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Health Determinants and Gender Heterogeneity of Elderly Population in Healthy China
Analysis Based on CLHLS Survey Data

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ABSTRACT
The healthy China strategy puts the health of the elderly population on an important strategic position. Based on CLHLS2018 data, this paper analyzes the health status of the elderly population in China and the existing gender differences, and further uses the ordered-Probit model for regression to study the factors affecting the health of the elderly population of different genders. It is found that the health level of the elderly male population in China is slightly better than that of the elderly female population, and the elderly female population is faced with a higher risk of disability. Family income, IADL, chronic diseases, psychological status and living habits have an impact on the self-rated health level of the elderly population, and there are differences based on gender. Therefore, we should accelerate the construction of diversified medical system, pay attention to the health problems of female elderly population, attach importance to the social participation of elderly population, and better realize active and healthy aging.

Keywords: *Health of the elderly; Social security; Influencing factors; Gender differences.*

1. INTRODUCTION

Population aging has become a global problem in the 21st century, and China's aging is developing rapidly. The large scale of the elderly population poses a challenge to the existing nursing, medical and social services. Under the healthy China 2030 plan, how to guarantee and improve the health level of the elderly with limited resources to achieve healthy aging poses a challenge to China's aging response [1].

According to the World Health Organization (WHO), health not only refers to the elimination of disease, but also includes the connotation of complete physical, mental and social health. Therefore, to explore the health problems of the elderly population, it is necessary to comprehensively consider the influence of family characteristics, medical insurance, mental status, living habits and other factors on the basis of the analysis of individual initial health level [2, 3].

Based on CLHLS2008 data and using multi-level logistic model, Feng et al. put forward the conclusion that the health of the elderly population is not only affected by personal income, but also has certain provincial differences [4]. Liu et al. pointed out that China's basic medical insurance system China's basic medical insurance system has played a positive role in improving the utilization of medical services for the elderly population and reducing the medical burden of families [5]. In addition, Zhai et al. pointed out that positive personality, optimistic psychology and reasonable diet can significantly improve the health level and achieve a long life [6].

At the same time, although the life expectancy of women is longer than that of men, the health level of the elderly male population is generally better than that of the elderly female population, which has been shown in many countries [7].

The innovation of this paper is that unlike most of the previous literature which only used the self-rated health level, this paper introduced five health dimensions. Also, most of the previous studies took the elderly population as a whole to analyze the influencing factors of health, while this paper took the gender factor into consideration.

2. MODEL CONSTRUCTION

2.1 Data Source

The data used in this paper are from the 2018 Survey

data of Chinese Longitudinal Healthy Longevity Survey (CLHLS), covering 23 provinces (autonomous regions and municipalities directly under the Central Government) in China, and the survey objects are the elderly aged 65 and above and adult children aged 35-64.

CLHLS is a long-term micro-panel data survey project on China's population research. The baseline survey was conducted in 1998 at the earliest, followed by follow-up surveys every 2 to 3 years.

2.2 Variables

Dependent variable. In this paper, self-rated health level was adopted. At the same time, different health status was assigned from 1 to 5. The higher the score, the higher the self-rated health level.

Independent variables. This paper comprehensively selected five factors including personal and family characteristics, medical insurance, personal basic health, psychological status and living habits.

Individual and family characteristics: including sex, age, educational background, marital status, family income, and urban and rural distribution.

Medical insurance: whether have new rural cooperative medical insurance (NRCMI) or urban residents' basic medical insurance (URBMI) or commercial health insurance.

Personal basic health: this paper mainly analyzed the health status of the elderly population from five dimensions of self-care ability (ADL), daily activity ability (IADL), cognitive function, other health assessment and self-assessment of chronic disease prevalence.

Psychological condition: there are 8 indicators in total, positive, neutral and negative scores were 1, 0 and -1 respectively. The total score range was [-8,8].

Living habits: including smoking, drinking, exercise and social activities.

2.3 Research Methods

As the dependent variable of self-rated health level has a natural ranking, the ordered-Probit model is adopted in this paper.

$$\mathbf{health}_i = \boldsymbol{X_i'\beta} + \boldsymbol{\varepsilon}$$

The selection rule is

$$\mathbf{health} = \begin{cases} \mathbf{1,\ where\ health} \le \boldsymbol{r_1} \\ \mathbf{2,\ where}\ \boldsymbol{r_1 < health \le r_2} \\ \mathbf{3,\ where}\ \boldsymbol{r_2 < health \le r_3} \\ \mathbf{4,\ where}\ \boldsymbol{r_3 < health \le r_4} \\ \mathbf{5,\ where\ health} > \boldsymbol{r_4} \end{cases}$$

Health means the self-rated health status of the elderly population, X_i' represents the vector of all explanatory variables involved in this paper. $r_1 < r_2 < \cdots < r_4$ is the parameter to be estimated, that is, the tangent point.

3. EMPIRICAL ANALYSIS RESULTS

3.1 Basic information of survey subjects

This study covered a total of 15,874 elderly population samples, including 6925 male elderly population, 8979 female elderly population. 74.53% of the elderly population have a score of 3-4 on their health level (see Table 1).

3.2 Descriptive results analysis

The average length of education of the elderly population is only 3.5 years, indicating that the current educational level of the elderly group in China is relatively low. In terms of marital status, nearly half of the elderly population has a spouse. Also, there are twice as many elderly women as men who are widowed or single.

Health status includes both physical and mental health. In terms of ADL, the average number of obstacles in China's elderly population is less than 1. However, there were more than 3 obstacles in the average of IADL. In addition, their cognitive abilities are at a medium level, with some cognitive abilities regressing. The average elderly person suffers from one chronic disease. As for the physical health, an average status of 5.255 can be defined as good.

Although the proportion of female elderly population is higher, China's elderly male population has a higher health level. Female elderly population is significantly weaker than male in terms of self-care ability, daily activity ability, cognitive function and mental health, facing the threat of disability.

Table 1 Definition and analysis of family (individual) characteristic variables

Variable	mean	female	male
Self-rated health	3.429	3.385	3.481
Age	85.456	87.129	83.293
Sex(0=female,1=male)	0.436	-	-
Education(years)	3.547	2.273	5.256
Marital status(0=Unmarried, 1=Married)	0.411	0.275	0.585

Income(Log of household income)	9.911	9.844	9.997
Residence(0=rural, 1=urban)	0.275	0.257	0.299
URBMI(0=uninsured, 1=insured)	0.245	0.223	0.275
NRCMI(0=uninsured, 1=insured)	0.638	0.664	0.604
Commercial health insurance(0=uninsured, 1=insured)	0.008	0.008	0.007
ADL	0.811	1	0.569
IADL	3.475	4.079	2.694
Cognitive ability	16.916	15.535	18.702
Evaluation of health from others	3.021	2.959	3.101
Numbers of chronic diseases	1.562	1.546	1.582
Psychological status(-8=worst , 8=best)	5.255	5.201	5.315
Smoking(0=few, 1=offen)	0.148	0.04	0.286
Drinking(0=few, 1=offen)	0.141	0.057	0.249
Exercise(0=few, 1=offen)	0.299	0.249	0.363
Social(0=few, 1=offen)	0.076	0.063	0.093

3.3 Empirical results and analysis

In this paper, the ordered-Probit model was used to analyze the factors affecting the health of the elderly population. Also, further regression analysis was conducted from gender perspective (see Table 2).

Table 2. Health influencing factors and gender differences of elderly population in China

Variable	total	female	male
Age	0.0138*** (7.6598)	0.0172*** (6.7970)	0.0100*** (3.8200)
Sex	0.0179 (0.5739)	-	-
Education	0.0021 (0.7396)	0.0009 (0.2306)	0.003 (0.7378)
Marital status	-0.0293 (-0.8888)	-0.0369 (-0.7949)	-0.0221 (-0.4679)
Income	0.0498*** (5.2058)	0.0364*** (2.9052)	0.0686*** (4.6016)
Residence	0.0077 (0.1805)	0.0699 (1.1822)	-0.0551 (-0.8852)
URBMI	-0.1142*** (-2.5899)	-0.1059* (-1.6568)	-0.1321** (-2.1596)
NRCMI	-0.0774* (-1.7463)	0.0131 (0.2137)	-0.1777*** (-2.7352)
Commercial health insurance	-0.0261 (-0.1506)	0.1322 (0.5607)	-0.1596 (-0.6228)
ADL	-0.0019 (-0.1319)	0.0003 (0.0150)	-0.0087 (-0.3642)
IADL	-0.0202*** (-2.7798)	-0.0234** (-2.3632)	-0.017 (-1.5734)
Cognitive ability	0.0023 (0.6469)	0.0039 (0.8599)	0.0011 (0.2003)
Evaluation of health from others	0.6073*** (24.0227)	0.6086*** (17.3086)	0.6033*** (16.5147)
Numbers of chronic diseases	-0.1230*** (-14.9834)	-0.1213*** (-10.4789)	-0.1265*** (-10.7943)
Psychological status	0.1414*** (22.7008)	0.1449*** (16.9039)	0.1373*** (15.0658)
Smoking	-0.0387 (-0.9778)	-0.006 (-0.0655)	-0.0532 (-1.1957)

Drinking	0.1723*** (4.3834)	0.128 (1.6240)	0.1759*** (3.8490)
Exercise	0.1092*** (3.5978)	0.1838*** (4.2297)	0.0498 (1.1659)
Social	-0.0075 (-0.4939)	0.0108 (0.4821)	-0.02 (-0.9624)
Observations	6,744	3,560	3,184

Note: numbers in parentheses are standard deviations; ***, **, and * indicate significance levels of 1, 5, and 10%.

Age has a significant impact on the self-rated health level of the elderly population, the higher the age, the higher the self-rated health level. This may be due to the older population paying more attention to the maintenance of health as they get older. In addition, household income has a significant effect on the self-rated health of the elderly population.

The influence of having basic medical insurance on self-rated health is negative. It is probably because of the basic medical insurance is accord, adverse selection, health higher levels of elderly population is not willing to participate in any medical insurance.

There is no doubt that the initial health status of the individual has a significant impact on the self-rated health of the elderly population. The more items with obstacles in IADL, the greater the negative impact on self-rated health of the elderly population. Compared with the male elderly population, the female elderly population is more negatively affected by impairments in daily activities and faces a higher risk of disability. In addition, the total number of chronic diseases significantly reduced the self-rated health of the elderly population. The psychological status of the elderly population has a significant positive effect on the self-rated health level of the elderly population.In terms of personal habits, drinking and exercise significantly improved the health of the elderly population.

4. DISCUSSION

4.1 Inadequate basic medical insurance

Basic medical insurance is not an effective way to improve the health level of the elderly population. In addition to the security provided by the basic medical insurance system, the elderly population may have a greater demand for outpatient chronic disease mechanism and nursing mechanism.

4.2 Poor health of women

The poorer health of the elderly female population may be due to the influence of biological differences between the sexes and the traditional lower status of the family, where women do most of the housework and enter a vicious cycle of deteriorating health.

4.3 Low female social participation

Poor social participation will affect the elderly's active life. Due to biological and social factors, women are more emotional. But older men are more involved than women in smoking and drinking habits, as well as in exercise and social activities. The lack of participation in social activities may also be one of the reasons for the poor self-care ability and poor mental health of female elderly population compared with men.

5. CONCLUSIONS

In conclusion, we should actively promote the development of integrated medical and elderly care services, and strengthen the development of the medical security system and social elderly care infrastructure. At the same time, more attention should be paid to the more serious health dilemma faced by the female elderly population. It is important to pay attention not only to the average life expectancy, but also to the healthy life expectancy, so that the entire elderly population can live in a positive, healthy and friendly environment.

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