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Article

The Effects of Grandparental Childcare on the Health of Urban and Rural Middle-Aged and Older Adults: Evidence from CHARLS

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Abstract: Using four waves of CHARLS panel data from 2012 to 2018, this study examines how grandparental childcare affects the physical and mental health of middle-aged and older adults in urban and rural China, as well as the urban-rural heterogeneity of these effects. The empirical analysis adopts a causal identification strategy combining fixed effects and instrumental variables, with robustness checks based on alternative explanatory variables. The results indicate that caring for grandchildren significantly impairs both physical and mental health, with stronger adverse effects among rural grandparents. As grandparental childcare becomes increasingly common in both urban and rural families, improving access to public childcare services in rural areas and strengthening the urban public childcare system are important ways to promote active and healthy ageing among middle-aged and older adults and to narrow the urban-rural health gap among grandparents.

Keywords: grandparental childcare; physical functional limitations; depression score; urban-rural differences

1. Introduction

Improvements in China's medical security system and limited formal childcare provision have increased grandparents' involvement in childcare. Shaped by family caregiving norms, grandparental childcare allows grandparents to realize a sense of self-worth while helping families reduce childcare costs and balance employment and caregiving responsibilities. Its implications for grandparents' physical and mental health are therefore important for evaluating their welfare.

Existing studies have reached different conclusions regarding the health effects of grandparental childcare. Some studies suggest that intensive caregiving or insufficient family support may adversely affect grandparents' physical and mental health [1-3]. Others find that grandparental childcare is associated with better physical health, cognitive functioning, and life satisfaction [4-5]. These differences may be related to caregiving intensity, family support, research samples, and empirical methods. Evidence on the causal effects of grandparental childcare and the corresponding urban-rural differences remains limited.

Against this background, this study uses four waves of panel data from the China Health and Retirement Longitudinal Study (CHARLS) for 2012-2018 and applies a rigorous causal identification strategy to examine the effects of grandparental childcare on grandparents' health and the corresponding urban-rural differences.

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2. Materials and Methods

2.1. Data Sources

This study uses the 2012, 2013, 2015, and 2018 waves of CHARLS, which surveys Chinese adults aged 45 and above. The survey covers 450 villages and communities in 150 counties and districts across 28 provinces, providing information on health, intergenerational relationships, socioeconomic characteristics, and grandparental childcare.

The sample is restricted to grandparents aged 45–80 who had at least one grandchild aged 16 or below during the survey period and were observed in at least two waves. After excluding observations with missing values in key variables, the final sample contains 35,554 observations.

2.2. Model Specification

2.2.1. Health Effects of Grandparental Childcare

Grandparental childcare may be endogenous due to time-invariant individual characteristics, time-varying family relationships, and reverse causality between childcare and health. Individual fixed effects control for time-invariant unobserved heterogeneity, while the FE-IV approach is employed to address the remaining sources of endogeneity.

This study employs the FE-IV approach, using the mean childcare participation of other grandparents in the same village or urban community as an instrument. Shared caregiving preferences support instrument relevance, while excluding the respondent's own participation avoids mechanical dependence. The exclusion restriction assumes that other grandparents' childcare participation affects individual health only through the respondent's own caregiving behavior.

Before applying the FE-IV method, this study first estimates a baseline regression model within a two-way fixed-effects framework to examine the causal effect of grandparental childcare on health outcomes among middle-aged and older adults. Healthyit denotes the health outcome of grandparent i in year t; GCit denotes the grandparental childcare variable for individual i in year t; Xit denotes individual- and household-level controls; and mu_i and lambda_t denote individual fixed effects and time fixed effects, respectively.

$$Healthy_{it} = \upsilon + \theta_1 \times GC_{it} + \theta_2 \times X_{it} + \mu_i + \lambda_t \quad (1)$$

$$GC_{it} = \delta + \vartheta_1 \times Z_{it} + \vartheta_2 \times X_{it} + \mu_i + \lambda_t \quad (2)$$

$$Healthy_{it} = \xi + \beta_1 \times \widehat{GC_{it}} + \beta_2 \times X_{it} + \mu_i + \lambda_t \quad (3)$$

2.2.2. Urban-Rural Differences

This section adds an interaction term between grandparental childcare and grandparents' household registration type to Equation (1) to examine urban-rural differences in the health effects of grandparental childcare. The model is specified as follows:

$$Healthy_{it} = \varepsilon + \alpha_1 \times GC_{it} + \alpha_2 \times X_{it} + \alpha_3 \times HT_{it} + \alpha_3 \times GC_{it} \times HT_{it} + \mu_i + \lambda_t \quad (4)$$

In Equation (4), HT_{it} denotes the household registration type of the grandparent, with rural registration coded as 2 and urban registration coded as 1. All other variables are defined as in Equation (1).

2.3. Variable Selection

2.3.1. Dependent Variables

Physical health is measured by physical functional limitations and chronic diseases, calculated as the respective counts of difficulties in 18 daily activities and 14 common chronic conditions. Each item is coded 1 if reported and 0 otherwise. Mental health is measured by the CESD-10 depression score and average nightly sleep duration. A higher depression score indicates poorer mental health. Sleep disturbances are associated with depression as are both short and long sleep duration [6,7].

2.3.2. Core Explanatory Variables

Grandparental childcare is measured by participation, the approximate number of grandchildren cared for, and total care duration. Participation equals 1 for caregivers and 0 otherwise. The number cared for is approximated by summing care reported for each adult child's children, assuming one grandchild per adult child. Total care duration is the sum of care time across adult children. The latter two measures capture caregiving intensity.

2.3.3. Control Variables

Control variables include grandparents' gender, age, marital status, education, and residence type; household income and number of children; and adult children's education, residence type, and employment status. Following a similar approach in the literature [8], all models also include interactions between baseline health indicators and year dummies to account for differences in health trajectories.

2.4. Descriptive Statistics

Descriptive statistics for the main variables are reported below: (As shown in Table 1).

Table 1. Descriptive Statistics of Main Variables

Variable		Variable name	Sample	Mean	Variance
Dependent variables	Chronic diseases	chd	35554	0.387	0.817
	Physical functional limitations	phd	35554	2.113	3.066
	Depression score	dscore	35554	3.948	1.317
	Sleep duration	slt	35554	6.292	1.813
Core explanatory variables	Childcare participation	ncare	35554	0.702	0.457
	Number cared for	carenum	35554	0.288	0.573
	Care duration	tnum	35554	76.825	63.417
Individual characteristics	Residence type	rtype	35554	1.236	0.216
	Education	degree	35554	6.498	4.294
	Marital status	marrige	35554	0.884	0.32
	Gender	rgender	35554	1.514	0.5
	Age	age	35554	59.787	8.785
Household characteristics	Number of children	number	35554	2.196	1.123
	Children's residence type	chtype	35554	2.282	1.265
	Children's education	cdegree	35554	5.149	1.115
	Household income	income	35554	5.861	1.447
	Employment status	work	35554	1.856	0.25

3. Results

3.1. Baseline Regression

Table 3 reports the estimates from Equation (1) using different health outcomes as dependent variables. Across the four equations, the coefficients on childcare participation are significantly negative at the 10%, 1%, 1%, and 10% levels, respectively. The results therefore indicate that participating in grandparental childcare has a significant adverse effect on grandparents' health outcomes. Overall, for Chinese rural grandparents, the negative health effects associated with grandparental childcare outweigh the positive effects, resulting in a negative net effect on their physical and mental health.

Table 3. Baseline Regression Results

	(1)	(2)	(3)	(4)
	chd	phd	dscore	slt
ncare	0.021*	0.144***	0.059***	-0.007*
	(0.011)	(0.019)	(0.019)	(0.004)

rtype	0.079***	0.021	-0.053	-0.003
	(0.023)	(0.040)	(0.038)	(0.008)
degree	-0.052***	-0.004	0.017***	0.000
	(0.001)	(0.003)	(0.003)	(0.001)
marrige	-0.091**	-0.076	0.142**	0.041***
	(0.036)	(0.064)	(0.060)	(0.012)
rgender	-0.114***	0.243***	-0.160***	-0.047***
	(0.009)	(0.017)	(0.016)	(0.003)
age	0.003*	0.008**	-0.007*	-0.001
	(0.002)	(0.004)	(0.004)	(0.001)
number	-0.082***	0.028***	-0.007	0.002
	(0.005)	(0.009)	(0.009)	(0.002)
chtype	-0.002	-0.022***	0.026***	-0.001
	(0.004)	(0.007)	(0.007)	(0.001)
cdegree	-0.018***	-0.012	0.025***	-0.000
	(0.004)	(0.008)	(0.007)	(0.001)
income	-0.002	-0.015**	0.007	0.002
	(0.004)	(0.006)	(0.006)	(0.001)
work	-0.018	0.193***	-0.210***	0.001
	(0.020)	(0.035)	(0.034)	(0.007)
healthy	0.104***	0.713***	0.186***	-0.009***
	(0.002)	(0.003)	(0.003)	(0.001)
_cons	0.339**	-3.575***	3.381***	2.067***
	(0.134)	(0.275)	(0.261)	(0.053)
Hid fe	YES	YES	YES	YES
Year fe	YES	YES	YES	YES
r2_a	0.298	0.845	0.243	0.319
N	35554	35554	35554	35554

*, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively; clustered standard errors are reported in parentheses. The variable healthy denotes baseline health status multiplied by year dummy variables; the same notation applies below.

3.2. Instrumental-Variable Regression

Table 4 presents the FE-IV estimates. The instrument is positively associated with individual childcare participation in the first stage. In the second stage, childcare participation increases the numbers of chronic diseases and functional limitations and the depression score by 0.315, 0.316, and 0.365, respectively, while reducing nightly sleep duration by 0.038 hours. All four estimates are statistically significant, although the effect on sleep is significant only at the 10% level. The estimates are consistent in direction with the baseline results.

Table 4. FE-IV Regression Results

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	ncare	chd	ncare	phd	ncare	dscore	ncare	slt
rate	0.785***		0.769***		0.769***		0.799***	
	(0.045)		(0.024)		(0.024)		(0.044)	
ncare		0.315***		0.316***		0.365***		-0.038*
		(0.099)		(0.120)		(0.112)		(0.019)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Hid fe	YES	YES	YES	YES	YES	YES	YES	YES
Year fe	YES	YES	YES	YES	YES	YES	YES	YES
N	35554	35554	35554	35554	35554	35554	35554	35554

3.3. Robustness Checks

To further examine the robustness of the estimated effect of grandparental childcare on the health of middle-aged and older adults, this study replaces the core explanatory variable with the number of grandchildren cared for and the duration of childcare. This also addresses the measurement limitation that the simple childcare participation dummy cannot capture the intensity of grandparental childcare.

Table 5 shows that all alternative core explanatory variables pass the significance tests, indicating that caring for grandchildren has a significant adverse effect on grandparents' health outcomes and confirming the robustness of the preceding estimates.

Table 5. Robustness Checks

	Number cared for				**Care duration**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	chd	phd	dscore	slt	chd	phd	dscore	slt
carenum	0.021**	0.040***	0.034**	-0.005*				
	(0.008)	(0.015)	(0.014)	(0.003)				
tnum					0.014*	0.131***	0.130***	-0.007***
					(0.008)	(0.013)	(0.013)	(0.003)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Hid fe	YES	YES	YES	YES	YES	YES	YES	YES
Year fe	YES	YES	YES	YES	YES	YES	YES	YES
r2_a	0.298	0.845	0.243	0.319	0.298	0.845	0.246	0.319
N	35554	35554	35554	35554	35554	35554	35554	35554

3.4. Heterogeneity Analysis

Table 6 shows significant interactions between grandparental childcare and rural registration for physical functional limitations, depression scores, and sleep duration. The adverse effects are stronger among rural grandparents on these outcomes. Rural grandparents may undertake more daily caregiving and increase their own labor supply, whereas urban grandparents may participate more in children's activities, partly offsetting the health burden.

Table 6. Heterogeneity Analysis

	(1)	**(2)**	**(3)**	**(4)**
	chd	phd	dscore	slt
ncare	0.010	0.077***	0.119***	-0.005
	(0.009)	(0.017)	(0.016)	(0.002)
ncare×htype	0.010	0.111***	0.070*	-0.011**
	(0.023)	(0.041)	(0.041)	(0.002)
htype	0.003	-0.062**	0.054**	-0.004
	(0.014)	(0.028)	(0.026)	(0.007)
Controls	YES	YES	YES	YES
Hid fe	YES	YES	YES	YES
Year fe	YES	YES	YES	YES
r2_a	0.296	0.819	0.134	0.079
N	35554	35554	35554	35554

4. Discussion

The FE-IV estimates show that grandparental childcare increases chronic diseases, physical functional limitations, and depression scores while reducing sleep duration. Adverse effects on physical functioning, depression, and sleep are stronger among rural grandparents. These results are consistent with evidence on the health costs of intensive

caregiving [1–3], while other studies report positive associations [4–6]. Differences in caregiving intensity and family support may explain these findings.

Rural grandparents may combine daily childcare with continued labor participation. Expanding childcare services and community support could ease caregiving burdens and reduce urban-rural health disparities. Future research could examine the roles of intergenerational support and public childcare provision in shaping long-term health outcomes.

References

1. F. Chen and G. Liu, "The health implications of grandparents caring for grandchildren in China," *J. Gerontol. B Psychol. Sci. Soc. Sci.*, vol. 67, no. 1, pp. 99–112, 2012, doi: 10.1093/geronb/gbr132.
2. M. Silverstein and D. Zuo, "Grandparents caring for grandchildren in rural China: Consequences for emotional and cognitive health in later life," *Aging Ment. Health*, vol. 25, no. 11, pp. 2042–2052, 2021, doi: 10.1080/13607863.2020.1852175.
3. H. Li, L. Gan, D. R. Xu, et al., "Long-term impact of grandchild caregiving trajectories on depression in middle-aged and older Chinese people: A longitudinal study," *Int. J. Aging Hum. Dev.*, vol. 95, no. 4, pp. 493–515, 2022, doi: 10.1177/00914150221084644.
4. S. Liao, L. Qi, J. Xiong, et al., "Intergenerational ties in context: Association between caring for grandchildren and cognitive function in middle-aged and older Chinese," *Int. J. Environ. Res. Public Health*, vol. 18, no. 1, p. 21, 2021, doi: 10.3390/ijerph18010021.
5. J. Zhou, W. Mao, Y. Lee, et al., "The impact of caring for grandchildren on grandparents' physical health outcomes: The role of intergenerational support," *Res. Aging*, vol. 39, no. 5, pp. 612–634, 2017, doi: 10.1177/0164027515623332.
6. C. Baglioni, G. Battagliese, B. Feige, et al., "Insomnia as a predictor of depression: A meta-analytic evaluation of longitudinal epidemiological studies," *J. Affect. Disord.*, vol. 135, no. 1–3, pp. 10–19, 2011, doi: 10.1016/j.jad.2011.01.011.
7. L. Zhai, H. Zhang, and D. Zhang, "Sleep duration and depression among adults: A meta-analysis of prospective studies," *Depress. Anxiety*, vol. 32, no. 9, pp. 664–670, 2015, doi: 10.1002/da.22386.
8. J. Schaller and A. H. Stevens, "Short-run effects of job loss on health conditions, health insurance, and health care utilization," *J. Health Econ.*, vol. 43, pp. 190–203, 2015, doi: 10.1016/j.jhealeco.2015.07.003.

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