Caring as curing: Grandparenting and depressive symptoms in China

Seung-won Emily Choi [a],[*], Zhenmei Zhang [b]

[a] *Department of Sociology, Anthropology, and Social Work, Texas Tech University, USA*
[b] *Department of Sociology, Michigan State University, USA*

ARTICLE INFO

ABSTRACT

Research on grandparenting (i.e., caring for grandchildren) and mental health in Asian contexts has been limited, despite the rapid growth of older adults who take care of grandchildren. This study aims to investigate how grandparenting influences depressive symptoms in China. Using the China Health and Retirement Longitudinal Study (2011–2015, $N = 4354$), we conducted fixed effects regression models to examine the association between various types of grandparenting and depressive symptoms among older adults between the ages of 45 and 80. The results show that for grandparents, providing care to their grandchildren in skipped-generation households (i.e., grandparent-grandchildren families without adult children) is associated with a lower level of depressive symptoms compared to providing no care, after controlling for socioeconomic status, health behaviors, social support, and basic demographic characteristics. Other types of care (i.e., multigenerational household grandparenting, and part-time and full-time noncoresident grandparenting) are not significantly linked to caregiving grandparents' depressive symptoms. Overall, our findings suggest that sociocultural contexts need to be considered in explaining the different mental health implications of grandparenting.

1. Introduction

As people are now generally living longer and healthier lives, older adults have been increasingly involved in caring for grandchildren (i.e., grandparenting) as either secondary or primary caregivers (Margolis, 2016; Silverstein and Giarrusso, 2010). This phenomenon is particularly prevalent in China. A recent study reports that approximately 34 percent of older adults provide some level of care for grandchildren (Sun, 2017). This prevalence may stem from Chinese older adults regarding grandparenting as their normative role in the family, based on the traditional values of strong family ties and lineage solidarity (Mehta and Thang, 2012; Yancura, 2013).

Despite the rapid growth of grandparents taking care of grandchildren in China, the mental health implications of grandparenting remain both underexplored and of mixed results. Most of the findings capture only older adults residing in rural regions who care for grandchildren, so as to support adult children who have migrated to urban regions for employment (Cong and Silverstein, 2008; Lou et al., 2013; L. Xu et al., 2012). Little is still known about the national profile of grandparenting types among older adults, and whether caregiving for grandchildren influences the mental health of the older population from a nationally representative sample. As a further complication, the measure of grandparenting in the previous literature has limitations: Grandparenting is measured by either family structure (e.g., family composition and living arrangement) or care intensity (e.g., hours spent on caregiving) (Ku et al., 2013; Chen and Liu, 2012), although both components interrelate with each other and influence older adults' grandparenting experience. Some studies only rely on a rough measure of whether grandparents have provided any care to their grandchildren (e.g., H. Xu, 2019). In addition, many prior studies used cross-sectional data, making it impossible to draw causal inference about the health consequences of grandparenting (Guo et al., 2008). Although several studies have used longitudinal data (e.g., Chen and Liu, 2012), few have used methods (e.g., fixed effects models) that control for unmeasured characteristics of grandparents (e.g., lifestyle preference and post-retirement job opportunities), which can influence both their entry into different types of grandparenting and their mental health.

The aim of this study is to examine the association between grandparenting and older adults' mental health in the Chinese context. To overcome the limitations in the previous literature, first, we assess whether and how grandparenting affects the depressive symptoms among older adults, drawing on three waves (2011–2015) of the China

---

Health and Retirement Longitudinal Study (CHARLS), a nationally representative survey. Second, we measure grandparenting using both family structure and care intensity. Third, we utilize fixed effects models that control for all time-invariant covariates, both measured and unmeasured. Finally, we control for multiple potential time-variant confounders, including individuals' socioeconomic status (SES), health behaviors, and social support, which may affect the link between grandparenting and depressive symptoms.

2. Theoretical background

2.1. Grandparenting and mental health

Research on grandparenting and mental health in later life has been underexplored in different national contexts. Most literature has focused on the experience of American and European grandparents, while few studies have been done regarding Chinese grandparenting. Thus, we first address previous findings based on those Western countries or other sociocultural contexts before discussing the Chinese context.

Previous literature has measured grandparenting using either family structure (i.e., family composition and living arrangements) or care intensity (i.e., hours spent on grandchild care) of the grandparents. In general, grandparenting is, paradoxically, both positively and negatively associated with mental health among older adults (Silverstein and Giarrusso, 2010), depending on the different types of care that older adults provide for their grandchildren. With respect to the protective effects of grandparenting on mental health, a moderate level of noncoresident grandparenting (i.e., 200–500 hours of babysitting over two years, or approximately 8–19 hours per week) is linked to lower depressive symptoms in later life in the U.S. (Hughes et al., 2007). The regular provision of a moderate level of care to grandchildren also reduces the risk of depression for grandmothers in Chile (Grundy et al., 2012). Grandparenting in multigenerational households is associated with better subjective psychological well-being in the U.S., and with fewer depressive symptoms in South Korea (Choi and Zhang, 2021; Goodman and Silverstein, 2002). Yet, the causal relationship of grandparenting with mental health is unclear due to the cross-sectional nature of some prior studies.

To account for these positive impacts of grandparenting on mental health, scholars use the *role enhancement theory*. This perspective argues that carrying out different social roles, and the compounded sense of fulfillment and life satisfaction obtained from these experiences, increases individuals' overall well-being (Moen et al., 1995). In this sense, grandparenting, an additional role emerging in one's later life, can benefit older adults' mental health. Grandparents achieve greater life satisfaction, self-efficacy, and feelings of reward through the caregiving role (Pruchno and McKenney, 2002; Rozario et al., 2004; Szinovacz and Davey, 2006). In addition to these emotional benefits, grandparenting can help older adults stay physically active (King et al., 1998) and maintain closer ties and intergenerational support while interacting with their grandchildren and adult children (Mahne and Huxhold, 2014).

In contrast, some studies suggest that grandparenting negatively affects mental health in later life, especially in more intensive types of caregiving situations. Specifically, custodial grandparenting in skipped-generation households—an increasing vulnerable family type which consists of grandparent(s) and grandchild(ren) only—is linked to elevated depressive symptoms in the U.S. and several European countries (Blustein et al., 2004; Minkler et al., 1997).

The *role strain theory* provides an explanation for these negative consequences of grandparenting on mental health. This theoretical perspective suggests that carrying out multiple social roles can be detrimental to individuals' mental health. Given the limited nature of resources, such as time, energy, and goods, individuals may experience difficulties executing different roles concurrently (Goode, 1960). The increased obligations of meeting these additional expectations serve as stressors that worsen one's mental health (Barnett and Baruch, 1985; Pearlin, 1989). From this theoretical perspective, considering the various social roles that older adults must already perform (e.g., spouse, parent, child, or employee), the burden of the additional role of grandparenting can harm older adults' psychological health, especially when the care is considerably intensive.

Other grandparenting-related stressors, including intergenerational conflicts over childrearing, a shortage of private time for self-care and social engagement, and pre-existing disadvantages in SES and health conditions, also undermine older adults' mental health (Baker et al., 2008; Blustein et al., 2004; Jendrek, 1993; Minkler, 1999). When these strains from grandparenting outweigh the benefits of caregiving, the health consequences of grandparenting are more likely to be negative (Choi, 2020).

2.2. Mental health implications of grandparenting in China

The perception and expectations for grandparental roles vary by sociocultural context (Hayslip et al., 2012). In many parts of Asia, active grandparental roles are normative and a form of family support based on strong family values and intergenerational ties (Kataoka-Yahiro et al., 2004; Yancura, 2013). In China specifically, a large number of older adults have provided various types of grandchild care to support both their adult children and the grandchildren themselves. Accordingly, increased attention has been paid to the health implications of grandparenting in this cultural context.

Researchers have found that grandparenting in China tends to be positively associated with physical and mental health, although some negative or null effects of grandparenting have also been reported (Wen et al., 2019; H. Xu, 2019). Some variations in psychological well-being still exist depending on the types of grandparenting. The majority of studies on Chinese grandparenting have explored caregiving grandparents in skipped-generation households, particularly those who reside in rural regions. Numerous grandparents are left behind in rural areas and take care of grandchildren as custodial caregivers to support their migrant adult children who work in urban centers (Lou et al., 2013). Despite the intensive care burden as a primary caregiver and limited access to quality public resources and services (e.g., pension benefits and health care access) in these rural areas (Li et al., 2016), most studies suggest that rural grandparents who provide skipped-generation household grandparenting can have better psychological health compared to their non-caregiving counterparts. Those mental health benefits depend on both the remittance from their adult children for the grandchild care and the intensity of caregiving (Cong and Silverstein, 2008; Silverstein et al., 2006; L. Xu et al., 2012). In contrast, a recent study reports that grandparents in skipped-generation households are less happy than those who live with only a spouse/partner, or in multigenerational households. However, in this study, it is not clear whether grandparents in the skipped-generation households and multigenerational households provided any care for their grandchildren (Wen et al., 2019).

Extant literature on grandparenting also focuses on multigenerational household grandparenting, which refers to older adults' grandchild care in an extended family setting. This type of family structure has been common and preferred in China and other Asian countries based upon strong family solidarity, filial piety, and collective interest (Mehta and Thang, 2012). Research from China, Taiwan, and Hong Kong has found that grandparents who provide multigenerational household grandparenting report fewer depressive symptoms and greater life satisfaction, relative to non-caregiving grandparents (Guo et al., 2008; Ku et al., 2013; Silverstein et al., 2006). Yet, most of these prior studies have used either regional or cross-sectional data (Guo et al., 2008; Silverstein et al., 2006). Furthermore, it is still unclear how the provision of grandchild care among grandparents who do not live with adult children and grandchildren (i.e., noncoresident grandparenting) shapes their mental health.

Findings on the link between grandparenting and mental health in China are still sparse and inconclusive. This mixed evidence suggests that the health implications of grandparenting are likely to vary by not only the caregiving experience itself but also regional context and underlying individual characteristics (H. Xu, 2019).

2.3. The present study

The current study aims to examine how grandparenting influences Chinese older adults' mental health, specifically depressive symptoms. This study goes beyond previous research in several ways. First, we use three waves (2011–2015) of the China Health and Retirement Longitudinal Study (CHARLS). The nationally representative longitudinal data allow us to examine grandparents in both rural and urban regions and overcome the limitations of cross-sectional studies. Second, we measure grandparenting by combining both family structure and care intensity of older adults. This is done to investigate various types of grandchild care less studied in the literature, such as part-time and full-time noncoresident grandparenting (i.e., grandchild care provided by grandparents who live separately from adult children and grandchildren). Third, we take into account diverse individual characteristics, such as socioeconomic status (SES), health behaviors, and social support, to better understand the association between grandparenting and depressive symptoms. Lastly, we utilize fixed effects models to control for unobserved heterogeneity among grandparents.

Building on theoretical frameworks and empirical studies on grandparenting in China, we propose three hypotheses. First, based on the majority of findings on skipped-generation household grandparenting and mental health, we hypothesize that, among Chinese older adults, providing skipped-generation household grandparenting is associated with fewer depressive symptoms than providing no grandchild care. Next, we hypothesize that providing multigenerational household grandparenting is associated with fewer depressive symptoms than providing no grandchild care. Lastly, we expect that providing part-time noncoresident grandparenting is associated with fewer depressive symptoms, while full-time noncoresident grandparenting is associated with more depressive symptoms.

3. Methods

3.1. Data

The present study utilized the China Health and Retirement Longitudinal Study (CHARLS) to investigate the association between grandparenting and depressive symptoms. The CHARLS has tracked a nationally representative sample of Chinese adults aged 45 years and older to collect data on older adults' health and lifestyles. The baseline sample included approximately 10,000 households and 17,500 individuals in 150 counties/districts and 450 villages/resident committees in 2011. The study has followed up with respondents every two years. We used three waves of the CHARLS (2011–2015). Our analytic sample included 4354 older adults who had grandchildren and completed the questions on grandparenting and depressive symptoms. We excluded grandparents who were over 80 years old, given that few of the oldest older adults were engaged in grandparenting due to declining health (Hughes et al., 2007).

3.2. Measures

Depressive Symptoms. The measure of depressive symptoms came from the Harmonized CHARLS data developed by the Gateway to Global Aging Data (Beaumaster et al., 2018). Depressive symptoms were measured as the sum of ten questions based on the 10-item Center for Epidemiologic Studies-Depression scale (CESD-10). The widely used CESD-10 scale has been validated in Chinese older adults in Hong Kong (Boey, 1999; Cheng and Chan, 2005) and also had factorial validity in

the CHARLS sample (Chen and Mui, 2014). The ten items in the CHARLS asked how respondents felt and behaved in the past week on a 4-point scale: "rarely or none of the time (less than one day = 0)" to "most or all of the time (five to seven days = 3)." Depressive symptoms, which are time-varying, ranged from 1 to 30, where 30 indicated the highest level of depressive symptoms.

Grandparenting. Grandparenting is a key independent variable in this study. This time-varying variable had five categories: 1) no grandparenting (reference), 2) skipped-generation household grandparenting, 3) multigenerational household grandparenting, 4) part-time noncoresident grandparenting, and 5) full-time noncoresident grandparenting. We first used the question, "Did you spend any time taking care of your grandchildren (under age 16) last year?" to identify caregiving and non-caregiving grandparents. We then utilized two items, household member information and a grandparenting-related question ("Approximately how many weeks and hours per week did you spend last year taking care of this child's children?"), to identify grandparents' family structure and care intensity, respectively. Using the information on family structure, we classified caregiving grandparents who lived with grandchildren, but not with adult children, as "skipped-generation household grandparenting." Caregiving grandparents who lived in an extended family with both grandchildren and adult children were classified as "multigenerational household grandparenting." Caregiving grandparents who lived in a separate household were categorized as "noncoresident grandparenting." In addition, we subcategorized the noncoresident grandparenting group into "part-time" and "full-time" depending on care intensity (i.e., hours of grandchild care per week). The part-time group included grandparents who spent less than 40 hours per week on noncoresident grandparenting. Grandparents spending 40 or more hours per week on noncoresident grandparenting were labeled as the full-time group (Choi and Zhang, 2018; H. Xu, 2021).

All other independent variables were time-varying, because fixed effects regression models eliminated time-invariant variables from the analyses. This study included three main types of confounders that might affect the association between grandparenting and depressive symptoms: socioeconomic status (SES), health behaviors, and social support.

SES. Three time-varying indicators represented older adults' SES. In order to measure household-level economic status, we used an asset index, rather than household income, because the asset index could be a better proxy of wealth or standard of living in the context of developing countries, and therefore was less subject to measurement errors (Bollen et al., 2002). We measured the asset index as a continuous variable using the household ownership of 17 luxury items (e.g., automobile, electric bicycle, motorcycle, refrigerator, washing machine, TV, etc.), ranging from 0 to 17. Current employment status was coded as dichotomous (working = 1). Pension receipt was a dichotomous variable indicating whether respondents received any pension income (yes = 1).

Health behaviors. We included two time-varying categorical predictors for health behaviors. Smoking was measured based on whether respondents were currently smoking (yes = 1). Drinking was a binary variable that indicated whether respondents were currently drinking (yes = 1).

Social support. Three time-varying dummy variables represented social support. Social activity was constructed using the item on whether respondents have participated in any social activities, including: spending time with friends; playing ma-jong, chess, or cards with others or going to a community club; sport, social, or other types of club activities; activities of community-related organizations; volunteer or charity work; and educational or training courses (yes = 1). In terms of financial support among family members, we included whether older adults have received any financial support from adult children (yes = 1), and whether older adults have given any financial support to adult children (yes = 1).

Controls. We controlled for several basic demographic characteristics and health conditions of older adults. Age was treated as continuous and

we also included the squared term of age to test whether there was a significant nonlinear pattern of age effects. Marital status was a dummy variable in which married individuals were coded 1 and non-married coded 0. Chronic condition was measured by respondents' reports of whether they have been diagnosed with any chronic conditions including hypertension, diabetes, heart disease, or stroke (yes = 1). All control variables were time-varying.

3.3. Analytic strategy

This study estimated fixed effects regression models to exploit the longitudinal nature of the CHARLS. Fixed effects models offer more rigorous estimations of the causal relationships between a dependent variable and time-varying independent variables. The advantage of fixed effects models is their ability to allow us to control for all time-invariant and unobserved characteristics of individuals that might influence their choice of (or selection into) a certain grandparenting type and depressive symptoms. This modeling strategy captures the variation observed within individuals over time in the outcome variable and explanatory variables. In fixed effects modeling, each respondent serves as his or her own control group. Multiple observations for the same respondent and the within-individual changes over time allow researchers to make robust conclusions in terms of the concurrence of the changes in depressive symptoms and grandparenting types (Allison, 2009). The fixed effects models are specified as follows:

$$y_{it} = \mu_t + \beta x_{it} + \alpha_i + \varepsilon_{it}$$

where y_{it} is the value of the depressive symptoms of an individual i at the time t, where $t = 1, 2,$ or 3, indicating the waves 1–3 of the CHALRS; μ_t is an intercept that varies over time t; x_{it} denotes a vector of time-varying independent variables; β represents a vector of coefficients for time-varying covariates, such as grandparenting; α_i indicates a person-specific error term, which can be the influence of all time-invariant predictors on depressive symptoms; and the error term ε_{it} is for each individual at each time point. Fixed effects models necessarily drop time-invariant characteristics, such as gender, residential regions (rural/urban), and education, from their analyses.

The analyses in this study estimated five models. Model 1 included grandparenting, the key independent variable, and basic control variables (i.e., age, age squared term, marital status, and chronic condition) to examine how grandparenting is associated with depressive symptoms. Models 2–4 introduced predictors of SES, health behaviors, and social support, respectively, to Model 1 in order to assess how those potential confounders influence the relationship between grandparenting and depressive symptoms. Model 5 was the full model including all covariates.

On average, approximately 10% of the respondents had missing data for at least one variable across all waves. To retain all cases, we imputed missing values with multiple imputation by chained equations in Stata 16. We also used the "multiple imputation, then deletion (MID)" approach, which generates all imputed values then deletes observations with the imputed dependent variable. The MID provides more robust and efficient estimates than a conventional multiple imputation strategy (Von Hippel, 2007). Results were based on estimates from 10 imputed data sets. A sensitivity test using listwise deletion yielded similar results (not shown but available upon request). We adjusted for the sampling design of the CHARLS by using the individual sampling weights from the first wave for all analyses. We also employed robust standard errors to all regression models to adjust for the clustering of observations within individuals.

4. Results

4.1. Sample characteristics

Table 1 presents weighted descriptive statistics at baseline (2011) for all analyzed variables. The results showed that the average score of depressive symptoms (CES-D) for all grandparents was 8.60 out of 30. In terms of grandparenting, approximately one half of grandparents provided no care for their grandchildren (50.41%). Among caregiving grandparents, the largest group was those who provided multigenerational household grandparenting (28.75%), followed by part-time noncoresident grandparenting (8.37%), skipped-generation household grandparenting (7.39%), and full-time noncoresident grandparenting (5.07%).

The average CES-D score for grandparents differed by grandparenting type at baseline. As shown in Fig. 1, older adults who provided skipped-generation household grandparenting reported the highest level of depressive symptoms (9.52). The second-highest average was found among grandparents who did not provide any care (8.90). The difference between these two groups was significant ($p < 0.05$). Note that this finding was descriptive without controlling for any covariates. The CES-D scores for those who provided multigenerational household grandparenting and full-time noncoresident grandparenting were 8.15 and 8.18, respectively. Grandparents providing part-time noncoresident grandparenting had the lowest level of depressive symptoms (7.83).

As for SES, the average score of household assets was 4.15 out of 17. The majority of grandparents were currently working, and 23.88% of them were receiving a pension. In terms of health behaviors, 32.21% of grandparents were current smokers and 22.65% were currently drinking. With respect to social support, 46.95% of grandparents were engaged in at least one social activity. Approximately 40% of grandparents received financial support from their adult children, whereas roughly 20% of grandparents provided financial support to their adult children. The average age of grandparents was 59.09 years and 77.71% were married. More than 37% of grandparents had been diagnosed with at least one major chronic condition.

4.2. Grandparenting and depressive symptoms

Table 2 shows the estimated coefficients of depressive symptoms

Table 1

Weighted descriptive statistics of grandparents, China health and retirement longitudinal study, 2011 (*N* = 4354).

Variable	Mean or %
CES-D (1–30)	8.60 (0.12)
Grandparenting	
No grandparenting (ref.)	50.41
Skipped-generation household grandparenting	7.39
Multigenerational household grandparenting	28.75
Part-time noncoresident grandparenting	8.37
Full-time noncoresident grandparenting	5.07
Socioeconomic Status	
Household asset (1–17)	4.15 (0.05)
Working (=1)	71.82
Pension (=1)	23.88
Health Behaviors	
Smoking (=1)	32.21
Drinking (=1)	22.65
Social Support	
Social activity (=1)	46.95
Support from adult children (=1)	39.71
Support to adult children (=1)	19.78
Controls	
Age	59.09 (0.15)
Married (=1)	77.71
Chronic condition (=1)	37.37

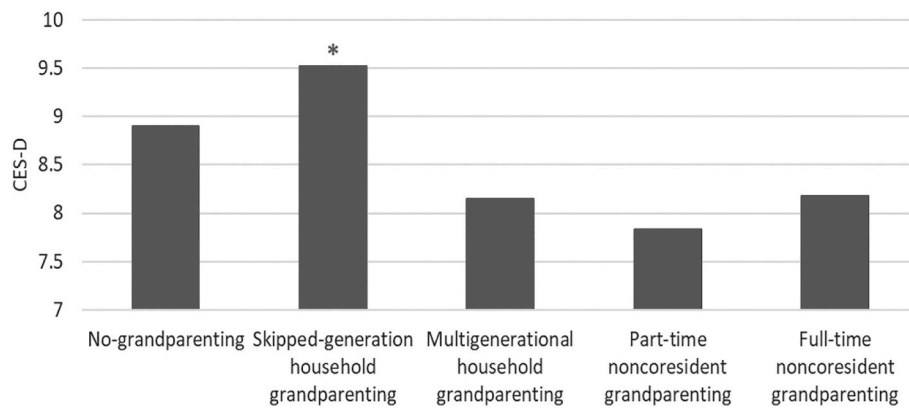*Note.* Standard deviations are in parentheses.

Fig. 1. Depressive symptoms (CES-D) by grandparenting at baseline (2011) (*N* = 4354).
Note. *Statistically significant difference between skipped-generation household grandparenting group and no-grandparenting group at the .05 level.

Table 2
Fixed effects linear regression models predicting depressive symptoms among grandparents (*N* = 4354).

	Model 1	Model 2	Model 3	Model 4	Model 5
	Coef. (RSE)				
Grandparenting (ref = no grandparenting)					
Skipped-generation household grandparenting	−0.531*	−0.552*	−0.527*	−0.530*	−0.548*
	(0.257)	(0.260)	(0.257)	(0.256)	(0.259)
Multigenerational household grandparenting	−0.001	−0.048	0.000	0.006	−0.043
	(0.212)	(0.220)	(0.212)	(0.210)	(0.217)
Part-time noncoresident grandparenting	0.133	0.125	0.130	0.145	0.135
	(0.213)	(0.213)	(0.214)	(0.213)	(0.214)
Full-time noncoresident grandparenting	−0.276	−0.292	−0.273	−0.274	−0.289
	(0.244)	(0.244)	(0.245)	(0.244)	(0.245)
Socioeconomic Status					
Household asset		0.031			0.034
		(0.024)			(0.024)
Working		−0.341*			−0.328
		(0.170)			(0.171)
Pension		−0.253			−0.243
		(0.159)			(0.159)
Health Behaviors					
Smoking			−0.303		−0.273
			(0.309)		(0.307)
Drinking			−0.049		−0.019
			(0.203)		(0.204)
Social Support					
Social activity				−0.212	−0.208
				(0.133)	(0.133)
Support from adult children				0.119	0.122
				(0.138)	(0.138)
Support to adult children				−0.134	−0.136
				(0.124)	(0.125)
Controls					
Age	0.514	0.499	0.515	0.492	0.479
	(0.417)	(0.419)	(0.419)	(0.411)	(0.414)
Age-squared	−0.004*	−0.004*	−0.004*	−0.004*	−0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Married	−0.909**	−0.872**	−0.911**	−0.919**	−0.884**
	(0.319)	(0.321)	(0.319)	(0.314)	(0.316)
Chronic condition	0.667**	0.683**	0.659**	0.662**	0.672**
	(0.249)	(0.249)	(0.249)	(0.250)	(0.249)

Note. Robust standard errors (RSE) in parentheses. All models control for survey wave (not shown).
***p < 0.001, **p < 0.01, *p < 0.05.

(CES-D) predicted by grandparenting from fixed effects linear regression models. The results of Model 1 suggested that skipped-generation household grandparenting was significantly associated with depressive symptoms. Surprisingly, transition into skipped-generation household grandparenting was associated with a 0.531-point lower CES-D score compared to providing no care to grandchildren (*p* < 0.05). This finding was observed after controlling for time-varying demographic characteristics, such as age, age-squared term, marital status, and chronic conditions. Meanwhile, other types of grandchild care, including multigenerational household grandparenting and part-time or full-time noncoresident grandparenting, had no significant effects on the depressive symptoms of older adults.

Models 2-4 added SES, health behaviors, and social support, respectively, to the base model to assess how those potential confounders might influence the association between grandparenting and depressive symptoms among older adults. In Model 2, the negative effect

of skipped-generation household grandparenting on depressive symptoms remained significant after including SES (i.e., household assets, work status, and pension receipt). The magnitude of the estimated coefficient slightly increased from -0.531 to -0.552 ($p < 0.05$). Among SES factors, current working status was significantly and negatively related to grandparents' depressive symptoms (-0.341; $p < 0.05$). Model 3 showed that the coefficient for skipped-generation household grandparenting was slightly reduced (-0.527) from Model 1 but remained significant when we added health behaviors (i.e., smoking and drinking). Model 4 suggested that adjusting for social support (i.e., social activity and support from/to adult children) did not change the coefficient for skipped-generation household grandparenting much, and the effect of skipped-generation household grandparenting was still significant ($p < 0.05$).

In Model 5, the full model, we included all of the covariates to the base model, and the results showed that skipped-generation household grandparenting was still inversely and significantly associated with depressive symptoms (-0.548, $p < 0.05$). Particularly, the results indicated that skipped-generation household grandparenting was associated with fewer depressive symptoms. None of the other three grandparenting types was significantly associated with depressive symptoms. Lastly, we found that being married was significantly related to a lower level of depressive symptoms. In contrast, having chronic health conditions was related to a higher level of depressive symptoms.

5. Discussion and conclusions

Although caring for grandchildren is a rapidly growing trend in various sociocultural contexts, the effects of grandparenting on older adults' mental health is underexplored, especially in Asian contexts including China (Mehta and Thang, 2012). This study aims to examine the association between grandparenting and depressive symptoms among Chinese older adults. Using nationally representative data from the CHARLS (2011–2015), we investigate whether caregiving for grandchildren influences the depressive symptoms of grandparents. Unlike previous research, we measure grandparenting from a holistic perspective by utilizing both key elements that shape various types of grandchild care: grandparents' family structure and level of care intensity. We also utilize fixed effects models and consider potential confounders, including SES, health behaviors, and social support, to better explore the relationship between grandparenting and depressive symptoms.

Our results suggest that for Chinese older adults, a particular type of grandparenting has a significant impact on depressive symptoms. We find that providing skipped-generation household grandparenting is associated with a significantly lower level of depressive symptoms, after controlling for SES, health behaviors, social support, and demographic characteristics. Our results from a longitudinal survey with a nationally representative sample add a new finding to the literature, which up to now has primarily focused on rural grandparents using cross-sectional data with regional samples in China (Cong and Silverstein, 2008; Silverstein et al., 2006).

The protective effect of skipped-generation household grandparenting on depressive symptoms is not consistent with previous U.S. and European studies that have found elevated depressive symptoms among caregiving older adults in skipped-generation households (Blustein et al., 2004; Minkler et al., 1997). However, the finding here supports our hypothesis and is largely in line with previous studies that report better psychological well-being (e.g., fewer depressive symptoms or greater life satisfaction) among Chinese older adults who care for grandchildren (Cong and Silverstein, 2008; Silverstein et al., 2006; H. Xu, 2019; L. Xu et al., 2012). It is particularly consistent with Silverstein and colleagues' 2006 regional study in rural Anhui province, which finds that grandparents in skipped-generation households have better mental health than those living in single-generation households. Nevertheless, we do not find evidence that the receipt of financial

support from adult children explains the mental health benefit of skipped-generation household grandparenting as reported in the literature. It should be noted, however, that those earlier studies mainly discussed the role of living arrangements rather than caregiving for grandchildren and used cross-sectional regional data (Cong and Silverstein, 2008; Silverstein et al., 2006). On the other hand, our results are different from a recent study in China which finds that grandparents in skipped-generation households are less happy than those living with only a spouse or those living in multigenerational households (Wen et al., 2019). Because Wen and colleagues' study does not directly examine the provision of grandchild care per se, and only examines living arrangements, it is hard to know whether it is the act of caregiving, or living arrangements, or a combination of both that leads to a lower level of happiness among grandparents living in the skipped generation households.

Our findings on skipped-generation household grandparenting are largely consistent with the role enhancement theory rather than the role strain theory. The role enhancement theory suggests that carrying out multiple social roles leads to better mental well-being because individuals may obtain positive rewards, such as a sense of fulfillment, greater life satisfaction, and greater self-efficacy (Moen et al., 1995). Older adults engaging in skipped-generation household grandparenting may benefit mentally from the caregiving experience despite intensive childcare without adult children present. Those grandparents may gain various psychological and physical rewards, such as increased self-esteem, sense of achievement, life satisfaction, and an active lifestyle, while executing multiple social roles as an active primary caregiver for their grandchildren (Chen and Liu, 2012; Choi and Zhang, 2018; Pruchno and McKenney, 2002).

In addition, caring for grandchildren is prevalent and culturally normative for older adults in China as a family obligation, especially to support absent adult children who migrate to other regions seeking employment (Wen et al., 2019). Given the Chinese context emphasizing strong family bonds and intergenerational support for collective well-being (Burnette et al., 2013; H. Xu, 2019), older adults who provide skipped-generation household grandparenting may gain a stronger sense of self-worth and greater respect from their adult children. As many adult children often send remittances back to their parents, grandparents who provide care to their grandchildren in skipped-generation households may also feel parental satisfaction that their children are filial and successful, which in turn can enhance their psychological well-being (Cong and Silverstein, 2011; Silverstein, 2007; Silverstein et al., 2006).

The lack of other grandparenting-related stressors, such as intergenerational conflicts over child-rearing philosophy and practices, is also likely related to lower depressive symptoms of grandparents in skipped-generational households. In China, it is often reported that grandparents have stress stemming from conflicts with adult children in multigenerational households, especially daughters-in-law, because paternal grandparents' active intervening in child rearing is culturally allowed (Cong and Silverstein, 2008). Such stress among family members may be much lower among grandparents who provide skipped-generation household grandparenting in light of the absence of adult children in the household. Furthermore, companionship and strong emotional bonds with grandchildren obtained while living together and taking care of them as a primary caregiver may contribute to those grandparents' mental well-being. It is also possible that older grandchildren need less intensive care from grandparents but can provide more instrumental support (e.g., light household chores) for their grandparents and households (Korinek et al., 2011). Ultimately, those psychological benefits and positive facets may outweigh the adverse effect of skipped-generation household grandparenting on depressive symptoms and improve grandparents' mental health.

We also hypothesized that providing multigenerational household grandparenting is associated with a lower level of depressive symptoms in China. Our results reveal that providing multigenerational household

grandparenting is not significantly associated with older adults' depressive symptoms, net of all covariates. This finding is not consistent with previous studies that report fewer depressive symptoms in older adults providing multigenerational household grandparenting in China (Guo et al., 2008; Silverstein et al., 2006). In addition, we do not find any significant effects of providing noncoresident grandparenting (i.e., part-time and full-time). However, our null finding is still a significant contribution since the literature has underexplored the health consequences of those who do not live with adult children and grandchildren but do provide grandchild care in China. Moreover, as far as we know, this study is one of the first to utilize fixed effects models to examine how grandparenting affects older adults' mental health in China.

We conducted multiple sensitivity analyses to test the robustness of the findings (results not shown but available on request). First, we included the interaction terms of grandparenting with gender, rural residence, and age (45–60 vs. 60 and above) in the models to examine whether there were any differences in depressive symptoms by those characteristics of grandparents based on the literature (Li et al., 2016; Wen et al., 2019; H. Xu, 2019). None of the interaction terms showed significant effects. Second, we controlled for additional predictors related to grandparents' health status, such as self-reported health and functional limitation (i.e., activities of daily living) in the models. The results were similar, suggesting that our findings were robust, net of those health factors. Third, we estimated our analytic models using ordinary least squares regression models for the baseline only. Although the results were marginally significant or not significant, the direction of the relationship between depressive symptoms and skipped-generation household grandparenting was consistent with the earlier, cross-sectional studies that reported worse psychological well-being of caregiving older adults in skipped-generation households (e.g., Ren and Treiman, 2015). Therefore, our results from longitudinal data and fixed effects models challenged the findings drawn from the cross-sectional design because previous studies were unable to control for unobserved heterogeneity. Taken together, our results suggest that although grandparents in skipped-generation households may be a disadvantaged group compared to grandparents in other living arrangements, their entry into custodial care of their grandchildren does not worsen their mental health.

This study has several limitations. First, some grandparenting types (e.g., skipped-generation and multigenerational household grandparenting) were not further classified utilizing care intensity due to insufficient sample size. Second, this study cannot entirely rule out the possibility that the identified grandparenting differences in depressive symptoms are in part driven by selection. Healthier older adults are more likely to engage in grandparenting than older adults who are frailer. Although we have controlled for several health conditions and behaviors over time, our measures are crude. Third, although the fixed effects models we use provide rigorous estimations of the causal relationships, the method cannot estimate the effects of time-invariant covariates and produces larger standard errors than other models. Finally, we call for future research that assesses how the health implications of grandparenting vary by the characteristics of care recipients (i.e., grandchildren) and available care support. For instance, caring for younger grandchildren, such as babies or toddlers, might be more challenging than caring for older grandchildren. The gender of the grandchildren may also affect the level of depressive symptoms among grandparents since China is traditionally a male-favored society. It is also possible that having some care support, such as nannies or relatives, reduces caregiving grandparents' physical and mental stress. Although we were unable to include these factors into our analysis due to data limitations, it is still important to examine how the attributes of grandchildren and the availability of care support may shape caregiving grandparents' mental health.

Despite these limitations, the current study makes important contributions to the literature on grandparenting and health, and particularly adds to the literature of the depressive symptoms among caregiving

older adults in China. The provision of skipped-generation household grandparenting is associated with fewer depressive symptoms, even after controlling for SES, health behaviors, social support, and basic demographic characteristics. All in all, the findings in this study advance our understanding of the sociocultural differences in the health consequences of grandparenting in a global context.

Credit author statement

Seung-won Emily Choi: Conceptualisation, Data curation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. Zhenmei Zhang: Conceptualisation, Writing – review & editing.

Acknowledgement

References

Allison, P.D., 2009. Fixed Effects Regression Models (Thousand Oaks, California).

Baker, L.A., Silverstein, M., Putney, N.M., 2008. Grandparents raising grandchildren in the United States: changing family forms, stagnant social policies. Journal of societal & social policy 7, 53.

Barnett, R.C., Baruch, G.K., 1985. Women's involvement in multiple roles and psychological distress. J. Pers. Soc. Psychol. 49, 135.

Beaumaster, S., Chien, S., Lau, S., Lin, A., Phillps, D., Wilkens, J., et al., 2018. Harmonized CHARLS Documentation, Version C. Center for Economic and Social Research, University of Southern California, Los Angeles.

Blustein, J., Chan, S., Guanais, F.C., 2004. Elevated depressive symptoms among caregiving grandparents. Health Serv. Res. 39, 1671–1690.

Boey, K.W., 1999. Cross-validation of a short form of the CES-D in Chinese elderly. Int. J. Geriatr. Psychiatr. 14, 608–617.

Bollen, K.A., Glanville, J.L., Stecklov, G., 2002. Economic status proxies in studies of fertility in developing countries: Does the measure matter? Popul. Stud. 56 (1), 81–96. https://doi.org/10.1080/00324720213796.

Burnette, D., Sun, J., Sun, F., 2013. A comparative review of grandparent care of children in the US and China. Ageing Int. 38, 43–57.

Chen, F., Liu, G., 2012. The health implications of grandparents caring for grandchildren in China. J. Gerontol. B Psychol. Sci. Soc. Sci. gbr132.

Chen, H., Mui, A.C., 2014. Factorial validity of the center for epidemiologic studies depression scale short form in older population in China. Int. Psychogeriatr. 26, 49–57.

Cheng, S.T., Chan, A.C., 2005. The center for epidemiologic studies depression scale in older Chinese: thresholds for long and short forms. Int. J. Geriatr. Psychiatr.: A journal of the psychiatry of late life and allied sciences 20, 465–470.

Choi, S.-w., Zhang, Z., 2018. Grandparenting and self-rated health among older Korean women. Res. Aging 40, 911–932.

Choi, S.-w.E., 2020. Grandparenting and mortality: how does race-ethnicity matter? J. Health Soc. Behav. 61, 96–112.

Choi, S.-w.E., Zhang, Z., 2021. Caregiving grandmothers and depressive symptoms in South Korea. In: Patricia Neff, C., Sampson Lee, B. (Eds.), Aging and the Family: Understanding Changes in Structural and Relationship Dynamics. Emerald Publishing Limited, pp. 123–139.

Cong, Z., Silverstein, M., 2008. Intergenerational time-for-money exchanges in rural China: does reciprocity reduce depressive symptoms of older grandparents? Res. Hum. Dev. 5, 6–25.

Cong, Z., Silverstein, M., 2011. Intergenerational exchange between parents and migrant and nonmigrant sons in rural China. J. Marriage Fam. 73, 93–104.

Goode, W.J., 1960. A theory of role strain. Am. Socio. Rev. 483–496.

Goodman, C., Silverstein, M., 2002. Grandmothers raising grandchildren: family structure and well-being in culturally diverse families. Gerontol. 42, 676–689.

Grundy, E.M., Albala, C., Allen, E., Dangour, A.D., Elbourne, D., Uauy, R., 2012. Grandparenting and psychosocial health among older Chileans: a longitudinal analysis. Aging Ment. Health 16, 1047–1057.

Guo, B., Pickard, J., Huang, J., 2008. A cultural perspective on health outcomes of caregiving grandparents: evidence from China. J. Intergener. Relat. 5, 25–40.

Hayslip, B., Page, K.S., Blieszner, R., Bedford, V., 2012. Grandparenthood: grandchild and great-grandchild relationships. Handbook of families and aging 183–212.

Hughes, M.E., Waite, L.J., LaPierre, T.A., Luo, Y., 2007. All in the family: the impact of caring for grandchildren on grandparents' health. J. Gerontol. B Psychol. Sci. Soc. Sci. 62, S108–S119.

Jendrek, M.P., 1993. Grandparents who parent their grandchildren: effects on lifestyle. J. Marriage Fam. 609–621.

Kataoka-Yahiro, M., Ceria, C., Caulfield, R., 2004. Grandparent caregiving role in ethnically diverse families. J. Pediatr. Nurs. 19, 315–328.

King, A.C., Rejeski, W.J., Buchner, D.M., 1998. Physical activity interventions targeting older adults: a critical review and recommendations. Am. J. Prev. Med. 15, 316–333.

Korinek, K., Zimmer, Z., Gu, D., 2011. Transitions in marital status and functional health and patterns of intergenerational coresidence among China's elderly population. J. Gerontol.: Ser. Bibliogr. 66B, 260–270.

Ku, L.-J.E., Stearns, S.C., Van Houtven, C.H., Lee, S.-Y.D., Dilworth-Anderson, P., Konrad, T.R., 2013. Impact of caring for grandchildren on the health of grandparents in Taiwan. The Journals of Gerontology Series B. Psychological Sciences and Social Sciences, gbt090.

Li, L.W., Liu, J., Xu, H., Zhang, Z., 2016. Understanding rural–urban differences in depressive symptoms among older adults in China. J. Aging Health 28, 341–362.

Lou, V.W.Q., Lu, N., Xu, L., Chi, I., 2013. Grandparent-grandchild family capital and self-rated health of older rural Chinese adults: the role of the grandparent-parent relationship. J. Gerontol. B Psychol. Sci. Soc. Sci. 68, 599.

Mahne, K., Huxhold, O., 2014. Grandparenthood and subjective well-being: moderating effects of educational level. J. Gerontol. B Psychol. Sci. Soc. Sci. 70, 782–792.

Margolis, R., 2016. The changing demography of grandparenthood. J. Marriage Fam. (n/a-n/a).

Mehta, K.K., Thang, L.L., 2012. Experiencing Grandparenthood: an Asian Perspective. Springer Science & Business Media.

Minkler, M., 1999. Intergenerational households headed by grandparents: contexts, realities, and implications for policy. J. Aging Stud. 13, 199–218.

Minkler, M., Fuller-Thomson, E., Miller, D., Driver, D., 1997. Depression in grandparents raising grandchildren: results of a national longitudinal study. Arch. Fam. Med. 6, 445.

Moen, P., Robison, J., Dempster-McClain, D., 1995. Caregiving and women's well-being: a life course approach. J. Health Soc. Behav. 259–273.

Pearlin, L.I., 1989. The sociological study of stress. J. Health Soc. Behav. 241–256.

Pruchno, R.A., McKenney, D., 2002. Psychological well-being of black and white grandmothers raising grandchildren examination of a two-factor model. J. Gerontol. B Psychol. Sci. Soc. Sci. 57, P444–P452.

Ren, Q., Treiman, D.J., 2015. Living arrangements of the elderly in China and consequences for their emotional well-being. Chinese Sociological Review 47, 255–286.

Rozario, P.A., Morrow-Howell, N., Hinterlong, J.E., 2004. Role enhancement or role strain assessing the impact of multiple productive roles on older caregiver well-being. Res. Aging 26, 413–428.

Silverstein, M., 2007. Benefits of grandparents raising grandchildren. J. Intergener. Relat. 5, 131–134.

Silverstein, M., Cong, Z., Li, S., 2006. Intergenerational transfers and living arrangements of older people in rural China: consequences for psychological well-being. J. Gerontol.: Ser. Bibliogr. 61, S256–S266.

Silverstein, M., Giarrusso, R., 2010. Aging and family life: a decade review. J. Marriage Fam. 72, 1039–1058.

Sun, J., 2017. Grandparents raising grandchildren in China and its effects on the quality of life of older people. Innovation in Aging 1, 1295.

Szinovacz, M.E., Davey, A., 2006. Effects of retirement and grandchild care on depressive symptoms. Int. J. Aging Hum. Dev. 62, 1–20.

Von Hippel, P.T., 2007. Regression with missing YS: an improved strategy for analyzing multiply imputed data. Socio. Methodol. 37, 83–117.

Wen, M., Ren, Q., Korinek, K., Trinh, H.N., 2019. Living in skipped generation households and happiness among middle-aged and older grandparents in China. Soc. Sci. Res. 80, 145–155.

Xu, H., 2019. Physical and mental health of Chinese grandparents caring for grandchildren and great-grandparents. Soc. Sci. Med. 229, 106–116.

Xu, H., 2021. Grandparenting and cognitive functioning in China. Popul. Res. Pol. Rev. https://doi.org/10.1007/s11113-020-09628-1. In press.

Xu, L., Wu, B., Chi, I., Hsiao, H.-Y., 2012. Intensity of grandparent caregiving and life satisfaction among rural Chinese older adults: a longitudinal study using latent difference score analysis. Fam. Community Health 35, 287–299.

Yancura, L.A., 2013. Justifications for caregiving in white, Asian American, and native Hawaiian grandparents raising grandchildren. J. Gerontol. B Psychol. Sci. Soc. Sci. 68, 139.