Effects of Increase Elderly Females on Ageing Society in Taiwan: Implications in Elderly Service Marketing

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The falling death rate is a very clear sign of the role of medicine in increasing life expectancy. This study examined the transformation in mortality and changes in sex proportion of the elderly since the 1950s in Taiwan. The effects of the sex ratio are due to a change in the mortality rate. This paper uses population data and periodic life tables that explain how age-specific mortality has changed and how the accumulation of the ever-increasing elderly population has made up the current sex ratio of later life. The results revealed that the ratio of the registered population and the life table population seemed to be significantly different. The female-to-male ratio was significantly changed, later life gradually moves into the mild-old phase, and finally reaches the old-old phase. It serves as an important reference for other countries and service marketing and policy-making for women in later life.

INTRODUCTION

In terms of population proportions, there have always been more male babies than female babies. Nevertheless, the average life expectancy of females has always been longer than that of males. Conventionally, females have always tended to marry older males. Thus, women generally outlive their husbands. As a consequence, females tend to suffer the vulnerability of living alone in their last few years of life. From the sex-specific mortality rates of the population registered data, using a life table that excludes the effects of migration and calculating the age range in which the female population exceeds the male population would illustrate the pattern of sex differences in the elderly population.

The demographic changes that have taken place in Taiwan over the past five decades, particularly declines in fertility and high rate of outmigration by generations, are increasing the likelihood that today's parents will live alone or always been longer of females during their older years. Wang (2011) compared with elderly men and women, women at all income levels experience a negative impact on income. Furthermore, aging generally means less income. The recent experience of the social security system in Asia, however, considers that a stronger safety net may load financial pressure on the government. Policy maker alike to evaluate the extent to which the private market and the government can substitute family networks in providing the requisite support for the older population in coming years. Taiwan's Council of Labor Affairs

beginning to introduce a foreign labor in 1989. The intention agency in a dilemma of putting aside the making industry of country can keep on a development. Moreover, women's household chores are shared. The heavy disease can acquire care especially the foreign nursing labor for elderly person who loses capability will require more services to perform activities of daily living. Beside, long term care costs are a major loading to elderly assets and public finance. Not only Taiwan, but China is far from prepared to response this growing challenge.

Few commercial insurance companies offer products of long term care, unfortunately, many elders couldn't afford expensive care costs (Hou, 2011). For the aging of the labor force structure, China had to restructure its economy, through recruiting some technicians and engineers from the advanced countries (Fisher, 2012). The Taiwan's elderly males depended more on their own earnings from work than the elderly females did. The elderly females depended on 'affection income' more than the males. Almost half of the elderly females stated that they counted on their sons and daughters to support them (Wang, 2011).

In the female elderly, it is important to initiate policies that would ensure the life quality of this population. The aim of this study was to differentiate age-specific mortality rates for males and females, in particular the trends in the elderly population and the sex distribution of the elderly from the age of sixty and over since the 1950s. Furthermore, in order to avoid the effects of population migration, we used life tables to explain the change in age-specific mortality rates over the years. This method would help us to exclude the effects of migration on the ever-increasing elderly population.

MEASURES AND ANALYSIS

To compute mortality rate, sex ratio for this paper, two key points of information are needed, one, age- and sex- specific mortality rate can be obtained; and two, sex ratio and the ages when the number of surviving females exceeded that of males. All data relating to the measure of the elderly population, the age of every year sex specifics, and death statistics were collected from the Department of Statistics, Ministry of the Interior. In this paper, an age of sixty was set as the lower boundary of the elderly population.

Life tables (sometimes called mortality tables) are tables of statistics giving information relating to the average probability of survival or death at different ages. Life tables are often used in public health, demography and actuary contexts. Standard life tables are tables that record the basic survival statistics, and death is the only reason to drop out of the life table. The notation is expressed as follows (Chiang,1984): $_nq_x$ being the mortality of a specific population with an age range from x to x+n, l_x being the number of persons surviving in the life table cohort from birth to the exact age x, $_nd_x$ being the number of deaths from the age of x to x+n, $_nL_x$ being the number of surviving person-years of the population at age x within **n** years, T_x being the total number of surviving person-years of the population at age x before death, and $\overset{\circ}{e}_x$ being the average number of surviving years of the population at age **x**.

The formula (Chiang's Method) is as follows:

$$_nq_x = \frac{n \cdot {_nM_x}}{\left[1 + n(1 - a_x)\,{_nM_x}\right]}$$

where $_nM_x$ stands for the age-specific death rate in the interval between the xth and (x+n)th birthdays; it is commonly estimated by dividing the number of people who die during a given year at an age falling in the specified interval by the mid-year population in that age interval. In addition, $_na_x$ is the fraction of the interval between the xth and (x+n)th birthdays lived on average by those dying within the interval.

$$_nd_x = l_x \cdot {}_nq_x \; and \; {}_\infty d_w = l_w \; \text{'} \; where \; \textbf{w} \text{ is the last group of the population}$$

$$l_x = (1 - {}_nq_x) \cdot l_{x-n}$$

$$_nL_x = l_{x+n} \cdot n + {}_na_x \cdot n \cdot {}_nd_x$$

$$T_x = \sum_{y=x}^{w} {}_nL_y$$

$$\overset{\circ}{e}_x = \frac{T_x}{l_x}$$

There are various calculation methods for the abridged life table. The main difference lies in the estimation of $_nq_x$, but all of the above methods gave similar results. However, if the age-group becomes larger, various methods have been suggested (Yue et al. 2001). The life table is published by the Department of Statistics, Ministry of the Interior (Ministry of the Interior 1951-2002) and mainly uses the Reed-Merrell method for standardizing. This study utilized the periodic life table to adjust the value of the registered population in order to eliminate the confounding effects of migration on the male-female ratios of the elderly in Taiwan.

AGE-SPECIFIC MORTALITY OVER THE PAST FIFTY YEARS

Age-specific mortality is a vital reference to the study of demographics. Figure 1 presents the age-specific mortality trends over time, which were calculated in Taiwan to be ten years apart for each group (under 1 year, 1-9 years old, 10-19 years old, 20-29 years old, 30-39 years old, 40-49 years old, 50-59 years old, 60 years old and over), and employed total years, mid-year population, and numbers of deceased in order to calculate age-specific mortality. The mortality rates of three groups (10-19 years old, 20-29 years old, and 30-39 years old) were very similar and were much lower than those of the other groups. For comparison, the above three groups were put together as one. Additionally, the groups from 40-49 years old and 50-59 years old were pooled together. The study then analyzed the new groups: newborn or under age one, 1-9 years old, 10-39 years old, 40-59 years old, and 60 years old and over.

FIGURE 1
THE TIME TREND OF AGE-SPECIFIC MORTALITY IN TAIWAN: 1950-2000
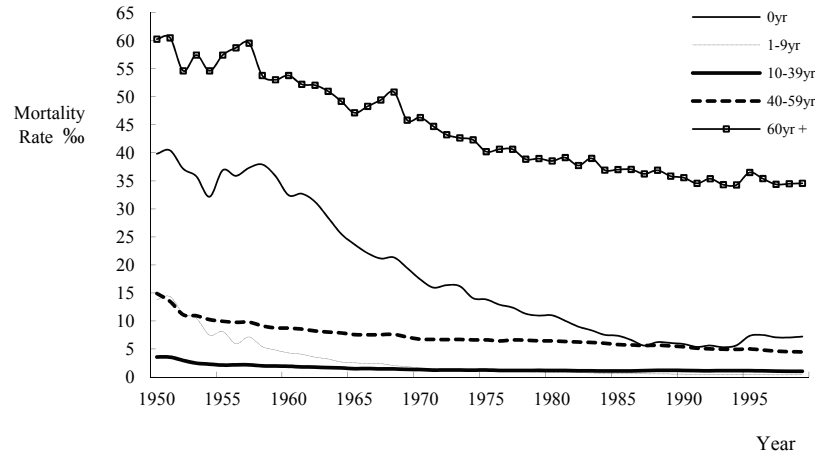
The results revealed two facts. One is that though mortality rate has fluctuated over the past fifty years, it has generally decreased. In the period from 1950 to 2000, the mortality of those younger than one year decreased from 39.8% to 7.2% and that of people 60 years old and over decreased from 60.3% to 34.6%. The mortality of the other groups, however, appeared lower. Another was that the changes in mortality have been consistent since 1980. However, the mortality of infants has increased in total by 2% since 1955, and for a long time.

THE ELDERLY POPULATION AND SEX COMPOSITION IN TAIWAN

The decrease in infant mortality indicates that more people would be surviving and moving toward old age. Also, if mortality of the elderly began to decrease, then the elderly population would increase more rapidly. Table 1 presents the population and male-female ratio of those sixty years old and over since 1950. In 1950, the elderly population was around 320,000. However, by the year 2000, the elderly population had reached more than 2.5 million. Prior to 2000, the male population outnumbered the female population, which seemed to contradict the theory of feminization of later life. It is profoundly influences that the development of immigration from mainland China. The current life expectancy in Taiwan is 77 years for females and 72 years for males. However, both ages are still lower than those in Japan (Yong and Saito, 2009) and European countries.

TABLE 1
THE ELDERLY POPULATION AND SEX RATIO OF THOSE SIXTY YEARS OLD AND OVER: REGISTERED POPULATION DATA AND LIFE TABLE POPULATION

Year	Registered population (thousand people) and sex ratio of sixty years old and over			Life table population and sex ratio of sixty years old and over	The variation of sex ratios
	male	female	(1)male/ female	(2) male/ female	(1)-(2)
1950	136	180	0.76	0.75	0.007
1952	142	187	0.76	0.76	0.006
1954	150	195	0.77	0.75	0.016
1956	162	208	0.78	0.71	0.070
1958	177	223	0.79	0.73	0.063
1960	196	242	0.81	0.74	0.076
1962	218	262	0.83	0.75	0.085
1964	242	283	0.86	0.75	0.108
1966	274	310	0.88	0.76	0.124
1968	301	336	0.90	0.75	0.147
1970	341	369	0.92	0.76	0.164
1972	390	408	0.95	0.77	0.179
1974	446	445	1.00	0.77	0.228
1976	499	481	1.04	0.78	0.257
1978	554	521	1.06	0.78	0.284
1980	618	565	1.09	0.79	0.305
1982	700	620	1.13	0.80	0.332
1984	781	672	1.16	0.80	0.364
1986	879	735	1.19	0.80	0.393
1988	981	803	1.22	0.80	0.417
1990	1074	873	1.23	0.80	0.434
1992	1161	951	1.22	0.80	0.418
1994	1223	1023	1.20	0.79	0.406
1996	1268	1098	1.15	0.78	0.371
1998	1314	1183	1.11	0.79	0.323
2000	1365	1276	1.06	0.78	0.280

To prevent migration from being a confounding factor in the study, the periodic life table (Ministry of the Interior, 1951-2003) was used to adjust the registered population. Table 1 contains the static population of those sixty years old and older since 1950. Sex composition in the life table was as expected. The number of elderly females was greater than males; the sex ratio for the past fifty years has been around 0.75 to 0.85. In the 1980s, the sex ratio was 0.80, which indicates that the mortality of elderly males seemed to surpass that of females. If there were no population migration in the future, the sex ratio in the elderly population would drop from the current 1.09 to 0.80, which would officially start the feminization of later life.

THE CONSTITUTION AND TRANSITION OF SEX RATIO OF LATER LIFE

The age-specific mortality of females was much lower than that of males. Though the sex distribution of newborn males appeared greater than that of females, the female elderly were greater in number than the male elderly as they both aged. To clearly demonstrate such a process,

we utilized the surviving population of each age group in the life table for an explanation. First of all, we assumed that males started with 108,000 people and females with 100,000 according to the registered data. Figure 2 shows that female newborns were less in number than males, but they survived longer. The population of females at age fifty-five and over began to surpass that of males, and females became progressively dominant in later life.

FIGURE 2
GENDER DIFFERENCE IN THE SURVIVING POPULATION:1950 AND 2000
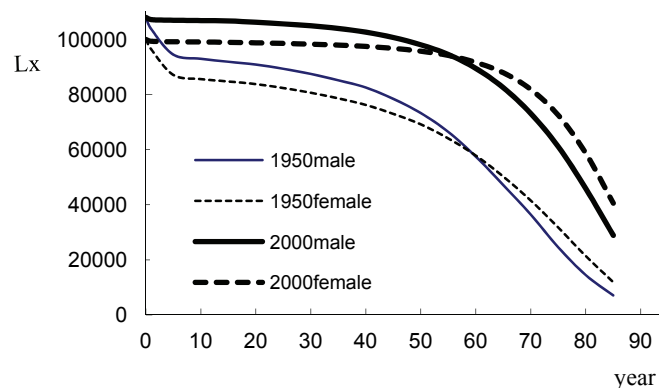

Figure 3 shows the ages when the number of surviving females exceeded that of males. It is clear that age increases with time. It was at age fifty-nine in the 1950s that the female population exceeded that of males, while that age dropped to fifty-five in 1990 and 2000. This fact indicated that before entering the elderly phase, female survival surpassed that of males. Chinese females have always tended to marry older males. As a consequence, females tend to suffer living alone in their last few years of life. The culture in Chinese society generates a very different pattern of support provision from that found in Western societies where the rules of reciprocity and negotiation generally dominate social interaction (Gong and Shang, 2011)

FIGURE 3
THE TREND OF AGE DIFFERENCES BY THE SURVIVING FEMALE POPULATION OUTNUMBERED THE MALE: 1950-2000
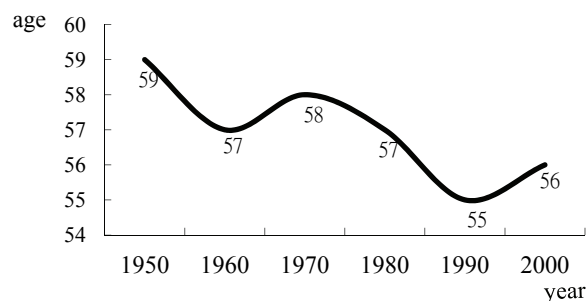
Causes of death include disease, natural causes, and accidents. Contagious or infectious diseases seem to increase in mortality rate from 1906 to 1936. During the era of Japanese colonization, the epidemic infections of malaria posed the biggest threat, and then plague, cholera, and smallpox all seriously shook the health of the general population. The Japanese ruling government began isolating patients, sterilizing infected areas, evacuating and destroying rats/mice, and setting up port quarantines to prevent disease from spreading further (Chen, 1979). It was not until 1917 that pests were finally brought under control. Cholera and smallpox, which did not affect the population as severely as pests, and a prevention mechanism was soon established in the coming year. Thus, the mortality caused by infectious diseases was effectively controlled.

Under the threat of poor living conditions, children and elderly with weak immune systems became the primary victims. This phenomenon was reflected in their mortality rate. The decrease in the 1920s, mortality rate relied heavily upon the reduction of infant deaths (Chen, 1979). The transformation of mortality during Japanese colonization indicated that the population would only grow if society and conditions were stable, clean, and improved and the infant death rate was kept low. Furthermore, infant mortality corresponded well with the advancement of medicine and the environment. However, such improvement did not necessarily affect the mortality of the elderly. Thus, in the process of social development, age-specific mortality for infants and children presented obvious improvements, while there was no significant improvement for the elderly. According to the analysis, the mortality of infants and children in Taiwan after World War II continued to decrease while that of the elderly.

With improvements in public health, decreases in the mortality of all ages, and a high birth rate since 1920, the survival rate of the entire age-specific population has improved. The population of the elderly aged 60 or older in 1950 did not reach 320,000, but it exceeded 2.5 million by 2000. In addition to such an increase of the elderly population, the male-female ratio among the elderly appeared to increase gradually until 1991. In reality, such a phenomenon reflected the complex history and background of Taiwan. After World War II, numerous men from mainland China arrived in Taiwan. The soldiers and youths who came to Taiwan in 1949 initially brought up the sex ratio, which reached the highest point in the 1990s, but they then started to age. Such a situation has gradually changed the sex ratio. Thus, the feminization of later life began. Since the age-specific mortality rate of females was relatively lower than that of the males, females constituted the majority of the exceeded that of males, while that age dropped to fifty-five in 1990 and 2000. The sex ratio of Taiwan in the 1950s was greater than one, which can be explained by the large number of males who immigrate from mainland China after World War II. When migration was eliminated as a confounding factor by using the life table population, the results revealed that the sex ratio of the registered population and the life table population was distinct. The sex ratio was thought to fall between 0.75 and 0.8 after the 1990s, and feminization begins with the young-old phase, gradually moving towards the mid-old and old-old phases.

BUSINESS OPPORTUNITIES EMERGING FROM ELDERLY CARE

With feminization becoming a trend, the sex ratio of the elderly has leveled off. The female population will eventually exceed the male population, and women will inevitably be forced to confront the disease and death of their spouses first. In an elderly relationship, the female often acts as the caregiver; therefore, the health condition of her spouse often becomes a burden, not to

mention her own deteriorating health. Thus, the quality of life of elderly females requires great attention. Business and non-profit, which have responded to needs in areas such as retirement housing, long-term care, work file extension, voluntary action, and lifelong learning. Some of these respond to new consumer markets, while others represent ways in which an ageing female population can become more productive through work, volunteer roles, and health promotion.

As the elderly population increases sharply, the demands on family and personal resources will increase. Indeed, ensuring the economic security of elderly females is an important issue, and the promotion of living care will be popular in the coming decade. The recent experience of the social services and security system in Japan, however, suggest that a stronger safety net may place considerable financial tension on the government. Thus it behooves researchers and policy makers alike to evaluate the extent to which the private market and the government can substitute family networks in providing the requisite support for the older population in future. The increasing age of the population in China is also obvious. Political goal was to find out or gage the level of awareness for care planning amongst younger population.

There are two aspects of Taiwanese society that motivate this detailed examination of elder gender differences in provision of support by children. First, sons bear the primary responsibility of the father's family. A second characteristic of Taiwanese society that has implications for differences in the support provided by sons and daughters relates to gender differences in human capital and economic resources. It is likely to affect that level and type of support that sons and daughters are able to provide to their older parents, especially a person who loses his or her autonomy will require more services to perform activities of daily living than others will require. They may need assistances, but long term care costs are a major threat to elder individual assets and their children.

Wang (2012) conclude that elderly females depended on 'family transfers' much more to some degree and tended to receive monetary income via 'affection income,' while the elderly males had more resources available through employment, retirement pension and savings. It demonstrates that the influence on monetary income through the factors of population and social background were noticeable and that due to gender difference, there were negative effects on elderly females in many respects. As for the financial support from sons and daughters, it was considered the most available source; unfortunately did not reach as far as the sources of income from employment, pension and savings.

It is obvious that the financial support from descendants was the most available, but its contribution to the sources of monetary income was limited. It is critical for the government to provide a strong safety net for older adults, especially older females.

CONCLUSION AND SUGGESTIONS

This paper, using registered population data and the life table population, empirically examines the transition of the elderly population and offers proposals as well as policy scenarios and assess the effectiveness of each policy option among the elderly, particularly the female elderly. The results of this paper serve as an important reference for other countries and future research and policy-making for women in later life. To offer perspectives on the regional and international migration of Chinese that empirically examines the transition of the mortality in population. However, this analysis could support interests in both population and gender research and bring a new dimension in health and gender studies to East Asia.

Thus it behooves policy makers and business models alike to evaluate the extent to which the

private market and the government can substitute elderly resources in the requisite support for the older population:

(1) Chinese need to recognize that they are responsible for covering the costs of much of their long term care needs and it is important to be aware of their options.

(2) Women may have a better grasp of long term care options than men has, they are less inclined to actively prepare for a long term care events.

(3) The industry could provide a wide range of financial security products such as life insurance, annuities (including pensions), long term care insurance, college savings, and supplementary health insurance to China.

(4) Encouraging family networks to plan for and finance their own long-term care needs will help slow the rate of growth in medical spending and provide the state with real fiscal relief. As China's population ages, the nation as a whole will benefit from this reduction of reliance on government-subsidized care, while our seniors will be able to continue to receive the high-quality life they deserve.

(5) Population aging will impact a larger percentage of the population creating a greater demand for nursing care facilities and living arrangement. Ageing in placing, elders are expected to adjust their daily patterns in home. At home or in nursing facilities, isn't cheap. Many people choose to buy insurance to help cover these risks. Long-term care insurance is a type of disability income policy whereby the contract states that if elder people are unable to perform two of the six activities of daily living (include eating, bathing, dressing, mobility, grooming, and toileting/continence.), but the insurance company how to cover medical costs up to a stated amount per day for a given period of time. Efforts aimed at raising standards, efficiency and effectiveness of care payment will be crucial.

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