

The effect of socioeconomic status on informal caregiving intensity of adult females for parents: Evidence from a national study in China

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Abstract

Background

Few studies explored the effect of SES of caregivers on informal caregiving in China, especially from a female perspective. The purpose of this study was to empirically examine how the SES of female caregivers affects the amount of informal care they provide for parents in China.

Methods

The data used in this study was derived from the China Health and Nutrition Survey (CHNS). Informal caregivers were divided into three categories: non-caregivers (0 hrs/week), low-intensity caregivers (less than 10 hrs/week), and high-intensity caregivers (more than 10 hrs/week). Chi-square tests and one-way analysis of variance (ANOVA) were used to compare the SES of the women between non-, low-, and high-intensity caregivers. Multinomial logistic regression analysis was used to calculate relative risk ratios (RRR) for various SES variables to assess the relation of SES on the likelihood of a low- and high-intensity caregiving in the household, adjusting for age, marital status, family characteristics and wave.

Results

Of the 2741 respondents, high-intensity and low-intensity caregivers accounted for 16.42% and 21.38% respectively. Multinomial logistic regression results found that the likelihood of being a high-intensity caregiver vs. a non-caregivers increased as the caregiver's education attainment increased. Urban females were 1.34 times more likely than their rural counterparts to provide low-intensity care vs. no care ($p < 0.05$) and were 1.34 times more likely to provide high-intensity care vs. no care ($p < 0.05$). Employed females were 1.27 times more likely than those non-employed to provide low-intensity care vs. no care ($p < 0.05$).

Conclusions

Differences in SES were found between high-intensity caregivers and low-intensity caregivers. Women with higher SES (higher education attainment, higher incomes, and urban Hukou) were more likely to provide high-intensity informal care, and women who were employed and with urban Hukou were more likely to provide low-intensity care.

Background

With the rapid economic growth, longer life expectancy, and declining fertility rates, China has entered an aging society since 1999 [1]. Compared with other countries, China is the most rapidly ageing country. It took 115 years for France, 85 years for Switzerland, 80 years for the United Kingdom, 60 years for the United States, but just 18 years for China to enter an aging society.[2] According to the latest data from the World Bank, the number of people aged 65 years and above had reached 160 million (11.5% of the

population) by 2019, and this number is estimated to increase to 239 million (16.9%) by 2030. This large amount of older adults will inevitably bring serious challenges to long-term care services in China.[3]

The World Health Organization (WHO) defines long-term care as a systematic activity, undertaken by informal caregivers (family members, friends or neighbors) or formal caregivers (such as professional medical institutions), to ensure that individuals incapable of fully caring for themselves can maintain a high quality of life [4]. In China, formal long-term care still in its infancy, there were only 2.7 registered nurses per thousand people and 29.1 beds provided by nursing homes per thousand older people by the end of 2018[5]. China is confronting unprecedented shortages in formal caregiving provision and care for the elderly is still mainly based on informal care for a long time in the future [6].

Socioeconomic status (SES), a comprehensive indicator measuring the position of individuals within systems of inequality in the society[7], plays a key role in the informal care. In this study, SES refers to income, education, employment, and Hukou status (See detailed introduction in following Methods). To be specific, the Hukou system (also called household registration system) of China classified all residents into rural and urban holders. In contrast to urban Hukou holders, those with a rural Hukou may have lower education, fewer job opportunities, lower access to health benefits as well as poorer living conditions[8]. SES was found to be a key determinant of the amount of caregiving, including informal and formal care, which was mainly due to accessibility, awareness, and ,affordability.[9] A study found that there was a positive association between informal caregiving intensity and income among the White caregivers in the United states.[10] Another study conducted in the United States indicated that many low-income households were unable to afford formal care services. In order to avoid expensive formal care, elderly people preferred to live at home and receive informal care when needed [11].

However, few studies explored the SES of caregivers in informal caregiving. A study in Japan examined the differences in SES between middle-aged female caregivers and non-caregivers, finding that those who were unmarried or who had low educational attainment were more likely to become the primary caregiver of the severely disabled elderly [12]. Another study in Belgium compared social demographic differences between co-resident and extra-resident caregivers, finding that younger women who were not formally employed were more likely to be informal caregivers and that married women were more likely to be involved in co-resident care, but this is not the case among extra-resident caregivers.[13]

The existing studies have mostly focused on comparing the demographics of caregivers and non-caregivers, making little distinction between the different intensities of informal care[12–15]. High-intensity caregivers differ significantly from low-intensity caregivers in a variety of ways, ranging from their demographic characteristics and their responsibilities in caregiving to the impact of caregiving on those they care for and also themselves. With increasing caregiving intensity, the percentage of caregivers reporting fair or poor general health also increase [16, 17]. High-intensity care providers may be particularly vulnerable to higher emotional stress, economic stress, health issues, and a lower quality of life [18–20]. Therefore, it is necessary to classify different caregiving intensities in this study to fully understand what SES affect informal caregivers to provide informal care.

In China, females (daughters or daughters-in-law) may be more sensitive to the care of the elderly than males and the majority of care was provided by females [21–24]. According to the data from the China Statistics Bureau, females were 2.90 and 2.54 times more likely than men to do housework and to care for the elderly, respectively. In addition, influenced by both traditional gender norms and Confucianism ideals of filial piety, adult daughters (or daughters-in-law) usually undertake the role of primary caregivers for their parents (or parents-in-law) [21–24]. There was no study about SES of caregivers in informal care intensity from a perspective of females in China.

The female caregivers with low SES may lack the awareness of caring for their parents, and they also lack the corresponding social support and medical service resources. Conversely, those with higher socioeconomic status can bring many resources to elderly parents who need care. We hypothesize that the female SES might have an effect on informal caregiving for their parents in China. Therefore, this study aims to empirically examine whether the SES of female caregivers affects the intensity of informal care that they provide for parents in China. Specifically, we used a nationally representative dataset to examine the differential effects of educational attainment, Hukou, household income, and employment status of female caregivers on the intensity of informal caregiving.

Methods

Study Design and Participants

Data for this study were extracted from the China Health and Nutrition Survey (CHNS). CHNS is a joint project between the University of North Carolina at Chapel Hill and the Chinese Center for Disease Control and Prevention, and the goal was allow researchers to understand how social, economic, and demographic changes in China affected health and health behaviors across the life cycle[25].The original survey launched in 1989 used a multistage random-cluster sampling process to select samples from eight provinces in China. [25]We pooled the data from 1993 to 2015 because the information of Hukou status was incorporated since 1993[8]. Of the respondents, the number of repeated interviewees in the 8 waves of sample is not large, the proportion of two and three times or more repeated ones was only 13.5% and 3.4%, respectively. Although the data include a panel of individuals, we analyzed the data as eight waves of repeated cross-sections to avoid the cohort as the age of the panel data changing over time and we used clustering robust standard error to avoid individual autocorrelation.

The respondents were restricted to women with at least one living parent or parent-in-law with care needs. The age range of the included women was defined due to the fact that the supplementary survey of the CHNS on intergenerational linkages was restricted to married women (including widows and divorced women) under the age of 52. Of the original 20819 married women respondents, 3182 participants were included for having at least one living parent or parent-in-law with care needs (Respondents who provided an affirmative answer to the question “Does your parent/parent-in-law need to be taken care of in daily life and shopping?” were classified as having an elderly parent with care needs). Then, 425 participants were excluded for the incomplete data; 16 women were excluded because they did not live

with their parents/parents-in-law who need care in one city/county. Finally, 2741 respondents with complete data were included in our analysis.

Outcome variable

In this study, we defined the informal care intensity provided by daughters or daughters-in-law as the dependent variable. Weekly hours of informal care were estimated with survey responses from the following question: “During the past week, how much time did you spend taking care of your parents or parents-in-law?” As defined by current literature, we defined the intensity of informal caregiving into three categories: non-caregivers (0 hrs/week of caregiving), low-intensity caregivers (less than 10 hrs/week of caregiving), and high-intensity caregivers (more than 10 hrs/week of caregiving) [21, 26].

Independent variables

The key explanatory variable in this study was socioeconomic status (SES). SES conventionally included three indicators of educational attainment, household income, and employment status. Some researchers indicated that Hukou status should be included in the SES, as it dictated the social benefits a person received in China[27–29]. Therefore, this study used educational attainment (Illiteracy, Primary school degree, Junior high school degree, high school degree, and university degree or above); household income, employment status (employed, unemployed), and Hukou status (urban or rural) to measure SES of the women. Controlled variables included demographic characteristics, family characteristics and wave. Demographic characteristics were measured by age and marital status. Family characteristics included number of siblings, number of care recipient and the age of care recipient.

Statistical analysis

We compared the SES of the caregivers across informal care intensities using one-way analysis of variance (ANOVA) and Chi-square tests as appropriate. Multinomial logistic (MNL) estimations were performed, using informal care intensity as the dependent variable and adjusting for the care recipient’s age and the survey year. Relative risk ratios (RRR) for different SES variables were computed. We also test the independence of irrelevant alternatives (IIA) by using the Hausman-McFadden test to avoid inconsistent and IIA non-compliant parameter estimates [30].

Results

Descriptive results

Table 1 provided summary statistics of the individual characteristics by caregiving intensity using the pooled sample of the 1993–2015 waves. The average age of the respondents was 41 years old, and the total number of respondents whose parents or parents-in-law need to be cared for was 2741, of which 1705 (62.20%) did not provide informal care. The proportion of high-intensity caregivers (16.42%) was lower than low-intensity caregivers (21.38%). Using Chi-square tests or ANOVA analysis, we found a statistically significant difference in the four indicators of SES: educational attainment, Hukou status,

household income, and employment status. In terms of educational attainment, those with a university degree or above accounted for 16.67% and 11.95% of high-intensity and low-intensity caregivers, respectively. Both these proportions are higher than those who did not provide care at all (8.68%). Regarding Hukou status, the percentages of urban Hukou holders were higher among high-intensity caregivers (50.22% vs. 49.78%) than low-intensity caregivers (46.76% vs. 53.24%). The economic status of high-intensity caregivers (47830 yuan/year) was higher than low-intensity caregivers (39212 yuan/year), and the economic status of low-intensity caregivers was higher than non-caregivers (34227 yuan/year). We calculated the average care intensity (total care hours / parent numbers) in descriptive statistics and found that high-intensity caregivers were higher than low-intensity caregivers ($p < 0.001$). Table 1 also indicated that there was a statistically significant difference in age, number of siblings, number of parents, and the wave at the 5% level.

Table 1

Descriptive statistics of socio-economic characteristics of the intensity of women's informal care in China.

Characteristic	All n (%)	Non- caregiver n (%)	Low- intensity n (%)	High- intensity n (%)	P- value
Total	2741	1705(62.20)	586(21.38)	450(16.42)	
Socioeconomic status					
Educational attainment					< 0.001
Illiteracy	655(23.90)	444(26.04)	135(23.04)	76(16.89)	
Primary school degree	524(19.12)	351(20.59)	95(16.21)	78(17.33)	
Junior school degree	882(32.10)	557(32.38)	192(32.76)	136(30.16)	
High school degree	387(14.12)	207(12.14)	94(16.04)	86(19.11)	
University or above	293(10.69)	148(8.68)	70(11.95)	75(16.67)	
Hukou status					< 0.001
Rural	1604(58.52)	1068(62.64)	312(53.24)	224(49.78)	
Urban	1137(41.48)	637(37.36)	274(46.76)	226(50.22)	
Inflation-adjusted total annual household income, mean	37525.653 (49496.45)	34226.569 (38920.966)	39211.668 (46158.549)	47829.951 (79208.513)	< 0.001
Employment status					0.017
Unemployed	834(30.43)	516(30.26)	159(27.13)	159(35.33)	
Employed	1907(69.57)	1199(69.71)	427(72.87)	292(64.75)	
Demographic characteristics					
Age, mean	41.15(7.02)	40.81(7.22)	41.99(6.41)	41.32(6.94)	0.002
Marital status					0.536
Married	2661(97.08)	1660(97.36)	566(96.59)	435(96.67)	
Divorced/widowed	80(2.92)	45(2.64)	20(3.41)	15(3.33)	
Family characteristics					

Note: χ^2 Tests for categorical variables and analysis of variance for continuous variables

Characteristic	All n (%)	Non- caregiver n (%)	Low- intensity n (%)	High- intensity n (%)	P- value
Number of siblings	2.94(1.66)	2.89(1.71)	2.95(1.64)	3.11(1.51)	0.005
Number of care recipient					0.003
1	2009(73.29)	1284(75.31)	431(73.55)	294(65.33)	
2	533(19.45)	305(17.89)	113(19.28)	115(25.56)	
3	128(4.67)	70(4.11)	30(5.12)	28(6.22)	
4	71(2.59)	46(2.70)	12(2.05)	13(2.89)	
Average care intensity (total care hours / parent numbers)	4.67(13.88)	0	3.36(2.21)	24.08(26.59)	< 0.001
Age of care recipient					0.001
< 50	52(1.90)	45(2.64)	5(0.85)	2(0.44)	
≥ 50	2689(98.10)	1660(97.36)	581(99.15)	448(99.56)	
Wave, n (%)					< 0.001
1993	263(9.60)	185(10.85)	54(9.22)	24(5.33)	
1997	297(10.84)	201(11.79)	60(10.24)	36(8.00)	
2000	366(13.35)	241(14.13)	76(12.97)	49(10.89)	
2004	420(15.32)	273(16.01)	84(14.33)	63(14.00)	
2006	349(12.73)	234(13.72)	56(9.56)	59(13.11)	
2009	280(10.22)	165(9.68)	63(10.75)	52(11.56)	
2011	376(13.72)	207(12.14)	93(15.87)	76(16.89)	
2015	390(14.23)	199(11.67)	100(17.06)	91(20.22)	
Note: χ^2 Tests for categorical variables and analysis of variance for continuous variables					

Multinomial logistic regression analyses

Table 2 presented the multinomial logistic regression results for the SES of respondents, with non-caregivers defined as the reference group. We found that those with higher educational attainment and economic status were more likely to be a high-intensity caregiver, and those with employed status were more likely to be a low-intensity caregivers. Additionally, respondents with urban Hukou were 1.34 times

more likely to be a low-intensity caregiver ($p < 0.01$) and were 1.34 times more likely to be a high-intensity caregiver ($p < 0.05$). Regarding employment status, employed respondents were 1.27 times more likely than unemployed females to be a low-intensity caregiver versus no care ($p < 0.1$). In terms of the economic status, high income was significantly related to the likelihood of being a high-intensity caregiver ($p < 0.05$).

Table 2

Socioeconomic status of the intensity of women's informal care: results of multinomial logistic regression using pooled CHNS data 1993–2015 (n = 2741)

Variables	Low-intensity RRR(SE)	High-intensity RRR(SE)
Socioeconomic status		
Educational attainment		
Primary school degree	0.92(0.14)	1.26(0.23)
Junior school degree	1.11(0.16)	1.19(0.20)
High school degree	1.32#(0.23)	1.89***(0.37)
University degree or above	1.15(0.24)	1.87***(0.41)
Economic status	1.01(0.01)	1.01*(0.01)
Employment status: Employed	1.27**(0.14)	0.87(0.10)
Hukou status: Urban	1.34**(0.16)	1.34**(0.17)
Controlled variables		
Age	1.02***(0.01)	1.00(0.01)
Marital status: Married	0.86(0.24)	0.83(0.26)
Number of siblings	0.97 (0.07)	0.94(0.07)
Number of care recipient		
2	1.05(0.13)	1.58***(0.21)
3	1.15(0.27)	1.57*(0.37)
4	0.67(0.22)	0.94(0.32)
Age of care recipient: ≥ 50	2.80**(1.34)	4.19*(3.17)
Wave		
1997	1.02(0.22)	1.38(0.39)
Note: *** p < 0.01, ** p < 0.05, * p < 0.1, # p < 0.15;		
RRR: Relative risk ratio;		
Robust standard errors were reported in parenthesis;		
Reference: Illiteracy (Educational attainment), Unemployed (Employment status), Rural (Hukou status), Divorced/widowed (Marital status), Age < 50 (Care recipient), 1 (Number of parents who need cared for), 1993 (Wave).		

Variables	Low-intensity RRR(SE)	High-intensity RRR(SE)
2000	1.24(0.22)	1.85(0.72)
2004	1.14(0.20)	1.93*(0.73)
2006	0.86(0.17)	2.03*(0.77)
2009	1.41(0.28)	2.44**(0.95)
2011	1.55(0.29)	2.49**(0.92)
2015	1.79*(0.35)	3.07***(1.10)
Constant	0.04***(0.02)	0.02***(0.02)
Note: *** p < 0.01, ** p < 0.05, * p < 0.1, # p < 0.15;		
RRR: Relative risk ratio;		
Robust standard errors were reported in parenthesis;		
Reference: Illiteracy (Educational attainment), Unemployed (Employment status), Rural (Hukou status), Divorced/widowed (Marital status), Age < 50 (Care recipient), 1 (Number of parents who need cared for), 1993 (Wave).		

The results in the controlled variables were also presented. When the age of care recipients was over 50, the likelihood of being a high-intensity caregiver was 4.19 times higher than non-caregiver ($p < 0.05$) and the likelihood of being a low-intensity caregiver was about 2.80 times higher ($p < 0.05$) than non-caregiver. No statistically significant was found in marital status and number of siblings. However, those who had two care-needing parents were 1.58 times more likely to be a high-intensity caregiver than those who had only one parent ($p < 0.01$). Results from time trends analyses suggested a significant upward trend of high-intensity care. The relative risk ratio increased year by year since 2004 and reached 3.07 in 2015, which indicated the respondents were more likely to be a high-intensity caregiver since 2004. (See Table 2)

Table 3 showed the Hausman test results, which indicated that none of the three options would reject the IIA assumption (See Table 3). Spearman coefficients were used to test the correlation between SES variables (See Appendix Table 1).

Table 3
Hausman test results of the IIA.

Omitted	Chi2	df	P>Chi2	evidence
0	8.560	11	0.662	for Ho
1	9.852	11	0.544	for Ho
2	11.285	11	0.420	for Ho

Discussion

SES is one key indicator affecting both caregiver and care-recipient in the caregiving context. It is crucial to develop targeting measures by analyzing the SES among female caregivers, so as to design welfare programs for informal care in China. To our knowledge, this was the first study to investigate the SES of married women who providing intensity informal care for their parents/parents-in-law in need of care in China. One of the key conclusion could be drawn from our findings was that higher SES women were more likely to provide care for the elderly compared with lower SES women, which was in agreement with the study by Benedicte De [13]. To be specific, those with higher educational attainment, higher economic status and urban Hukou were more likely to provide high-intensity care, and women who were employed and with urban Hukou were more likely to provide low-intensity care.

The current study found that the women with higher educational attainment were more likely to play the role of be high-intensity caregivers, while this education effect was not found to be statistically significant in low-intensity informal caregivers. One important reason for this finding might be due to the “feedback theory” proposed by Xiaotong Fei [31]. The “feedback theory” pointed out that children have the responsibility to support their parents in order to repay for their upbringing and education. Education has long been an important factor in social and personal development, and attaining higher education requires greater parental and household investment. Those have attained higher education may view caregiving as a way to provide for parents and repay them for their investment [32]. In addition, the women with higher education tended to be motivated by Chinese traditional culture that it is a virtue to support parents, especially when they were under need of care[33, 34].

Surprisingly, the employed women were found to be more inclined to provide low-intensity informal care, whereas this association was not statistically significant in high-intensive care. In order to further explain this phenomenon, we had an in-depth analysis to examine the correlation of the different variables of SES (See the Appendix Table 1). We found that there was a positive correlation between education, income, and Hukou, while employment status was only negatively correlated with Hukou. Based on this result, we speculated there may be a selection effect involved, especially for those rural women with lower SES. Such rural women usually had to find a job for basic livelihood. It may be that when they are weighing decision to find a job versus take care of their parents or parents-in-law who need care, they would consider the care intensity the parents need. If the parents or parents-in-law just need a low-

intensity care, they would prefer to find a job. But high-intensity care required a certain amount of time and effort, the women had to spend much time providing informal care for their parents or parents-in-law, regardless of the employment status.

Consistent with previous studies, we also found that women with urban Hukou were more likely to provide informal care than those with rural Hukou [35, 36]. There were several potential explanations for the urban-rural disparity observed in this study. First, with China's rapid industrialization and urbanization, a large number of young people, including young women, have moved to urban areas for better job opportunities, leaving their aged parents behind in the rural areas [37]. According to the National Health and Family Planning Commission of China [38], about 252 million rural people have moved to urban areas by the end of 2014, of which 78 percent were aged between 15 and 59 years old. As a result, the migrant young women were unable to provide the necessary care and support for the left-behind older parents. Second, compared with rural women, urban women have higher educational level, and higher education was found to be associated with more informal caregiving. This association was also demonstrated in the Appendix Table 1.

Interestingly, one study in Japan found women with lower SES were more likely to be primary caregivers, which was inconsistent with the current study [12]. One of the possible explanations may be due to the difference of long-term care system between two countries. In China, the long-term care system is still in its infancy, and informal care remains the dominant. In contrast, taking care of the elderly is mainly provided through public sectors under a long-term care insurance scheme in Japan. Thus, the women with higher SES have a greater capacity to purchase formal institutional care for the aged parents instead of informal care in Japan.

As can be seen from time trends, the number of people providing high-intensity informal care has been increasing over the last two decades. There are two possible reasons for this finding. First, according to the National Bureau of Statistics [39], the proportion of the population over 65 years has been entered in a rapid increase since 2000, which brings a higher need for high-intensity care for the elderly. However, the Chinese government has not been well ready for coping for this challenge, and the supply for the formal care is not sufficient. As an alternative, an increase in the informal high-intensity care was observed. Second, even though we used clustering robust standard error to avoid individual autocorrelation across eight waves of the data, the increase of high-intensity care in recent waves might be partly due to the fact that the care recipients were older, and also the need for high-intensity care increased.

Although this study explored the SES among female informal caregivers using the nationally representative population-based data, there were still several limitations. First, information including weekly hours of informal care was self-reported, which could lead to recall bias. Second, some variables, such as the types of care activities, the care recipient's age and his or her marital status, were not available in the database, making the analysis less comprehensive.

Conclusions

Using a national sample of Chinese women, we found that there were differences in SES between high-intensity informal female caregivers and low-intensity female caregivers. Women with higher SES (higher education attainment, higher incomes, and urban Hukou) were more likely to provide high-intensity informal care, and women who are employed and with urban Hukou were more likely to provide low-intensity care. These findings suggested that low SES women may not be providing informal care for their parents. Therefore, policy makers should develop long-term care insurance for the elderly most vulnerable, such as those in low SES households and rural Hukou holders, rather than relying on informal care as a stable source of informal caregiving, which—as our study demonstrates—is influenced by a variety of SES factors.

Abbreviations

SES: socioeconomic status; CHNS: China Health and Nutrition Survey; RRR: Relative risk ratios

Declarations

Ethics approval and consent to participate

This research has been approved by the Institutional Review Board of the University of North Carolina at Chapel Hill and the National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention. All participants gave written informed consent for their participation in the survey.

Consent for publication

Not applicable.

Availability of data and materials

The datasets are open to all of the potential users online. [<http://www.cpc.unc.edu/projects/china>].

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

CZ conceived the idea and polished the manuscript. YW and JL coded and analyzed data and wrote the manuscript. LZ, YF, XT, and LS participated in interpretation of the data. All authors read and approved the final manuscript.

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