

纪念 CCER 成立十周年成果系列

中国高龄老人健康长寿影响因素分析

主编：曾毅、柳玉芝、张纯元、萧振禹

Analysis on Determinants of Healthy Longevity in China

Edited by Zeng Yi, Liu Yuzhi, Zhang Chunyuan, and Xiao Zhenyu

GENERAL INTRODUCTION

-- A Summary of the Chinese Longitudinal Healthy Longevity Survey and Research

This general introduction of the book series summarizes the significance, objectives, sampling design, and contents of the data collected in the Chinese Longitudinal Healthy Longevity Survey (CLHLS) conducted in 22 provinces, where the population consists of about 85% of the total population of China. With NIA grant support and Chinese matching input, the CLHLS gathered extensive questionnaire data through interviewing 8,959, 11,161, and 11,163 oldest-old aged 80+ in 1998, 2000, and 2002, respectively. Among the total number of 31,283 interviews to the oldest-old, 8,170, 10,457, and 12,656 interviews were conducted with centenarians, nonagenarians, and octogenarians, respectively. With additional support from China National Social Sciences Foundation and UNFPA, we added 4,894 younger interviewees aged 65-79 in the 22 provinces for the first time in our 2002 survey. Fully funded by the Chinese sources, 4,478 elderly interviewees' adult children aged 35-65 in 8 provinces were interviewed in 2002. Data on mortality and health status before dying for the 6,628 oldest-old aged 80-110 who died between the waves were collected through interviewing a close family member of the deceased elders. This unique survey study has proved rich data information for investigations on current status, dynamic changes, and determinants of health and longevity of elderly population with a focus on oldest-old, which are very useful for scientific research and policy analysis.

PART I GENERAL PROFILES OF THE CHINESE OLDEST-OLD

Chapter 1. Data Assessment of the CLHLS 1998, 2000, and 2002 Waves

This chapter assesses the data quality in the 1998, 2000, and 2002 waves of the CLHLS Survey in terms of the quality of age reporting, reliability and validity of major health measurements/indicators, proxy, non-responses, missing value, and sample attritions. The results show that the quality of age reporting among interviewed Chinese oldest-old is reasonably good. The reliability and validity of major health measurements/indicators are above the common criterions. Compared with the similar major surveys around the world, the un-logic error, non-response rate, item missing rate, and sample attrition in the CLHLS is relatively low or modest. Such evidences lead us to conclude that the data quality of the CLHLS is generally good, but special attentions should be given to a few variables with relatively high missing value, and the poor quality of the prevalence rate of self-reported chronic diseases.

Chapter 2. Basic Characteristics of the Chinese Oldest-Old

Based on findings from analyzing the CLHLS data sets, this chapter discusses the main characteristics of the oldest-old in China including their demographic, socioeconomic and health status, current and previous quality of life etc. As compared to the younger elderly, the main characteristics of the Chinese oldest-old could be summarized as “seven more and seven less”, namely, more females and less males; more illiterate and less educated; more likely widowed and lessened number of surviving children; more likely economically dependent and less likely having retirement wages; daily care depends more on children and less on social support; more leisure time but less entertainment; suffering more from chronic disease but getting less adequate medication. The chapter also addresses the challenges of caring for the oldest-old population faced by society; and offers some suggestions in policy making based on the theme of respecting and protecting the basic rights/benefits of the oldest-old.

Chapter 3. Regional Distribution of the Chinese Oldest-Old

The number of the Chinese oldest-old aged 80+ and the centenarians reached 11,991,083 and 17,877 persons in 2000. From 1990 to 2000, the average annual increase rates of the oldest-old and centenarians were 4.6% and 10.3%, respectively, much higher than that of the whole elderly population. In the process of population aging, the level of longevity (i.e. percent of oldest-old aged 80+ among elderly aged 60+) also increased dramatically. In this chapter, we present the maps of the provincial distributions of the elderly population and the level of longevity in China using the 2000 Census data, as well as the corresponding descriptive analyses and discussions.

PART II OLDEST-OLD'S HEALTHY STATUS AND ITS DETERMINANTS

Chapter 4. Activities of Daily Living and Its Determinants

With the population aging and rapid growth of the oldest-old, the number of the oldest-old who need care from family and/or society will increase tremendously. Based on the CLHLS data sets, this chapter investigates Activities of Daily Living (ADL) and its associations with various covariates using logistic regression. The result shows that age, gender, smoking, alcoholic-consumption are the important factors associated with ADL functioning. The finding also shows that the chronic conditions such as diabetes, cataracts, stroke, bronchitis, and bedsore affect ADL functioning as well.

Chapter 5. Self-Rated Health and Its Determinants

This chapter explores the correlation between socio-demographic factors and the self-rated health status of the Chinese oldest-old using the CLHLS 1998 baseline data. We applied the stereotype ordered regression model to capture the ordinal nature of the response variables. While controlling for covariates such as the capacity of physical performance of daily activities and chronic diseases, we found that age, gender, living arrangement, educational attainment, and occupational history are associated significantly with the self-rated health status of the Chinese oldest-old; centenarians and nonagenarians have a better self-reported health than octogenarians; those oldest-old who are males, co-resident with their children, with more education, and with non-agricultural occupational background are more likely to have a good self-reported health; differentials of self-report health in urban/rural residences and ethnicities are small.

Chapter 6. Subjective Well-Being and Its Determinants

This chapter examines subjective well-being of the Chinese oldest-old, as indicated by positive and negative side of different predictors, based on a large sample ($N=4006$, age range 80~105 years) from the CLHLS survey and ANOVA, General Linear Model, and stepwise hierarchical regression. Based on the cross-sectional data, age group comparisons indicate that younger participants reported higher positive well-being and lower negative well-being than centenarians, but the size of the effects was small (less than one quarter of a standard deviation). Across all age groups, longitudinal analyses revealed that decline on both positive and negative side of well-being. Employing the hierarchical regression models, we examine the effects of age, socio-demographic characteristics, cognitive functioning, social integration, function health, engagement in activity and self-rated health on the subjective well-being. These models showed that age was not a significant predictor of subjective well-being once other covariates are controlled for. Cognitive functioning, engagement in activities, functional health and self-rated health were significantly associated with subjective well-being. Being women and living in rural areas played an important role in the negative side of well-being. Furthermore, age-group difference in predictors' patterns was significant.

Chapter 7. Gender and Urban/Rural Difference in Active Life Expectancy

This chapter reviews concept, measurements and method of active/disable life expectancy. We estimate the ADL active/disable life expectancy using the CLHLS 1998 baseline dataset and Sullivan method. The results show that the oldest-old living in rural China are more likely to be active in daily living throughout their remaining

life than their urban counterparts. A higher percentage of elderly men maintain an active lifestyle than women, although women have a longer total life expectancy. Some explanations on such interesting rural-urban and gender differentials are discussed.

Chapter 8. Impacts of Community Environmental and Socioeconomic Characteristics on Longevity

This chapter mainly intends to test whether environmental and socio-economic factors have direct effects on the longevity at county/city level in China, in order to detect the major determinants affecting longevity between different regions. Using the multiple linear regression model, the results show that factors such as temperature, climate, longitude, type of soils, as well as type of agricultural food production play major roles in shaping the longevity at county/city level, and that socio-economic factors like infant mortality and crude death rate also have some direct impact on longevity, but the degree of their impacts is not as strong as the environmental factors.

Chapter 9. Analysis of Health Status Using Grade of Membership (GoM) Method

Applying the Grade of Membership (GoM) method, this chapter summarizes 50 variables of health status from 8,805 interviewees aged 80-105 in the CLHLS in 1998. Five GoM profiles representing statuses of healthy, relatively healthy, poor functioning, frail, and extremely frail were estimated, respectively. With advance in ages, probabilities of being healthy declines dramatically, from 70% for octogenarians to nearly 20% for centenarians, while the probability of being extremely frail increases with ages from 2% in octogenarians to more than 20% in centenarians. As compared to their male counterparts, Chinese oldest old females are disadvantaged in their healthiness. The sizable rural/urban residential difference is also observed in some cases.

PART III SOCIOECONOMIC STATUS, LIFE STYLE, AND HEALTHY LONGEVITY

Chapter 10. Association of Education with Healthy Longevity

Education is one of the various important factors affecting the health and longevity of the elders. Using the CLHLS baseline survey data collected in 1998, this chapter analyzes the relations between education and healthy longevity among the oldest-old. We found that those oldest-old with more education have a better self-reported health, low prevalence rate of chronic conditions, higher capacities in

both activities of daily living and cognitive functioning. This is mainly because educated persons have more knowledge about healthy longevity and a better awareness of health and health practice.

Chapter 11. Economic Status and its Impacts on Activities of Daily Living

Based on the data from CLHLS baseline survey conducted in 1998, this chapter analyzes the situation of economic independence of the oldest-old and the linkage between the degrees of economic independence and activities of daily living. The results show that the Chinese oldest-old are over-dependent on the economic support from their families due to the poor economic independence, because they used to be mainly engaged in agricultural or household activities at young ages and could not benefit from the pension. We found that there are large age, gender, and rural-urban differentials in degrees of economic independence among the oldest-old. There is obviously a positive relationship between economic independence and daily living of the oldest-old. In contrast to those who are dependent on social relief, the economically independent oldest-old would have higher probability of being active in daily living than those with the complete dependence. In addition, the degrees of economic independence did affect the healthy status of oldest-old through medical treatment and psychological wellbeing. This chapter also proposes the establishment of insurance system for the old to increase of level of economic independence in order to improve health.

Chapter 12. Current Situation and Problems of Medical Insurance

The proportions covered by the medical insurance in urban are 34.6 % and 9.1% for male oldest-old and female-oldest-old, respectively, while the corresponding figures in rural are 6.4% and 2.6%. Medical expenditure has brought heavy pressures both on the oldest-old and on their families, and become a major cause for a lower quality of life. This chapter suggests to gradually build multi-level social and medical security systems including a social pension plan, supplementary pension plan by enterprises, commercial pension plan, savings pension plan, and medical insurance and service programs.

Chapter 13. The Relationship between Diet and Health

Using the CLHLS baseline survey data, this chapter analyzes the relationship between diet and health of the oldest-old by a proportional odds model. While controlling for the main demographic, socioeconomic characteristics and chronic disease conditions, cognitive function, and ADL, the study shows that the type of staple food, frequencies of intake of fresh fruits, vegetables, fishery products, beans,

and frequency of drinking tea are correlated with self-reported health.

Chapter 14. Smoking, Alcoholic-Drinking and Healthy Longevity

Using the baseline survey data from the Chinese Longitudinal Health Longevity Survey, this chapter describes age, gender, and residential patterns of smoking and alcohol consumption in the past and present, the types of alcohol consumed, start-age and quitting-age for smoking among the oldest-old. We also discuss the associations of smoking, alcohol drinking with health statuses measured by self-reported health and illness.

Chapter 15. Association between Lifestyle and Self-Rated Health

Though previous studies found the strong impacts of life style on health and survival, we know little about how and to what extent the lifestyle of the oldest-old in China affects their health, given the Chinese cultural context. Based on the Chinese Longitudinal Healthy Longevity Survey (2000) and using the stereotype ordered model, we explore the association between the lifestyle and self-rated health the oldest-old. The findings of our analysis with controlling for other socio-demographic and health conditions covariates show that the elderly with regular healthy-related activities are likely to assess their health status more positively. Different from other studies, however, we do not find significant relationship between religious activities and self-rated health, which could be explained based on Chinese culture context.

PART IV INTERGENERATIONAL RELATIONS, MARRIAGE, FERTILITY, AND HEALTHY LONGEVITY

Chapter 16. The Living Arrangement and Its Determinants

This chapter presents the distribution of the living arrangements by age, sex, and urban-rural residence based on the CLHLS survey data for the oldest-old in China. It indicates that the majority of the oldest-old still live with their offspring. Multivariate logistic regression analysis show that age, residence, primary occupation, and marital status are significant affecters, but gender, years of schooling are not. In particular, demographic availability is tested in respective of both quantity and composition. The strong threshold effect is found between no child and one child, but number of children alive is of insignificant effect. Besides, strong sex preference is found pertaining to dependence of the oldest-old upon their children.

Chapter 17. Gender Differentials of Widowhood and Remarriage

According to the data collected in the Chinese Longitudinal Healthy Longevity Survey among people aged 80~105 in 1998, 92.3% oldest old women were widows and 58.4% of men were widowers. Not only the proportion of widows was higher than that of widowers in each age group, but also women's remarriage possibility was much lower than men of same age. Among those who lost spouses after age 60, the remarriage rate was 2.3% for men and 0.5% for women. On average, women had significantly longer period of widowhood than that of men.

Chapter 18. Effects of Marriage Quality on Healthy Longevity

Based on the 1998 and 2000 waves of the CLHLS, this chapter analyzes the effects of gender differential in marriage on health and longevity among the oldest-old in China using logistic and Cox proportional hazard model. The finding reveals that the protective effect of marriage on health is larger for females than for males, whereas the positive effect of marriage on survival is higher for males than for females. High quality of marriage reduces the risk of health deterioration and mortality. Lose of spouse at advanced ages increases the risk of likelihood of dying, with females in more disadvantaged status than their male counterparts.

Chapter 19. Longevity among Chinese Family Members

Based on baseline data collected by the Chinese Longitudinal Healthy Longevity Survey in 1998, this chapter analyzes longevity status among family members of the oldest-old Chinese. We found that 28% of the interviewed oldest-old has at least one parent ever survived to 80. The positive association between parents' longevity and children's longevity is observed, but no gender difference in children. The result also shows that the proportion of the low birth orders is higher among interviewed oldest-old than that in normal population.

Chapter 20. The Effects of Education and Occupation on Lifetime Fertility

Theoretical and empirical studies on testing the bio-demographic theory of Dynamic Balance between fecundity and survival are very limited due to the difficulties of measuring fecundity. The Chinese Longitudinal Healthy Longevity Survey, which collected information on occupation, education, marriage, and fertility of the oldest-old aged 80+, enables us to study these differentials in fecundity. Statistical analysis shows that the assumption of negative relationship between longevity and fecundity is not supported in our study. Contrarily, a positive relationship is observed among the Chinese oldest-old. Moreover, our research does not support the U shape of relationship between parities and longevity which is

resulted from the study in Austria, England and Wales. However, our research reaches the same conclusion as the Austrian and British study that women giving births after age 40 have a good chance of living longer. It is found that education attainment show a negative correlation with the number of births, although the most educated oldest-old is most unlikely infertile. Although the oldest-old of different occupations have significantly different numbers of children, the regulatory relationship between fertility and occupation status is not yet defined.

Chapter 21. Association of Late Childbearing with Healthy Longevity

Statistical analysis of the large and unique CLHLS longitudinal data set, based on binary logistic regression, ordinal logistic regression and Cox proportional hazard model, demonstrates that late childbearing after age 35 or 40 is significantly associated with survival and healthy survival among very old Chinese women and men. The association is stronger in oldest-old women than men. The estimates are adjusted for a variety of confounding factors of demographic characteristics, family support, social connections, health practices, and health conditions. Further analysis based on an extension of the Fixed Attribute Dynamics method shows that late childbearing is positively associated with long-term survival and healthy survival from ages 80-85 to 90-95 and 100-105. This association exists among oldest-old women and men, but, again, the effects are substantially stronger in women than men. We discuss four possible factors which may explain why late childbearing affects healthy longevity at advanced ages: (1) social factors; (2) biological changes caused by late pregnancy and delivery; (3) genetic and other biological characteristics; and (4) selection.

PART V MORTALITY AT OLDEST-OLD AGES

Chapter 22. Mortality Pattern at Oldest-Old Ages in China

This chapter finds that the Kannisto model, a two-parameter logistic formula, fits Han Chinese death rates at oldest-old ages better than the Gompertz and four other models. Chinese death rates appear to be roughly similar to Swedish and Japanese rates after age 97 for both males and females. Because reports of age seem to be serviceably reliable up to age 100 and perhaps age 105 in China, we think that this convergence may be mainly due to mortality selection in the heterogeneous Chinese population. We show that in China, as in developed countries, the rate of increase in mortality with age decelerates at very old ages.

Chapter 23. The Impact of Economic Factors on Mortality and Health at Oldest-Old Ages

Using the data from 2000 and 2002 waves of the Chinese Longitudinal Healthy Longevity Survey and the multiple-regression and Probit modeling, we examine the impacts of economic factors on the health outcome and mortality of the oldest old in China. We find 1) the medical care condition in childhood is important for late life health, 2) financial self-sufficiency is beneficial for one's health outcome until death.

Chapter 24. The Impact of Intergenerational Support on Mortality at Oldest-Old Ages

Although many studies have focused on the association between intergenerational support and the health status of the elderly, we know little about the impact of these supports on the mortality of the oldest-old in China, a developing country with a unique cultural context. We examine such impact and the nature of the relationship by considering other aspects closely related to the aforementioned support. Based on data from 1998 and 2000 waves of the Chinese Longitudinal Healthy Longevity Survey using stratified Cox proportional hazard model, we find that physical caregiving and emotional support provided by children positively affect the survival of the oldest-old in China. In addition, after controlling for the elders' need of support, we find that financial support has no significant effect on the mortality of the oldest-old. We also indicate the policy implication from these results. Given the very low fertility in China today, it will be inappropriate to expect the near future Chinese family to act as the main provider in the elderly support, as in the past.

Chapter 25. Smoking and Mortality of the Oldest-Old

The effect of smoking history on survival of the oldest-old is studied based on the data derived from 1998 and 2000 CLHLS waves. The results of Cox survival analysis shows that the smoking history, measured by age at starting to smoke, average amount of smoking per day, smoking length, and current smoking status, doesn't have a statistically significant impact on mortality, though that smoking is harmful to health is very commonly reported. It is possible that smoking does not have direct effects on the survival process for the oldest-old. Interactive analysis, however, indicates some negative effects of smoking on survival. Further study on relationship between smoking and survival among the oldest-old is deserved.

PART VI QUALITY OF LIFE AMONG THE OLDEST-OLD

Chapter 26. Review on Recent International Studies on Quality of Life of the Elderly

This chapter presents a literature review on the international studies of quality of life of elderly population. Research topics reviewed include development of measurement system of quality of life, frail elderly groups (such as elderly women, oldest-old, disabled elderly, and minority groups), healthy longevity, cross-cultural studies, and studies on intervention programs.

Chapter 27. A General Assessment of Quality of Life at Oldest-Old Ages

Based on the baseline survey of the Chinese Longitudinal Healthy Longevity Study, this chapter discusses the quality of life of the oldest-old from the dimensions of physical functioning, psychological well-being, ADL, and life satisfaction. The results show that the psychological well-being and self-reported life satisfaction of the Chinese oldest-old is relatively good although their physical health and functioning of activities in daily living is relatively poor. The major factor of affecting physical health of the Chinese oldest-old is the high chronic conditions. The result also reveals that female oldest-old, centenarians, and rural oldest-old have low quality of life, as compared with their corresponding counterparts.

Chapter 28. Determinants of the Psychological Dimensions of Quality of Life

This chapter focuses on determinants of the psychological dimensions of quality of life of the oldest-old based on data of the CLHLS baseline survey. The analyses show that while most of the oldest-old have positive personality, more than 10% of them feel fearful, anxious, isolated or lonely, especially for female oldest-old and the oldest-old who are living alone. About 57% of the oldest-old whose cognitive function is normal and nearly 70% of oldest-old reported that their life is good or very good. Logistic regression shows that differentials of cognitive functioning in age, gender, physical health conditions, life style, education, primary occupation, urban-rural residence, and living arrangement were observed.

Chapter 29. Quality of Life before Dying

Based on data of the CLHLS baseline and first follow-up wave, this chapter examines selected domains of quality of life (QoL) before dying among the oldest-old in China using logistic regression. While controlling for various confounding factors observed at the baseline survey, the results show quantitatively that the quality of life of those died before the next wave, measured by ADL, cognitive function, sadness, loneliness, economically dependent, adequate medication, poor health and life satisfaction, is much worse than those who survived. The study also demonstrates that

in approaching to the end of life, the QoL of the oldest-old drops quickly with sizable differences observed between genders and urban-rural residences. The empirical evidences suggest that family and society should give more caring and supports concerning end-life quality to those disadvantaged oldest-old.

Chapter 30. Quality of Life of Centenarians

Chinese centenarians are dominated by females, of whom most are illiterate and widowed. Majority of them were engaged in agriculture activities and have no retirement wages and mainly receive economic and daily support/care from family. Most Chinese centenarians are optimistic. The proportion of self-reported good health and life satisfaction among Chinese centenarians is relatively high. Many of them, however, need assistance in their daily life. The economic independence, adequate medication, and accessibility of the medical resources, which affect life quality, vary by urban/rural residence, gender, and living arrangement. More attention should be given to centenarians who are living alone.