disablement process and on a single health measure [6]. In Thailand estimates have been made of years with self-care disability [7-9], mobility disability [9], and in different states of perceived health [10] at older ages, and, all studies focused on gender differences and/or trends over time.

Nevertheless regional differences of health expectancies which cover the spectrum of the disablement process remain unknown for the Thai population. Due to varying environmental and socio-economic factors, the health status of the Thai population differs between regions and regional inequalities in life expectancy have been evident for some time [2]. Regional differences in health expectancies across the disablement process could indicate environmental, technological, healthcare, or other factors which affect the passage between health stages along the disablement pathway which may be useful for diverse policy audiences [11]. This study therefore uses the most recent Thai national data in 2009 to examine differences between the 5 regions in Thailand in health expectancies that more fully cover the stages in the disablement process. More specifically the study estimates years of life at age 60 years with: chronic physical impairment; cognitive impairment; depression; disability in instrumental activities of daily living (IADL); and disability in activities of daily living (ADL). The 5 regions are composed of the 4 geographical regions, i.e. Central (not include Bangkok), North, North East, and South; and Bangkok, Thailand's capital city.

Methods

Data

Mortality data was drawn from the Thai vital registration system, the most important source of mortality data. Data on morbidity and disability were drawn from the fourth Thai

National Health Examination Survey (NHES IV) in 2009. The NHES IV is a cross-sectional survey using stratified multi-stage sampling of the Thai population to yield nationally and regionally representative samples. The sampling method has been described elsewhere [12]. The present study focused on 9,210 participants aged 60 years and older (95% response rate). Information on participants was collected through a variety of methods, including a face-to-face interview, functional tests, physical examinations, and laboratory tests. The NHES IV was approved by the Ethical Review Committee for Research in Human Subjects, Ministry of Public Health. And, all participants provided written informed consent.

Health measures

The measures on which health expectancies were based included chronic physical impairment, cognitive impairment, depression, and disability in IADL and ADL. Full definitions are provided in table 1.

Statistical methods

Health expectancies were calculated by Sullivan's method [13,14]. The first step was to calculate the period life tables, for males and females in each region, from the age- and sex-specific death rates by regions which required some adjustment in (i) the number of deaths (for unknown age of death and under-registration) and (ii) the age- and sex-specific death rates for the very old. Overall, and age- and sex-specific percent completeness of death registration obtained from other reports [15-17] was applied to adjust the number of deaths for under-registration. The Coale-Kisker method [18] was employed to estimate age- and sex-specific death rates for those aged 80 years and older as the values were too low when calculated directly. This method assumes the declining rate of increase in mortality rates at very old ages. Then, the age- and sex-specific prevalence of health states by regions was applied to divide the number of person years lived in the given age interval (from a period life table) into years lived with and without health problems. Variance was calculated following established methods [13] as health expectancies are subject to sampling variation from the health surveys.

Results

Life expectancy and years of life with morbidity and disability at age 60 by regions, along with the between region rankings, are shown in table 2 (for males) and table 3 (for females). There was a 1.2 year differences in life expectancy at age 60 for males in 2009 among the 4 regions and Bangkok, from 18.7 years in Bangkok to 20.0 years in South. For females, the difference was greater (2.8 years), from 21.7 years in North to 24.6 years in South. Regional inequalities in years lived with morbidity and disability were significantly greater than inequalities in life expectancy for almost all health measures, apart from for depression and ADL disability. Moreover significant differences were evident between the regions having the most and the least years lived with morbidity and disability whatever the health measures used, except for ADL disability in females. Nevertheless these regional differences were not consistent across the disablement process. Although males and females in the South, who had the longest life expectancy, ranked amongst the worst in almost all of the health expectancies, regions with the least years lived with morbidity and disability varied by health measures in both genders. Most notably both males and females in Bangkok could expect to live the least years on average with IADL disability, perhaps a result of their more age-friendly environment.

Conclusion

This study shows inequalities among the 4 regions and Bangkok in Thailand in life expectancy and health expectancies in a range of health stages that cover the disablement process. The varying nature of these inequalities across the disablement process may indicate factors at societal level (e.g. environmental, medical care and rehabilitation, etc.) which operate to alter the passage between health stages along the disablement pathway. The findings also suggest that the regions with the longest life expectancy were not necessarily those with the highest health expectancies. Despite relatively short life expectancy, Bangkok, the capital city of Thailand, ranked the best for years lived with IADL disability. This might partly be explained by its more age-friendly environment, e.g. accessibility to public transport, assistive tools. Finally, greater regional differences in health expectancy than in life expectancy suggest that regions are more distinct with respect to quality rather than quantity of the remaining life.

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Table 1 Definitions of health measures

Health measures	Definitions
Chronic physical impairment	Having at least 1 of 2 diseases; hypertension (diagnosed based on systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or self-reports of being under antihypertensive) and diabetes mellitus (diagnosed based on fasting plasma glucose level ≥ 126 mg/dl, or self-reports of diagnosis from physicians and being under medical treatments)
Depression	Being diagnosed as depression based on the criterion of Diagnostic and Statistical Manual of Mental disorders, 4 th edition, or self-reports of diagnosis from physicians and being under medical treatments within the last 12 months
Cognitive impairment	Having scores of Mini-Mental State Examination Thai version-2002 less than the cut-off points determined by the Institute of geriatric medicine, Thailand (14 out of 23 points for illiterate; 17 out of 30 points for primary school levels; and 22 out of 30 points for higher levels)
ADL disability	Being unable to do at least one of basic self-care activities without assistances, which include feeding, dressing, bathing, toileting, and transferring from beds or chairs
IADL disability	Being unable to do at least one of activities without assistances, which include using telephone, handling finances, responsibility for own medication, using transportation or driving, light housework (sweeping, gathering things, and make beds), and heavy housework (wiping, carrying, dipping up water)

Table 2 Life expectancy and number of years lived with morbidity and disability at age 60 for Thai males, by regions (95%CI) [rank between regions, 1=lowest, 5= highest]

Indicator	Bangkok	Central	North	NorthEast	South
Life expectancy	18.71 [1]	19.38 [4]	18.82 [2]	18.90 [3]	19.97 [5]
Years lived with					
Chronic physical impairment	13.39 (12.44-14.35) [5]	10.70 (10.09-11.32) [3]	10.20 (9.61-10.79) [2]	7.71 (7.11-8.31) [1]	10.79 (10.15-11.43) [4]
Cognitive impairment	1.58 (0.90-2.27) [1]	1.97 (1.56-2.39) [3]	2.09 (1.70-2.49) [4]	1.91 (1.51-2.32) [2]	3.08 (2.60-3.56) [5]
Depression	0.72 (0.21-1.23) [4]	0.50 (0.30-0.70) [2]	0.58 (0.37-0.80) [3]	0.48 (0.29-0.68) [1]	1.04 (0.76-1.32) [5]
IADL disability	4.02 (3.16-4.88) [1]	5.17 (4.61-5.73) [2]	9.67 (9.13-10.22) [3]	10.19 (9.67-10.72) [4]	10.32 (9.73-10.92) [5]
ADL disability	1.21 (0.66-1.77) [5]	0.20 (0.06-0.35) [1]	0.39 (0.20-0.58) [3]	0.38 (0.19-0.57) [2]	0.83 (0.54-1.13) [4]

Table 3 Life expectancy and number of years lived with morbidity and disability at age 60 for Thai females, by regions (95%CI) [rank between regions, 1=lowest, 5= highest]

Indicator	Bangkok	Central	North	NorthEast	South
Life expectancy	22.87 [3]	23.10 [4]	21.74 [1]	21.86 [2]	24.58 [5]
Years lived with					
Chronic physical impairment	14.77 (13.51-16.03) [3]	14.89 (14.15-15.63) [4]	12.01 (11.31-12.70) [2]	9.70 (8.93-10.48) [1]	15.31 (14.57-16.06) [5]
Cognitive impairment	4.80 (3.61-5.98) [4]	4.18 (3.54-4.82) [3]	3.57 (3.02-4.11) [1]	4.17 (3.50-4.84) [2]	7.22 (6.49-7.94) [5]
Depression	1.32 (0.77-1.87) [3]	0.85 (0.56-1.14) [1]	1.10 (0.81-1.40) [2]	2.00 (1.52-2.49) [5]	1.81 (1.36-2.25) [4]
IADL disability	10.90 (9.86-11.95) [1]	13.62 (13.00-14.24) [2]	15.89 (15.34-16.44) [3]	17.28 (16.82-17.75) [4]	17.59 (16.96-18.22) [5]
ADL disability	0.40 (0.02-0.78) [1]	0.49 (0.22-0.76) [2]	1.10 (0.73-1.47) [4]	0.94 (0.53-1.34) [3]	1.11 (0.73-1.49) [5]