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Factors Influencing Health Status of Women in Rural China

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Abstract: *With the socioeconomic development of residents in China, women's health has improved significantly in China, but the health status of women in rural areas still needs to be improved. This study employs the data from the 2018 China Health and Aging Tracking Survey and uses R language and logistic regression modeling to analyze how factors such as age, income, education, sleeping time, physical exercise and frequency of children's visits affect women's health in rural areas. Finally, this study concludes that women in rural areas can actively improve their own health through adopting healthy lifestyles and enhancing family companionship.*

Keywords: *women, rural areas, health*

1. Introduction

Women's health reflects the level of health, quality of life and civilization of the entire population of the country. In order to protect women's rights and interests, promote women's development, and promote gender equality, China promulgated and implemented the China Women's Development Program (2011-2020) (Zhongguo funv fazhangangyao) (hereinafter referred to as the Program) in 2011. In December 2021, the National Bureau of Statistics released the final statistical monitoring report "Program" [1]. The results show that: during the decade, women's social status has improved significantly and women's health has been greatly improved. The average life expectancy of women exceeded 80 years, ranking 62nd out of 184 countries and 4 years higher than the worlds' average for women. The program also points out that although the level of women's health in China has improved considerably, the field of women's health also faces new difficulties and challenges. The gap between urban and rural areas still exists, and the problem of unbalanced and insufficient development of women is still prominent. For this reason, in the future, special attention and consideration should be given to the needs of some social groups that are disadvantaged in socio-economic development and the multiple threats to their health, including women living in rural areas. Also, efforts should be made to improve their living conditions and give them access to better health services to achieve sustainable development.

The author previously completed a project titled "A Study on Reducing the Prevalence of Gynecological Diseases among Rural Women around Xi 'an City, The research team used questionnaires, interviews and field surveys to understand the prevalence of gynecological diseases among rural women living around Xi'an. We found that the prevalence was high, which not only caused pain to the patients themselves, but also imposed a large financial burden on their families. In the conclusion of the study, we proposed measures to effectively reduce the prevalence of gynecological diseases, but since the data were obtained from questionnaires and field visits, the sample size was small, and the geographical scope was limited to a few villages around Xi'an, which lacked universality, further research is necessary to make the results more scientific and accurate.

Based on this background, the theme of this study is to examine factors affecting health status of women in rural areas and propose policy implications.

2. Literature review

In "Medical Sociology", social class is the most powerful determinant of health and illness (Cockerham, 2012) [2]. In the United States, medical sociologists typically use the concept of socioeconomic status (SES) to identify a person's social status. Socioeconomic status includes three related but independent variables: income, education, and occupational status. Each of these variables can have a significant impact on health, with education having a particularly significant impact on health. In a national study conducted in the United States, Herd and colleagues then found that education has a

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very important impact on the development of chronic diseases and physical disorders (Herd et al., 2007).

Some literature also confirmed the effects of SES on the health status of women in rural areas, such as the article “Analysis of Rural Women’s Health Status and its Influencing Factors-- Based on Ordered Probit Model (Woguo nongcunfunv jiankangzhuangkuang jiqi yingxiangyinsu fenxi—jiyu ordered probit moxing de guji)”, the researcher chose ordered probit model to analyze the factors affecting rural women’s health status, and concluded that family income and education level play a positive role in the health status of rural women[3].

In the article “Analysis of 4945 Urban and Rural Women Screened for Gynecological Diseases (4945 ming chengxiangfunv fukejibing puchaqingkuang fenxi)” the researcher focused on 4945 female teachers in the education system who were screened for gynecological diseases at the Yuci District Chinese Hospital in Jinzhong City[4]. The results showed that female teachers have a lower prevalence rate is directly related to their good economic conditions, high education level, and strong awareness of self-care.

In the article “Survey Analysis of Women’s Health Care and Health Needs of Women’s Diseases in Xinjiang Hetian Region (Xinjiang hetian diqu funv weishengbaojian ji funvbing jiankangxuqiu de diaochafenxi)”, the effect of different levels of education on prevalence was explained[5]. Women with lower levels of education, who were less aware in focusing on personal hygiene, had higher prevalence rates. This study also found that the literacy level of rural women in Hetian area gradually decreased with age.

Overall, better educated and wealthier people did better in terms of health and longevity.

Healthy lifestyles are also becoming increasingly important in improving people’s health. Healthy behaviors are behaviors that individuals actively adopt to maintain or promote health and prevent health problems. In the article “there are Five Elements to a Healthy Lifestyle (jiankang shenghuofangshi you wuyaosu)”, we know that healthy lifestyles include eating right, controlling weight, exercising, resting, relaxing, as well as avoiding stress, alcohol and substance abuse(Yan sheng, 2021) [6].

Sleep status and physical activity were also noted to be associated with influencing health status. In the article “The Health Hazards of Sleep Deprivation (shuimianbuzu dui jiankang de weihai)”, it mentions that sleep is in the leading position in human life activities, and the lack of sleep caused by people’s work pressure and bad habits in modern life can affect the health of the body, thus causing diseases such as hypertension and diabetes[7]. And in the article “Study on the Factors of Physical Exercise on the Health Status of Adult Residents in China (tiyuduanlian dui woguochengrenjumin jiankangzhuangkuang de yingxiangyinsuyanjiu)”, it points out that physical activity has a significant effect on the health status of adult residents in China, especially on the health advantage of rural residents who participate in physical activity[8].

For individuals, membership in groups and organizations is important for their physical and psychological well-being. As defined by Turner (2004:13), social capital is "the social investment of members of a society - the investment made by way of membership in formal and informal groups, networks and institutions". Similarly, Lin (2001) sees social capital as an investment in social relationships that people can use to buffer stress and depression. According to Bourdieu (1993:2), social capital is what we commonly refer to as "relationships". Robert Putnam (2000) asserts that the positive effects of social capital on health come from enhanced self-esteem, feelings of support, access to group and organizational resources, and its ability to buffer against stressful situations. In Putnam’s view, "feelings of social connectedness" are the most powerful determinants of health. After reviewing a number of studies, he found that those who were socially isolated were two to five times more likely to die from all illnesses than those with close family and friendships.

Age has been identified as another factor influencing women’s health in rural areas. The article “Analysis of the Disease Situation of Women in Remote and Poor Minority Areas (Bianyuan pinkundiqu shaoshuminzufunv jibingqingkuang fenxi)” focused on 3600 women aged 19 to 50 years old living in remote and poor minority areas, and found that the age of onset of the disease was 61.8% of the total number of women aged 30 to 50 years old, which was among the groups with the highest proportion of the disease age structure[9].

In general, some of the measures to reduce the prevalence of gynecological diseases among women have been proposed in previous studies papers named “Common gynecological diseases of rural women of childbearing age, influencing factors and preventive measures: A case study of Mengcheng County(Nongcun yulingfunv changjianfukejibing,yingxiangyinsu ji qiyufangduice—yi mengchengxian

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weili)", such as: changing the concept of rural women, raising awareness of protection, alleviating the labor intensity and mental stress of rural women, increasing investment in rural health, popularizing knowledge of diseases, and establishing a system of free disease examination or financial subsidies for examination (Li, 2021) [10]. However, the factors mentioned in the above papers are mostly factors that are difficult to change in a short period of time, such as the income situation and education level of women in rural areas, so the authors hope to find some factors that can be changed in a short period of time for research and analysis, as well as to verify the factors that have been proposed in other papers.

Therefore, the hypotheses of this study were determined as follows.

H1. Age has a negative effect on women's health status in rural areas

H2. Income has a positive effect on women's health status in rural areas

H3. Educational attainment has a positive effect on women's health status in rural areas

H4. Sleep duration has a positive effect on women's health status in rural areas

H5. Physical activity has a positive effect on women's health status in rural areas

H6. Frequency of child visitation has a positive effect on women's health status in rural areas

3. Methods

The data used in this study was obtained from the China Health and Retirement Longitudinal Study (hereinafter referred to as CHARLS), which aims to collect high-quality micro-data representing households and individuals aged 45 years and older in China to analyze population aging issues and promote interdisciplinary research on aging. The CHARLS national baseline survey was conducted in 2011, covering 150 county-level units, 450 village-level units, and 17,000 people in approximately 10,000 households. The sample is tracked every two to three years, and the data are made available to the academic community one year after the survey is completed.

The 2018 data from the CHARLS database was selected for this study, and the data covered various segments such as household, health status and functioning, cognition and depression, health care and insurance, work and retirement, pension, income expenditure and assets, and property and housing status of the survey members. We selected women with non-urban households as the study sample from the total sample, and selected 7 more variables as dependent and independent variables from the 2247 variables. The final sample size is 5300.

Table 1: Descriptive statistics table

Variable Name	Statistics
Age(mean)	63.07years
Income(mean)	6952yuan
Education	less than primary school:2980,56.23%
	primary school:1019,19.23%
	middle school:857,16.17%
	high school:380,7.17%
	higher education:64,1.21%
Sleeping Time(mean)	5.954hour
Exercises(mean)	0.8881
Visit Children	almost daily:1265,23.87%
	2or3/week to 1/2weeks:1698,32.04%
	1/1-3months:1184,22.34%
	1/6months:993,18.74%
	never:160,3.02%

In this study, the improvement of women's health status in rural areas was used as the dependent variable and the remaining six variables were used as independent variables. The first independent variable is age, the minimum age of the 5300 samples is 18 years old, the maximum age is 108 years old, the mean is 63.07 years old, and the median is 63 years old. The second independent variable is income, the minimum annual income of the samples is $0, the maximum annual income is 444, 000, the mean is $6952, and the median is $960. The third independent variable is education level. The CHARLS original

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education variable has 11 levels. For the convenience of model building, this study divided 11 different levels of education into five categories: below elementary school, elementary school, middle school, high school, high school and above. The percentage of each category is detailed in the figure below. The fourth independent variable is the sleep time, the minimum sleep time in the sample is 0 hours, the maximum sleep time is 24 hours, the average is 6 hours. The fifth independent variable is physical activity, which is a categorical variable, where 1 indicates continuous physical activity and 0 indicates no physical activity, and the mean value in the sample is 0.8881. The sixth independent variable is frequency of child visitation. For the sake of research, the data of the children showing the highest frequency of visitation was selected and divided into five classes, namely, once a day, 1-3 times a week, once every 1 to 3 months, once every 6 months, and never. The percentages of each class show in the following figure (See Table 1).

Based on the above variables and data, a model was constructed using logistic regression method to analyze the effect of age, income, education, sleep duration, physical activity, and frequency of child visitation on women's health in rural areas. Our dependent variable is a dichotomous variable, when the variable is yes or takes a value of 1, it indicates deteriorating health status; when it takes a value of 0, it indicates improving or unchanged health status.

Then I plotted the diagram based on the relationship of the six independent variables on the dependent variable, as shown below:

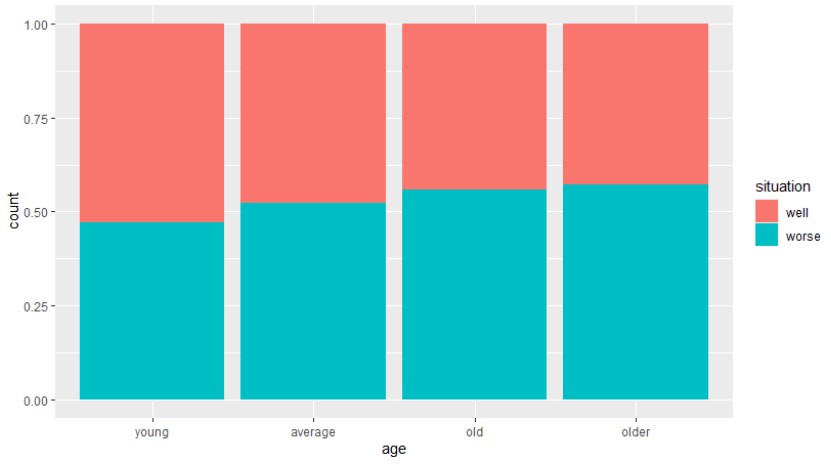

Figure 1: Age factor

In the analysis chart of the first variable (See Figure 1), I found that at higher ages, women in remote areas were more likely to have the disease.

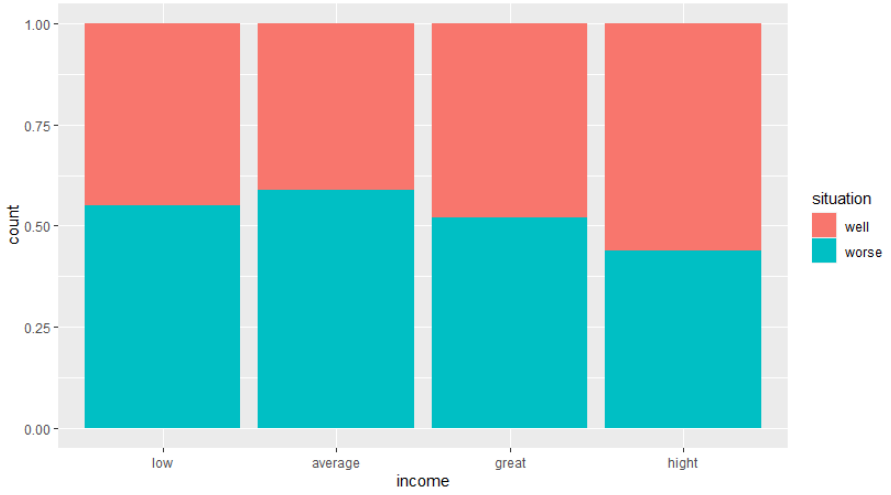

Figure 2: Income factor

In the analysis chart of the second variable (See Figure 2), I find that in contrast, the incidence of disease decreases with the increase of income for women in remote areas, but for the lowest income group, their incidence is actually lower than that of the average income group. It is speculated that they

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may have done more work in their daily lives, so they exercised their bodies in their work.

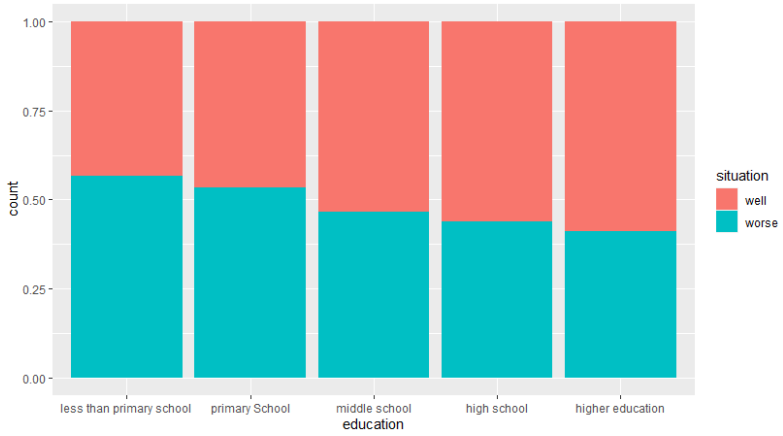

Figure 3: Education factor

In the analysis of the third variable in the chart (See Figure 3), I found that the odds of women in remote areas decreased as their education level increased. Women with higher education have the lowest incidence of the disease as a result of their clear awareness of the disease and awareness of prevention.

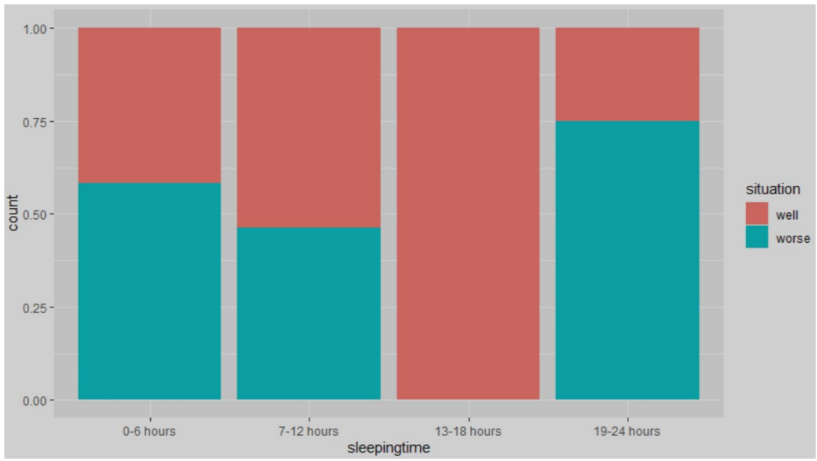

Figure 4: Sleeping time factor

In the analysis of the fourth variable (See Figure 4), I found that women in remote areas has the lowest risk when they slept between 13 and 18 hours. However, the sample sizes for the 13 to 18 hour and 19 to 24 hour data are very small and potentially vegetative, so these two data sets are not representative.

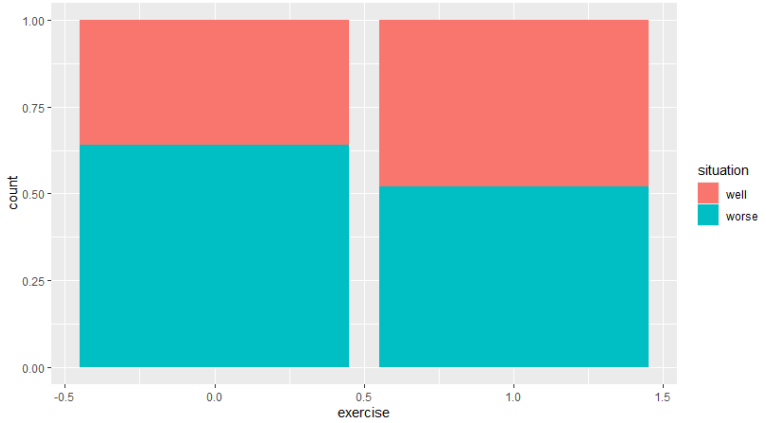

Figure 5: Exercising factor

In the analysis of the fifth variable (See Figure 5), I found that when women in remote areas exercised, their risk of disease decreased. So proper exercise will help improve their physical health.

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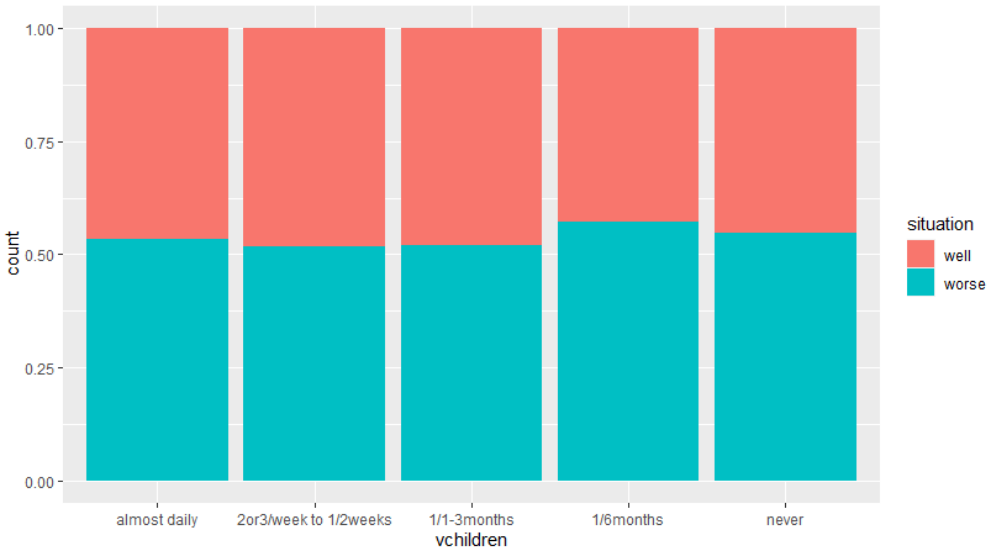

Figure 6: Visiting children frequency factor

In the analysis of the sixth variable (See Figure 6), I found that women in remote areas has a lower risk of developing the disease when their children visited them more frequently.

4. Results

In this study, five logistic regression models were constructed to analyze the effects of six independent variables on women's health status in rural areas.

In the first model (glm6), three of the six independent variables are selected, namely age, income, and physical activity. We can find that all three independent variables have a significant effect on the dependent variable, when other variables controlled, the odds of health deterioration increases 0.96% (exp(0.00959)-1=0.96%)for every 1 year increase in age, decreases 0.001411% (exp(-0.00001)-1=0.001411%) for every $1increase in income, and decreases 32.91% (exp(-0.39913)-1=32.91%)for regular physical activity.

In the second, third and fourth models, certain independent variables were selected from the six independent variables for the study analysis, and each model has significant independent variables that identified factors affecting the odds of deterioration of women's health status in rural areas. For example, in the second model, increases in income, physical activity, and sleep duration significantly reduced the odds of deterioration in women's health status. In the third model, income, physical activity, increased frequency of children's visits, and increased education significantly reduced the odds of women's health deterioration, but increasing age significantly increased their odds of health deterioration. In the fourth model, physical activity, increased frequency of child visits, and increased educational attainment significantly decreased the odds of women's health deterioration, while increasing age significantly increased their odds of health deterioration.

The fifth model (glm5) is the full model, which means that all six independent variables were used for analysis. In the model, we found that all six independent variables were significant. Controlling for changes in a single variable, the odds of health deterioration increases 0.82% (exp(0.00817)-1=0.82%) for each year of age, decreases 0.001190% (exp(-0.00001)-1=0.001190%) for each $1increase in income, decreases 11.42% (exp(-0.12128)-1=11.42%) for each hour of sleep, and decreases 34.63% (exp(-0.42506)-1=34.63%) for regular physical activity; For the remaining two categorical variables, we can observe that compared with daily visits by their children, visiting once in 6 months by children increases the odds of deterioration of health status of women in rural areas by 26.34%(exp(0.23381)-1=26.34%); For their education, the odds of deterioration of health status of women with secondary education decreases by 16.71% (exp(-0.18286)-1=16.71%) compared with women with education below primary education.

The data model is as follows (See Table 2).

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Table 2: Data model

	Dependent variable:				
	dep				
	(1)glm6	(2)glm1	(3)glm3	(4)glm4	(5)glm5
income	-0.00001***	-0.00001***	-0.00001***		-0.00001***
	(0.000002)	(0.000002)	(0.000002)		(0.000002)
age	0.00959***		0.00973***	0.00843***	0.00817***
	(0.00256)		(0.00286)	(0.00284)	(0.00288)
sleepingtime		-0.12531***			-0.12128***
		(0.01327)			(0.01331)
vchildren2or3/week to 1/2weeks		-0.04670	0.00071	0.00307	-0.00095
		(0.07581)	(0.07615)	(0.07595)	(0.07679)
vchildren1/1-3months		-0.09577	0.00008	0.01979	-0.01939
		(0.08264)	(0.08430)	(0.08400)	(0.08507)
vchildren1/6months		0.13746	0.24804***	0.26850***	0.23381**
		(0.08709)	(0.09034)	(0.09006)	(0.09111)
vchildrennever		0.07209	0.22933	0.22230	0.19804
		(0.17169)	(0.17412)	(0.17336)	(0.17534)
exercise	-0.39913***	-0.49666***	-0.40309***	-0.42748***	-0.42506***
	(0.09359)	(0.09295)	(0.09384)	(0.09363)	(0.09501)
educationprimary School			-0.00377	-0.05433	0.00475
			(0.07567)	(0.07485)	(0.07625)
educationmiddle school			-0.20560**	-0.30162***	-0.18286**
			(0.08400)	(0.08165)	(0.08458)
educationhigh school			-0.17659	-0.42599***	-0.17378
			(0.12283)	(0.11187)	(0.12340)
educationhigher education			-0.10581	-0.64282**	-0.09711
			(0.28413)	(0.26035)	(0.28629)
Constant	-0.00383	1.44388***	-0.02876	0.03416	0.81719***
	(0.19917)	(0.12840)	(0.23586)	(0.23500)	(0.25518)
Observations	5,300	5,300	5,300	5,300	5,300
Log Likelihood	-3,609.95400	-3,566.79500	-3,599.92300	-3,613.28400	-3,557.10400
Akaike Inf. Crit.	7,227.90800	7,149.59000	7,223.84600	7,248.56900	7,140.20800
Note:					*p**p***p<0.01

5. Conclusion

This study is aimed at providing implications for improving the health status of women in rural areas, based on data from the CHARLS database for 2018, from which a sample of 5300 women in rural areas and 7 variables were selected for the study to analyze the factors that affect the health status of women, so that actions can be made to improve it.

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We used women's health status in rural areas as the dependent variable, with 1 indicating deterioration of health status and 0 indicating improved or unchanged health status, and the six variables of age, income, sleep time, physical exercise, education level, and frequency of children's visitation as the independent variables for the research analysis. In the five models constructed, it can be found that all the above six independent variables have significant effects on the improvement of health status. Besides, they support the hypothesis proposed at the beginning of this paper, that is, age has a negative effect on the improvement of health status of women in rural areas, while income, education level, sleep time, physical exercise, and frequency of children's visits have a positive effect on the improvement of health status. And in the full model, it can be found that physical exercise has the greatest effect on the improvement of health status, and appropriate physical exercise decreases the odds of deteriorating health status of women in rural areas by 34.63%.

In this study, the latest 2018 survey data from CHARLS were used to corroborate the findings of previous papers that age, income, and educational attainment affect the odds of deterioration of women's health status in rural areas. For the first time, it was proposed that sleep duration, physical exercise, and frequency of children's visits significantly affect the health status of women in rural areas. These three newly identified factors are all factors that can be self-adjusted and self-improved, and therefore have more practical guidance to help women in rural areas improve their health status.

However, there are still shortcomings in this study. First, the sample size is small, with only 5300 women in rural areas. Second, this study is based on the 2018 time transect, and lacks comparative analysis of longer-term historical data. Third, an interview study could also be conducted to further verify the effectiveness of the subjective improvement measures proposed in response to the study results.

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