

Original Research Article

Health Inequalities in the Elderly with Different Socioeconomic Status in China

Duanying Cai^{1*}, Xuehua Lai¹

¹School of Nursing, Jiujiang University, Jiujiang, China

***Corresponding Author:** Duanying Cai
School of Nursing, Jiujiang University, Jiujiang, China

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Abstract: This study aims to examine socioeconomic inequalities in health status and health service of the elderly in China to provide basis for health promotion. The data of China Health and Retirement Longitudinal Study (CHRLS) in the year 2015 was used. Adults aged 60 and over (n=8001) were included in the analytic sample. Socioeconomic status (SES) of the elderly was assessed by annual per capita consumption expenditure, education, and regional and rural/ urban status. Health status was measured by self-rated health, activities of daily living (ADL), the prevalence rate of chronic diseases and the 1-month prevalence rate; while health service was measured by the utilization of both outpatient service and inpatient service. Overall, the elderly with higher economic level had better health status and higher ADL disability rate, but lower prevalence rate of chronic diseases, 1-month outpatient visit rate and annual hospitalization rate. The elderly with lower education level had higher self-rated "poor" health, ADL disability rate, 1-month prevalence rate and 1-month non-visit rate. The elderly in eastern region or urban areas had better health status than those in central and western regions or rural areas. However, for health service utilization, the elderly in western region used both outpatient and inpatient services more frequently. The rural elderly had higher 1-month outpatient visit rate, while the urban elderly had higher annual hospitalization rate. Socioeconomic inequalities in health existed in Chinese elderly. To promote health equity among the elderly, the government should improve health insurance and medical assistance policies, optimize health resources allocation, and narrow economic gaps between western and eastern regions, and between rural and urban areas.

Keywords: Elderly, health inequalities, socioeconomic stats, concentration index, CHARLS.

INTRODUCTION

By the end of 2019, 18.1% of the total population in China is aged 60 and above, reaching at 253.9 million (National Bureau of Statistics, 2019). Though health status and life expectancy of the elderly in China have been improved due to economic growth, the aging population inevitably leads to high prevalence of chronic diseases and disabilities. Because of physiological and financial vulnerability of the elderly, there are increasing concerns about their health and health care needs. Recently, more and more scholars have emphasized the importance of healthy aging in China. However, the elderly with different individual characteristics, especially with different socioeconomic status, are having different health status and health service utilization (Liu *et al.*, 2016; Miao & Wu, 2016), which is against the idea of "health equity" that we highly praised at present.

Socioeconomic status (SES) defined as a construct that captures power, material resources and social capital (Nuru-Jeter *et al.*, 2018), is one of essentials to achieve health. Income, education and occupation are commonly used to create the informative image of SES (Mackenbach *et al.*, 2008). These indicators can reflect an individual's status in social structure from different perspectives. The importance of each indicator may vary between and within cultures and countries (Smith, 2000). SES related health disparity also known as socioeconomic inequalities in health cannot be simply explained. SES may affect health through access to health care services, exposure to environmental pathogens and

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occupational hazards, social capital and support levels, health risk behaviors, cumulative effects of stress, and health care policies (Kagamimori *et al.*, 2009).

Many population-based studies in industrialized countries have shown that socioeconomic inequalities in health persist into old age (Huisman *et al.*, 2013). SES not only determines who can live through to late life, but also plays an important role in forming risks of poor health and mortality of older adults. Some have argued that the elderly with low SES usually have few sources of health care information, poor access to health care services, and difficulties to develop healthy behaviours (Ergin & Mandiracioglu, 2015). It is believed that despite efforts to equalize access to health care for elderly, socioeconomic inequalities in health is still troubling (Shaw *et al.*, 2014).

In China, reducing inequalities is widely regarded as one main goal of health care policies. Efforts to reduce health inequalities have been implemented in recent two decades. Insurance reforms were initiated from 2003 to 2008, and a systematic health system reform was announced in 2009. Undoubtedly, substantial improvements have been achieved including expanded health insurance coverage, strengthened primary care, improved public health services, and effective reforms in public hospitals (Yip *et al.*, 2012). Through which, the elderly in China surely have received better financial protection and increased access to health care, but some have suggested that the effect of these measures in reducing health inequalities is limited, because they do not provide equal access to the higher quality of care for the elderly (Ta *et al.*, 2020).

The purpose of this study was to examine and describe the evidence about socioeconomic inequalities in health status and health service of respondents aged 60 and above based on the China Health and Retirement Longitudinal Study database. Through clarification of the impact of socioeconomic position on health, we expected to provide reference for development of policies and initiatives to promote health status and health service utilization of the elderly, so that to improve health equity and healthy ageing.

METHODS

Data

The China Health and Retirement Longitudinal Study (CHARLS) is a nationally representative survey of people aged 45 and above in China to analyze and tackle with aging problems. A probability-proportional-to-size sampling technique was applied to randomly choose respondents and a computer-assisted personal interview was used to conduct face-to-face interviews (Zhao *et al.*, 2014). The data used in this study was the follow-up survey of CHARLS in 2015. The 2015 survey contained records of 9,785 respondents aged 60 and above (living in 12,221 households, 450 urban communities/villages, 150 county-level units in 28 provinces in China). To explore health inequalities in the elderly with different socioeconomic status, the study recruited respondents with SES information (annual per capita consumption expenditure, education level, regional and rural/urban status) data. A total of 8001 subjects were included (Fig 1).

SES indicators

Income, education and occupation are the most commonly used indicators for SES. However, due to the low employment proportion of the elderly population, the adaptability of occupation as an indicator is poor. Also, income of the elderly is relatively low, with some of them having no monetary income. Comparatively, consumption index is relatively stable, which can better reflect actual living standard of the research respondents, so it is believed to be more applicable than income index in developing countries (Grosh & Glewwe, 2000). In addition, China has unbalanced economic growth and income disparity between geographical regions, and between urban and rural areas. Therefore, the indicators selected to measure SES of the elderly were annual per capita consumption expenditure, education, regional and rural/urban status.

The economic level of the elderly was sorted according to annual per capita consumption expenditure and equally divided into 5 groups: I (lowest consumption group), II (low consumption group), group III (general group), IV (high consumption group), and V (highest consumption group). Education level was categorized into 5 groups as I (illiterate), II (did not finish primary school), III (primary school), IV (middle school), or V (high school and above). The division of three geographical regions including east, central and west is based on the standard from the National Bureau of statistics (2011). The health and health service utilization of the elderly with different economic condition, education background, and regional and rural/urban status were studied.

Health inequalities indicators

Health inequalities include inequalities in health status and health service (National Center on Minority Health and Health Disparities, 2010). In the study, self-rated health, activities of daily living (ADL), the prevalence rate of chronic diseases and the 1-month prevalence rate were chosen to measure health status; while health service was measured by utilization of outpatient service including 1-month outpatient visit rate and 1-month non-visit rate, and inpatient service including annual hospitalization rate and annual non-hospitalization rate.

Self-rated health is a widely used indicator in the literature to measure health status. In the questionnaire of CHARLS, self-rated health was based on respondent's answer to "How is your health in general?", with the categories being very good, good, fair, poor, and very poor. In this study, "very good", "good" and "fair" were classified as self-rated "good" health, and "poor" and "very poor" were classified as self-rated "poor" health.

ADL was assessed by a 6-item scale with questions "Because of a physical, mental, emotional or memory problem, do you have any difficulty with one type of everyday activity, excluding any that you expect to last less than three months?" The everyday activities included "dressing, bathing or showering, eating, getting into or out of bed, using the toilet, and controlling urination and defecation". Four possible answers involved "1) No, I don't have any difficulty; 2) I have difficulty but can still do it; 3) Yes, I have difficulty and need help; and 4) I cannot do it." In this study, respondents having no difficulties to complete all of the six activities were considered as ADL independent, while the ones who had difficulty in doing one of the activities were considered as having ADL disability.

The prevalence rate of chronic diseases was identified as diagnosed with at least one of the following chronic diseases: hypertension, dyslipidemia, diabetes, cancer or malignant tumor, chronic lung diseases, liver disease, heart disease, stroke, kidney disease, stomach or other digestive disease, emotional or mental problems, memory-related disease, arthritis or rheumatism, and asthma. The 1-month prevalence rate was assessed by asking "Have you been ill in the last month?"

Outpatient visit rate was measured by asking respondents "In the last month have you visited a public hospital, private hospital, public health center, clinic, or health worker's or doctor's practice, or been visited by a health worker or doctor for outpatient care?" Non-visit was defined as "not seeking medical treatment" when respondents were ill in the last month.

Hospitalization rate and non-hospitalization rate were measured by asking respondents "Have you received inpatient care in the past year?" and "In the past year, did a doctor suggest that you needed inpatient care but you did not get hospitalized?" respectively.

Health inequalities evaluation indicator

Concentration index (CI) is frequently used to evaluate the distribution of socioeconomic-related health inequalities (O'Donnell et al., 2016). This index ranges between -1 and +1. The closer the absolute value of CI is to 0, the more fair it is. If the value of CI is negative, it indicates that dependent variable is concentrated in the lower social strata; while if it is positive, it means that dependent variable is concentrated in the higher social strata. It can be calculated by: $CI=2Cov(X, H)/M$,

Where X represents the rank of social class, H is the corresponding health level or disease prevalence, and M is the average level of health or disease prevalence of the whole population.

Ethical considerations

This study was approved by the Ethics Committee of School of Nursing, Jiujiang University (2020-JS-031). The CHARLS study was approved by the Biomedical Ethics Review Committee of Peking University to interview respondents and collect data (IRB00001052-11015), and the written informed consent was obtained from all the respondents.

Data Analysis

Descriptive analysis was used to describe characteristics of the sample and socioeconomic subgroups. A chi-squared test was used to evaluate the relation of health status and health service utilization of the elderly with their economic level, education and regional and urban/rural status. Concentration index was used to evaluate the distribution of health inequalities indicators across socioeconomic levels.

RESULTS

Respondents who finished the survey with completed data numbered 8001: around half of them were male (50.1%), most of them were young-old (83.0%) and married/cohabitating (78.4%); a larger proportion of the respondents were from rural communities (62.9%), with primary school or lower education (78.0%). The socio-demographic characteristics of the recruited sample are presented in Table 1.

Table 1: Socio-demographic characteristics of the sample

Characteristics	No. of subjects	Percentage (%)
Gender		
Male	4010	50.1
Female	3991	49.9
Age (year)(mean=68.02, SD=6.50)		
60-74	6641	83.0
≥75	1360	17.0
Marital status		
Married/cohabitating	6276	78.4
Divorced/separated /widowed/never married	1725	21.6
Socioeconomic status		
Annual per capita consumption expenditure (RMB) (mean=10065.38, SD=18126.60)		
Education level		
I	2615	32.7
II	1722	21.5
III	1902	23.8
IV	1146	14.3
V	616	7.7
Regions		
East	3024	37.8
Central	2917	36.5
West	2060	25.7
Rural/urban areas		
Rural	5029	62.9
Urban	2972	37.1

Health status of the elderly with different SES

Table 2 shows health status of the elderly with different economic condition, education background, and regional and rural/urban status.

Economic level and health status

There were significant differences in ADL disability rate and prevalence rate of chronic diseases among the elderly with different economic levels ($P < 0.05$). The CI of ADL disability was -0.0311, which indicated that ADL of the elderly with lower economic level were more likely to be impaired. However, the prevalence of chronic diseases was higher in the elderly with higher economic level, with CI at 0.0081.

Education level and health status

There were significant differences in self-rated health, ADL disability rate and 1-month prevalence rate among the elderly with different education levels ($P < 0.001$). Self-rated “poor” health, ADL disability, and getting ill within 1-month were all more common in less educated elderly, with CI at -0.0317, -0.1197 and -0.0762 respectively.

Regional and urban/rural status and health status

There were differences in health status of the elderly in different geographical regions in China ($P < 0.001$). The elderly in eastern region had lower rates in the four indicators of health status, while those in western region had higher rates. Self-rated “poor” health, ADL disability rate and 1-month prevalence rate of the elderly in rural communities were higher than those in urban communities ($P < 0.001$). No significant differences were found in chronic disease incidence in the elderly between rural and urban areas.

Health service utilization of the elderly with different SES

Table 3 shows utilization of outpatient and inpatient service of the elderly with different economic condition, education background, and regional and urban/rural status.

Economic level and health service utilization

There were significant differences in 1-month outpatient visit rate and annual hospitalization rate among the elderly with different economic levels ($P < 0.001$). The CI of the two indicators were 0.0782 and 0.1449 respectively, which implied that the utilization of both outpatient and inpatient services was concentrated in the elderly with higher economic level.

Education level and health service utilization

There were significant differences in 1-month non-visit rate among the elderly with different education levels ($P < 0.05$). The CI for this indicator was -0.0581, which suggested the elderly with lower education level tended not to visit

a doctor when it was needed.

Regional and rural/urban status and health service utilization

There were significant differences in health service utilization among the elderly in different regions (P < 0.001). Compared to the elderly in eastern and central regions of China, the elderly in western region not only had higher 1-month outpatient visit rate and annual hospitalization rate, but also had higher 1-month non-visit rate and annual non-hospitalization rate.

The 1-month outpatient visit rate and annual non-hospitalization rate of rural elderly were higher than those of urban elderly, while annual hospitalization rate of urban elderly was higher than that of rural elderly.

Table 2: Health status of the elderly with different socioeconomic status

Socioeconomic status	Self-rated "poor" health (%)	χ^2 (p)	ADL disability (%)	χ^2 (p)	Prevalence rate of chronic diseases (%)	χ^2 (p)	1-month prevalence rate (%)	χ^2 (p)
Economic level								
I	877 (54.8)	6.509 (0.239)	439 (27.4)	9.635 (0.047)	1338 (83.6)	16.526 (0.002)	194 (12.1)	2.803 (0.591)
II	874 (54.6)		429 (26.8)		1373 (85.8)		177 (11.1)	
III	897 (56.1)		398 (24.9)		1338 (83.6)		187 (11.7)	
IV	902 (56.4)		408 (25.5)		1393 (87.1)		205 (12.8)	
V	843 (52.7)		370 (23.1)		1397 (87.3)		183 (11.4)	
Education level								
I	1511 (57.8)	48.549 (0.000)	819 (31.3)	130.657 (0.000)	2249 (86.0)	5.124 (0.275)	343 (13.1)	25.867 (0.000)
II	957 (55.6)		486 (28.2)		1480 (85.9)		237 (13.8)	
III	1075 (56.5)		443 (23.3)		1633 (85.9)		205 (10.8)	
IV	577 (50.3)		206 (18.0)		958 (83.6)		112 (9.8)	
V	273 (44.3)		90 (14.6)		519 (84.3)		49 (8.0)	
Regions								
East	1556 (51.5)	23.840 (0.000)	622 (20.6)	63.392 (0.000)	2483 (82.1)	50.822 (0.000)	253 (8.4)	87.426 (0.000)
Central	1651 (56.6)		837 (28.7)		2522 (86.5)		343 (11.8)	
West	1186 (57.6)		585 (28.4)		1834 (89.0)		350 (17.0)	
Rural/urban areas								
Rural	2875 (57.2)	27.998 (0.000)	1412 (28.1)	45.574 (0.000)	4275 (85.0)	2.408 (0.064)	649 (12.9)	15.193 (0.000)
Urban	1518 (51.1)		632 (21.3)		2564 (86.3)		297 (10.0)	

Table 3: Health service utilization of the elderly with different socioeconomic status

Socioeconomic status	1-month outpatient visit rate (%)	χ^2 (p)	1-month non-visit rate (%)	χ^2 (p)	Annual hospitalization rate (%)	χ^2 (p)	Annual non-hospitalization rate (%)	χ^2 (p)
Economic level								
I	269 (16.8)	40.836 (0.000)	170 (10.6)	3.836 (0.429)	180 (11.3)	109.777 (0.000)	86 (5.4)	7.581 (0.108)
II	301 (18.8)		142 (8.9)		223 (13.9)		99 (6.2)	
III	334 (20.9)		149 (9.3)		237 (14.8)		123 (7.7)	
IV	354 (22.1)		166 (10.4)		312 (19.5)		100 (6.3)	
V	405 (25.3)		156 (9.8)		376 (23.5)		107 (6.7)	
Education level								
I	542 (20.7)	4.244 (0.374)	270 (10.3)	16.624 (0.002)	414 (15.8)	3.916 (0.418)	177 (6.8)	1.504 (0.826)
II	341 (19.8)		198 (11.5)		277 (16.1)		115 (6.7)	
III	403 (21.2)		179 (9.4)		327 (17.2)		118 (6.2)	
IV	232 (20.2)		95 (8.3)		208 (18.2)		69 (6.0)	
V	145 (23.5)		41 (6.7)		102 (16.6)		36 (5.8)	
Regions								
East	601 (19.9)	22.690 (0.000)	193 (6.4)	99.630 (0.000)	435 (14.4)	23.092 (0.000)	133 (4.4)	39.546 (0.000)
Central	559 (19.2)		284 (9.7)		492 (16.9)		203 (7.0)	
West	503 (24.4)		306 (14.9)		401 (19.5)		179 (8.7)	
Rural/urban areas								
Rural	1080 (21.5)	3.921 (0.048)	516 (10.3)	3.449 (0.063)	803 (16.0)	3.888 (0.049)	350 (7.0)	6.148 (0.013)
Urban	583 (19.6)		267 (9.0)		525 (17.7)		165 (5.6)	

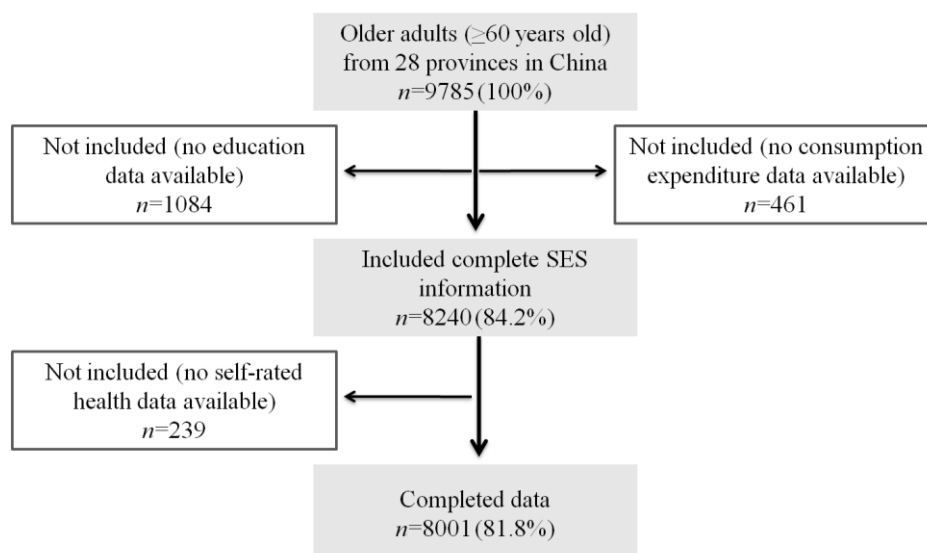


Fig 1: Sample selection flowchart

DISCUSSION

Economic level and health inequalities

The correlation between economic level and health was observed since 1890s (Kagamimori *et al.*, 2009). Previous studies suggested that economic condition was associated with health inequalities in the elderly (Miao & Wu, 2016; Shaw *et al.*, 2014). Usually, better economic condition provides better housing, nutrition, recreation, and health care facilities. Therefore, people with better economic condition have better health status theoretically. However, in this study, we found that the elderly with lower economic level had higher ADL disability rate, but lower prevalence rate of chronic diseases. This might be because chronic disease referred in particular to the one diagnosed by doctors in the study. Many of the elderly with low economic level pay less attention to health and they would not go to see a doctor for a little sick (Zhong *et al.*, 2013). Their consumption mainly focuses on physiological needs, such as food and clothing, instead of health care services, even if they were ill (Chen *et al.*, 2014), so their actual prevalence rate of chronic diseases might be higher. Other researchers explained that the richer individuals were more likely to acquire chronic diseases was because they might adopt more unhealthy lifestyles, for instances, high-fat diets and sedentary work (Miao & Wu, 2016).

As for health service utilization, the elderly who were more likely to seek outpatient or inpatient service were concentrated in the higher economic level, which indicated that economic level was an important factor to influence the elderly to use health care service. Johar *et al.*, (2018) further revealed that only access to outpatient service at public primary health facilities was pro-poor, whilst access to care service at private clinics and hospitals was pro-rich. Actually, many poor elderly people still cannot obtain needed health care service in China (Miao & Wu, 2016). It is the responsibility of the government to provide the elderly with adequate health care service and ensure their rights to be fairly guaranteed. For instance, health insurance and medical assistance system should be improved, and reimbursement proportion of medical expenses could be appropriately increased to reduce financial difficulties of the elderly.

Education level and health inequalities

Education is easy to record and remains stable throughout one's life, so it is a commonly chosen indicator of socioeconomic status. In previous studies, education was proved to be associated with growing inequalities in health status in later life (Ergin & Mandiracioglu, 2015; Zhong *et al.*, 2013). This study also showed consistent results that better education background provided the elderly with better health status. This is because education can promote good health not only through generating economic resources such as income and employment, but also through providing psycho-social resources, such as ability to cope with stress and self-management knowledge and skills (Lowry & Xie, 2009).

For health service utilization, those who did not use outpatient service were concentrated in the less educated elderly in the study. It can be explained that the educated elderly are more aware of disease prevention and treatment (Acciai, 2018), so they are more likely to see a doctor when feeling uncomfortable. In addition, the educated elderly usually go for medical services more frequently because they are more able to afford for them.

Regional and rural/urban status and health inequalities

Generally speaking, health status of the elderly in eastern region and urban areas was better than that in central

and western regions and rural areas. In China, the East is the most developed region, followed by the Central and the West. Because of developed economy, there are more general hospitals and advanced medical technologies in the East. Also, households annual expenditure to health in the East is higher (Meng *et al.*, 2012). Similarly, China's long-term urban-rural dual structure leads to significant differences in economic development and health resources allocation between rural and urban areas. In rural areas, there are mainly public primary health institutions where lack of modern medical facilities and competent health professionals (Lowry & Xie, 2009). Therefore, health services provided in rural areas are less developed (Chen *et al.*, 2014). These can explain the health advantages of the elderly in the East and urban areas.

For health service utilization, the findings were different from what we thought. The utilization of both outpatient and inpatient service of the elderly in western region was higher than that in central and eastern regions. The outpatient visit rate was higher in rural areas while the inpatient service was accessed more frequently in urban areas. The results were consistent with the study from Meng *et al.* (2012). They described that rapid and continuous increases in health insurance coverage especially in western region and rural areas was narrowing the inequalities in health access between western and eastern regions, and between rural and urban areas. However, health status of the elderly in the West and rural areas is relatively poor, there is still a large group of patients who should be treated have not sought for health services. In addition, urban elderly are usually covered by the Urban Employee Basic Medical Insurance or the Urban Resident Basic Medical Insurance, while rural elderly are usually covered by the New Rural Cooperative Medical Scheme which has the lower inpatient reimbursement rate (Meng *et al.*, 2012). This can explain that why urban elderly had higher utilization of inpatient service.

CONCLUSION

This study aimed to examine health inequalities of the elderly with different socioeconomic status in China. Our findings indicated that socioeconomic inequalities in health existed in Chinese elderly. The differences of economic condition, education background, and regional and rural/urban status of the elderly led to differences in their health status and health service utilization. In order to promote health equity among the elderly for healthy aging, the government should improve health insurance and medical assistance policies, optimize health resources allocation, and narrow economic gaps between western and eastern regions, and between rural and urban areas.

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