

Studying Gender Differentials in Health Using an Active Life Expectancy Approach: The Case of Older Adults in Japan

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Short Abstract

This study has two aims: (i) examine gender differentials in total and active life expectancy (ALE) among older adults in Japan and, (ii) account for these differentials using predictor variables that represent four domains often thought to intervene in the association between gender and health - behaviours, socioeconomic characteristics, psychological characteristics, social support. The latter domain may be of particular consequence given gender differences in intergenerational ties thought to shape relationships within Asian families. Active and inactive states are defined using Activities of Daily Living. Expected years of life and active life are examined by constructing multi-state life-tables, which employ probabilities of health and mortality transitions derived from hazard rate models. Preliminary results indicate older women in Japan spend more of remaining life in inactive states, and some their disadvantage is explained by factors representing intervening domains. The discussion will highlight the implications of our findings for an aging Japan.

Extended Abstract

Introduction

Gender differences in mortality and health in old age have been documented in Western societies and, to a lesser extent, in Asia. The common understanding is that women live longer than men but suffer from higher incidence and prevalence of functional disorders (Manton 1988, Verbrugge 1989; Li et al. 2005; Zimmer et al. 2002; Li et al. 2005). While there has been some headway made toward understanding why these differentials exist within a Western setting, the exploration (and interpretation) of gender differences in older adult health within Asian contexts is in its infancy. Yet, the rapid population aging taking place in Asia, coupled with the very distinct health problems that are experienced by men versus women in old age, underscores the need to understand how gender, aging and health interrelate for policy and planning purposes.

Indeed, across aging societies, policy makers interested in health and long-term care are being faced with both a burgeoning older population and a subsequent rise in health care resources and costs consumed by this population segment (Over et al. 1992). Japan has the

world's oldest population. Current estimates show that 21% is above age 65 and the fastest growing segment of the population are those elderly aged 85 and above. Japan also has the greatest number of centenarians in the world. Women in Japan are the longest lived population worldwide, with a life expectancy exceeding 85 years. Men in Japan, in contrast, have an average life expectancy of 78 years. The current paper explores the association between gender and health among older adults in Japan.

Some of the early baseline studies of gender, aging and health in Asia reveal cultural-specific factors that influence relationships. For example, older women tend to report higher levels of disability compared to older men in Taiwan, Singapore, and Thailand, where no gender differences are found in the Philippines (Zimmer et al. 2002). Moreover, cultural differences in the roles and resources accorded to Asian females may have significant impacts on health at later ages. As Knodel and Ofstedal (2003) recently highlighted, "gender is not always the compelling marker of disadvantage" (page 679). They note that the current dominant theoretical framework used to explain gender differences in older adult health, the life course perspective, focuses on cumulative disadvantages that women experience over the life course and their relationship to poor health. There are instances, however, within Asian cultures, where women may have an advantage. For example, women tend to have stronger ties with children over the life course and consequentially tend to receive more support. Several authors have found that in Asia, older women are more likely to live with an adult child and receive intergenerational transfers compared to older men (Biddlecom et al. 2002; Chan 1997). This may be important for health outcomes. A study from China indicated that social support from adult children buffered deleterious health effects of widowhood (Li et al. 2005), a finding that is in contrast to those from the United States that generally show widows to be in poorer health compared to their married counterparts (Goldman et al. 1995). A recent study in Singapore has found widowed women to not be at a health disadvantage compared to their male counterparts, a result partially explained by strong support from children (Chan and Jatrana 2007).

The current study employs an active life expectancy (ALE) approach to integrate measures of functional health and mortality for older adults in Japan. As of yet, functional discrepancies by gender have not well been established either in Japan or across Asia, making policy decision-making and planning around issues such as disability difficult. The ALE approach is ideal for our purposes because it takes both mortality and morbidity into account when estimating the transitions into poor health. Our study has two general aims: (i) to examine the level of gender differentials in total and active life among older adults in Japan and, (ii) to account for these differentials using a series of predictor variables. These predictors represent four domains that are thought to intervene in the association between gender and health, specifically, health behaviours, socioeconomic characteristics, psychological characteristics and social support. The latter is particularly important given the above discussion regarding differences in intergenerational support by gender to older adults in Asia.

Methods

The study uses comprehensive data from the first two waves (1999 and 2001) of the Nihon University Longitudinal Japanese Study on Aging. The panel consists of 4,237 baseline observations of individuals aged 65 and older, 57% of whom were women, which were followed-up in 2001. By time of follow-up, a total of 318 individuals, or 7.5% of the panel sample, had died.

At time of baseline, individuals were asked whether they can perform a series of tasks that can be classified as Activities of Daily Living (ADLs), that is, activities necessary for survival. Specifically, individuals were asked whether they have the ability, on their own, to bathe, dress, eat, rise from a bed or chair, walk inside the house, leave the house, and use the toilet. We begin by dichotomously coding individuals into 'active' and 'inactive' states based on whether they can conduct all seven of these tasks. At time of follow-up, survivors were asked the same questions. We code outcome into three categories, adding the absorbing state of dying between survey

waves. Using these categories, we estimate total and active life expectancies for men versus women using a multi-state life table technique. There are two stages to conducting the estimation. First, multivariate hazard models are employed to estimate mortality rates and the rates of entering and leaving functional states for those with and without ADL difficulties at baseline. The models are run using SAS 9.1 PROC LIFETEST. Second, the hazard rates that are generated in the first procedure are applied to a multi-state life table from which total life and active life expectancies are obtained. Further details of the technique can be found in Crimmins, Hayward and Saito (1994 and 1996) and Hayward and Grady (1990).

We employ a nested modelling approach estimating several models. The first sets of models consider only age and sex and serves as the baseline. Next, we add variables representing the four explanatory domains, that is, health behaviours, socioeconomic characteristics, psychological characteristics and social support. When each set of variables is added, we examine the degree to which gender differences converge. Finally, we run a parsimonious model consisting of those variables that best explain the gender differentials.

Although we have thus far examined associations between gender and ADLs, we plan to examine further associations with other categories of functional items, such as Instrumental Activities of Daily Living such as cooking and doing household chores, and more general mobility items, such as lifting things and bending.

Preliminary Results

We present here several descriptive and preliminary findings. Table 1 shows the percent reporting at least one ADL difficulty by sex and age at baseline (1999). The results generally confirm the common finding of higher disability among women. For instance, about 7% of women aged 65 to 69 report at least one ADL difficulty compared to only about 3% for men. The exception is those aged 70 to 74, where men have a higher prevalence of ADL difficulties.

Table 2 reports follow-up status for men and women across originating status. While the first table confirmed the pattern of higher disability among women, this table confirms that men have higher rates of mortality, and this is true regardless of originating status. For instance, among those that begin the observation period without ADL difficulties, about 6% of men do not survive the two year inter-survey period in comparison to about 4% for women. The table also shows that follow-up status and mortality are both very much a function of originating functional status, as would be expected.

Table 3 reports the baseline hazard results, that is, the result of the simplest model that adjusts hazards only for age and sex. The results indicate that among those originating without an ADL difficulty, women are significantly more likely than men to make a transition to having a difficulty, while men are significantly more likely to die. Among those reporting at least one ADL difficulty at baseline, the influence of gender is not significant for determining the probability of remaining with functional problems, although the result is in the expected direction. Again, men are more likely to die. The age results are generally as expected. Older individuals that originate without ADL difficulties are significantly more likely to end up with difficulties and they are less likely to survive the two year follow-up period. Among those that begin with ADL difficulties, older adults are more likely to die, but are also less likely to remain functionally limited.

Figure 1 highlights one of findings calculated from the hazard ratios shown in Table 3. Here we plot the percent of remaining life that women versus men can expect to live without ADL difficulties by age. In order to obtain these results, we determine the number of years of life spent in healthy and unhealthy states (that is, without and with ADL difficulties) using multi-state life table calculations translating the hazard ratios in Table 3 to probabilities of making transitions between states, assuming that transitions are made at exactly the mid-point of the two-year inter-survey period. At age 65, men can expect to live 18.07 additional years of life, of which 16.70 are expected to be with ADL difficulties and 1.37 without, resulting in 92.4% of

remaining years in a healthy state. Women at age 65 can expect to live an additional 20.03 years, giving them a substantial mortality advantage. But, the extra years of life are clearly spent with ADL difficulties. Specifically, 17.32 years can be expected in a healthy state versus 2.71 in an unhealthy state. As a result, at age 65, Japanese women can expect 86.5% of remaining years to be in a healthy state. The female disadvantage in this regard continues as age increases.

In our continuing analysis, we will introduce control variables that represent the four domains listed above - health behaviours, socioeconomic characteristics, psychological characteristics and social support - in order to determine whether these factors explain the differences that we see in total, healthy and unhealthy life between women and men. Our conclusion will then comment on the implications of these findings for an aging Japan.

Table 1: Percent reporting at least one ADL problem at baseline (number of observations in parentheses)

Age	Men	Women
65-69	2.6 (495)	6.8 (502)
70-74	8.9 (393)	7.9 (444)
75-79	14.2 (529)	16.2 (749)
80-84	20.1 (289)	29.7 (478)
85+	32.8 (131)	44.5 (227)

Table 2: Follow-up ADL and mortality status by gender and originating status

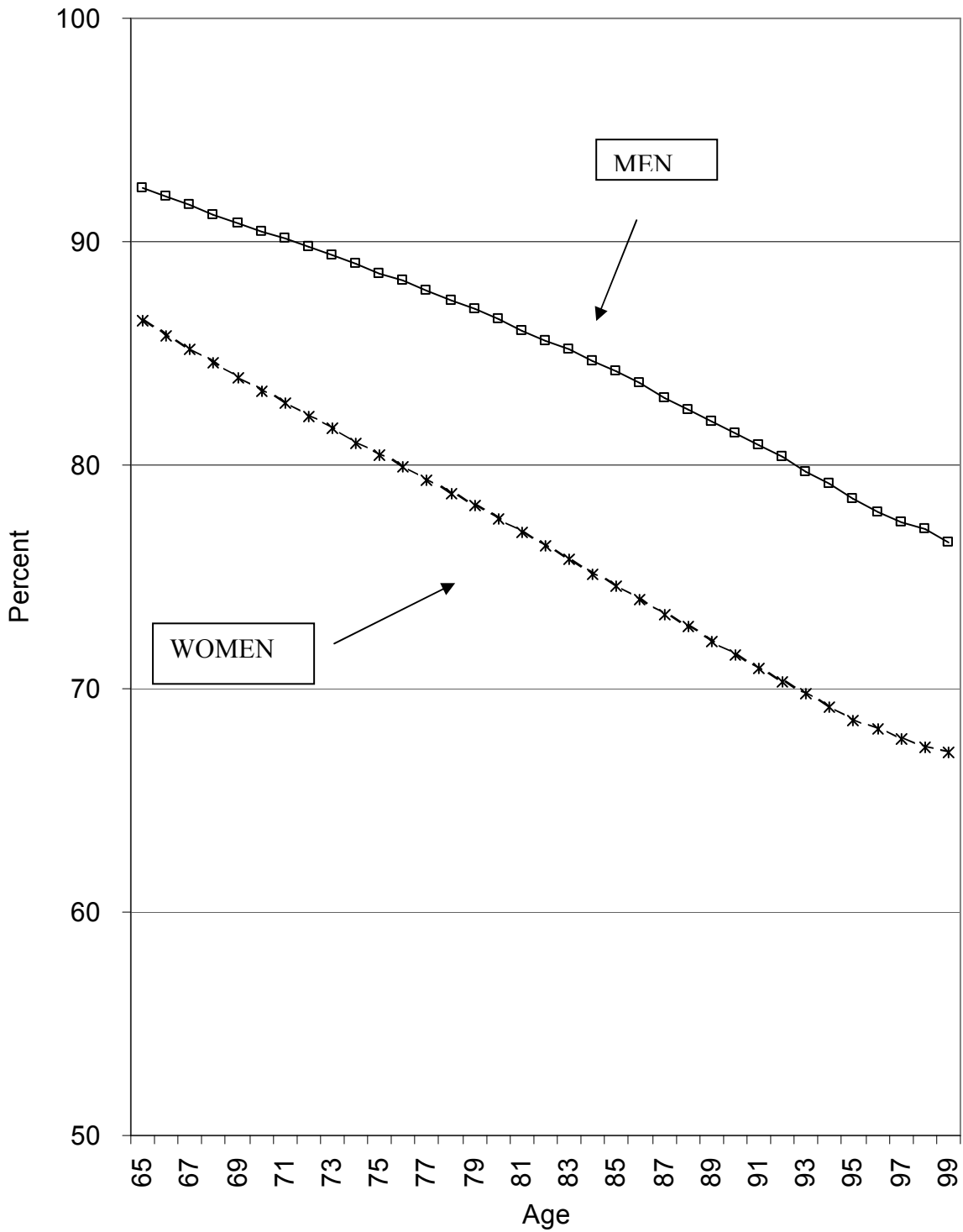
Outcome		Baseline Status	
		No ADL difficulties reported	At least one ADL difficulty reported
Men	No ADL difficulties reported	88.0%	19.2%
	At least one ADL difficulty reported	6.3	50.0
	Died before follow-up	5.7	30.8
	Total	100.0	100.0
Women	No ADL difficulties reported	85.2%	26.1%
	At least one ADL reported	11.2	54.0
	Died before follow-up	3.6	19.9
	Total	100.0	100.0

Table 3: Hazard model results showing hazard ratios for various transitions

	Originating status			
	No ADL difficulties reported		At least one ADL difficulty reported	
	At least one ADL difficulty reported	Died before follow-up	At least one ADL difficulty reported	Died before follow-up
Sex (female= 1)	+.504**	-.528**	+.290	-.568**
Age	+.099**	+.105**	-.043**	+.078**
Constant	-10.903	-11.470	1.585	-7.667
LL	-1224.9	-729.3	-298.3	-388.2

** p < .01 * p < .05

Percent of remaining life expected without ADL difficulties for men and women by age



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