Being Left-behind or Migrant? The Impacts of Migration on the Mental Health of Chinese Rural Older Adults

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Introduction

Over the past several decades, migration has emerged as a major process of demographic change all over the world (Bell et al., 2015; Massey et al., 1993). No matter international or internal migration, working age group is the main sector of the migrant population (Bell et al., 2015; Lucas, 2015; White & Lindstrom, 2005). In order to pursuit higher salary or better development opportunities, the working age population immigrate from poor areas/countries to rich areas/countries (Lucas, 2015; White & Lindstrom, 2005). The huge migration of working age population has critical impact the lives of their old parents.

Facing the migration of adult children, older adults have two choices: one is being left-behind in rural/poor areas to be left-behind older adults (Kuhn, Everett, & Silvey, 2011; Song, 2017b), and another is migrating to urban/rich areas with children to be migrant older adults (Miller-Martinez & Wallace, 2006). Whether being left-behind or being migrant, profound change happen in their lives and then impact their mental health (Antman, 2010; Song, 2017a). A large number of studies focused on the relationship between the adult children migration and the mental health of left-behind older parents in developing countries (Antman, 2010; Cong & Silverstein, 2011; K. Lin, Yin, & Loubere, 2014; Song, 2017a; Yahirun & Arenas, 2018; Yamada & Teerawichitchainan, 2015). The left-behind older adults are commonly compared with the general older adults, none of whose children are migrating, and found to be poor mental health(Song, 2017b). Meanwhile, some researchers are interested in the immigrant older adults (Kim, Linton, & Lum, 2015; Litwin, 1995; Miller-Martinez & Wallace, 2006; Treas & Mazumdar, 2002; Wu et al., 2010). Most studies about immigrant older adults only concentrated on the difference within immigrant older

adults per se (Kim et al., 2015) or compared this group with the native/local born older residents of the destination (Lum & Vanderaa, 2010). There is few research make direct compassion among the three groups with different residential types directly, saying general, left-behind and migrant older adults, to answer which choice is better for older adults when facing the migration of adult children. This study compares depressive symptoms of the left-behind and migrant older adults with that of general older adults with rural household registration (*Hukou*) in China. Since the migrations of offspring or older adult per se change social networks in older adults' lives (K. Lin et al., 2014; Miller-Martinez & Wallace, 2006) and social networks play an critical role in the psychological well- being of older adults, this study also investigate the association between residential types and the social networks of Chinese rural older adults, and how the social network moderate or mediate the relationship between residential types and depressive symptoms.

According to the "convoy of support model", individuals are surrounded by supportive others who move with them throughout the life course. The structure, function, and quality of conveys are influenced by personal and situational (Antonucci, Ajrouch, & Birditt, 2014). The migration changes living situation of older adults, then the social networks. Consistent with previous studies on social networks among older adults (Chopik, 2017; Litwin & Shiovitz-Ezra, 2011), here we distinguish older adults' social networks in terms of family ties and friendship ties. For the left-behind older adults, the migration of children removes close family members from the social support systems. This may decrease the family ties and keep the friend ties stable (Lu, 2012; Song, 2017a; Yamada & Teerawichitchainan, 2015). For the migrant older adults, the motivation of migration at older ages is most commonly family-based (Miller-Martinez & Wallace, 2006; Treas & Mazumdar, 2002), and this may result a relatively fine kinship ties. However, the friend ties of immigrant older adults will shrink seriously. The friendship ties of immigrants in original village are lost due to relocation, and it is difficult for all age immigrants to extend new friendship ties in the destination (Angel, Angel, & Markides, 2000), not to say the older adults (Treas &

Mazumdar, 2002). So far, no study shows what change in the family ties and friend ties among the left-behind and migrant older adult compared with the general counterparts.

Massive researches discovered the significant protective effects of social networks on mental health among older adults (Kim et al., 2015; Lei, Shen, Smith, & Zhou, 2015; Litwin, 1997; Sicotte, Alvarado, León, & Zunzunegui, 2008; Thoits, 2011). But it is still not clear to what extent the mental health among the left-behind and migrant older adults are impacted by the changes in family ties and friend ties respectively.

The stress-buffering hypothesis (Cohen & Wills, 1985; Thoits, 2011) argues that social networks affect health through direct (main) effects and/or indirect (buffering) effects. So the change of social networks may have direct and/or indirect effects on the depressive symptoms among left-behind and migrant older adults. Since it is believed that the residential types affect the social networks of older adults, family ties and/or friend ties will act as the mediating variables on the association between residential types and depressive symptoms if social networks have direct effects. Considering that left-behind or migrant is a stressful event for older adults (Song, 2017b; Treas & Mazumdar, 2002), the social networks may have greater effects on the depressive symptom among left-behind and/or migrant older adults compared with the general group. Family and/or friend ties may mediate the association between residential types and psychological well-being.

In this article, we ask how migration affects rural older adults' social networks and mental health in China. We distinguish three residential types: general older adults, left-behind older adults and migrant adults. We compare the difference in family ties, friendship ties and depressive symptoms among the three groups. And then the mechanism of family ties and friend ties on the association between residential types and depressive symptoms, specifically the mediating effects and/or moderating effects, are examined.

Methods

Data and Sample

We use data from the China Longitudinal Aging Social Survey (CLASS), conducted by a team of researchers at Renmin University of China (data and documentation are available at http://class.ruc.edu.cn). The baseline survey was conducted between July and December 2014. The CLASS applied a multi-stage stratified probability sampling method, with counties as the primary sampling units, villages/neighborhood committees as the secondary sample units, and people aged 60 and over living in households as the survey objects. The survey covered 28 provinces, autonomous regions, and municipalities in mainland China, and collected information from 11,511 older adults living in 462 villages/neighborhood communities. It represents a nationally representative sample of older adults aged 60 and over in mainland China (NSRC, 2014).

In China, household registration system (*hukou*) is an important concept when discussing the characteristic of population (Liang, 2016). This study focuses on the older adults 60 and above with rural *hukou*. The analysis is restricted to older adults who live in rural area with a local *hukou* or live in ubran area without a local hukou. The original sample size is 4462.

Given the cognitive ability of participants will influent the validity of self-reported scales, all respondents were initially asked to answer five cognition-related questions, and only those who answered correctly on at least three proceeded to the psychological well-being and attitudinal questions. This measure is a widely used practice in clinical and epidemiological studies (Wang, Chen, & Han, 2014). Approximately 36.3% of the samples were excluded in this study as a result.[1] These cognitively impaired individuals were more likely to be women than men, and to have lower socioeconomic status (SES). In addition to the attrition of cognition

[1] The exclude rate is pretty high. But the difference pattern in family ties, friend ties and all other covariables among the three older adults are same in the original and selected sample is research.

impairment, we also excluded respondents with missing values on analytical variables (8.2%), resulting in 2472 older adults, with 1,475 general older adults, 891 left-behind older adults and 106 migrant older adults included in this study's analysis.

Measures

Dependent Variable

Depressive symptoms were measured by a subset (nine items) from the Center for Epidemiologic Studies-Depression (CES-D) scale (Radloff, 1977; Silverstein, Cong, & Li, 2006). We coded the frequency with which the participant had experienced each symptom in the past week as 0 (rarely or none of the time), 1 (some of the time), or 2 (most of the time). After the coding of positive affect items had been reversed, the nine items were summed, which produced a depressive symptom score ranging from 0 to 18, with a higher score indicating more depressive symptoms (Cronbach's α =0.755).

Independent Variables

One of our key independent variables is the living circumstance of older adults, which we label as "residential type" (Ren & Treiman, 2016). Based on the migration[2] of children and the older adults their own, the older adults are distinguished into three distinct groups: 1) general, 2) left-behind, and 3) migrant. The general older adults are the older adults live in rural area with local *hukou*, and none of their children is migrating. The left-behind older adults are the older adults live in rural area, and at

[2] The individuals who live in the area out of the county boundary of *hukou* registration are defined as migrant population (Liang, 2016).

least one of their children is migrating. The migrant older adults are the older adults live in urban or rural areas without a local *hukou.* The immigrants who have lived in the destinations for many decades are nearly as well-off as local residents (Kritz, Gurak, & Chen, 2000). Here we want to explore the impact of new migration, so the migrant older adults are restricted to those who live in the present counties no more than 10 years.

The *Lubben Social Networks Scale* (LSNS) (Lubben et al., 2006), an index that has been widely used in the literature were used to assess social networks of older adults(Chan, Malhotra, Malhotra, & ØStbye, 2011; Leung et al., 2016). LSNS is constructed from a set of three questions evaluating family ties and a comparable three questions for friendship ties. The questions comprised: "How many relatives/friends do you see or hear at least once a month?", "How many relatives/friends do you feel at ease with to talk about private matters?", and "How many relatives/friends do you feel close to such that you could call on them for help?". We coded the number answered by the participants for each question as 0 (none), 1 (1), 2 (2), 3(3 or 4), 4 (5 through 8), or 5 (9 or more). The three items were summed into a scale ranging from 0~15 for (separately) family ties and friendship ties. The Cronbach's α coefficients were 0.742 for the subscale of family ties and 0.852 for the subscale of friendship ties.

A series of sociodemographic variables are controlled in the analysis, including gender, age, marital status (married or not), number of children, presence of child in the household, education (less secondary/secondary and above), number of chronic

diseases, functional limitations (with an index of 0~30, the higher the worse), and annual personal income (logged).

Analytical Strategy

We conducted the analysis in three steps. The first set of analysis reported descriptive statistics older adults' depressive symptoms, social networks, and other variables included in the multivariate models by general, left-behind and migrant older adults subsamples. In the second set, we started with using multivariate linear regression models to examine the effects of residential types on social networks scores, controlling for other independent variables. We then tested the effects of residential types on CES-D scores, with family ties and friendship ties include in as independent variables. We further tested for the moderating effects of social network scales in the association between residential and CES-D scores by adding four interaction items. In the third set, we tested the mediating effect of family ties and friend ties on the relationship between residential types and CES-D. The analyses of the mediation effects were performed using Hayes' PROCESS macro (2013). The bootstrapping method produces 95% bias-corrected confidence intervals of these effects form 5,000 resamples of the data; confidence intervals that do not contain zero indicate significant effects.

RESULTS

Sample characteristics

Table 1 shows the sample characteristics. The three groups' older adults were

significantly different in some aspects such and age, gender ratio, marriage status, living arrangements and number of chronic diseases. Compared with the general older adults, the left-behind older adults were likely to be younger, married, more chronic diseases and not living with children. The percentage of living with children of the left-behind older adults was the lowest. Meanwhile, the migrant older adults were the youngest in the three groups, having highest percentage of living with children, the least chronic diseases and the lowest married percentage. Moreover, there were significant difference in family ties and depressive symptoms among the three groups of older adults. The left-behind older adults showed lowest family ties scores and highest depressive symptoms. The friendship ties scores of migrant older adults were lower than the other two groups, but the difference in friendship ties among the three groups were not significant.

Table 1. Descriptive Statistics of General, Left-behind and Migrant Rural Older Adults, CLASS 2014

	Total	General	Left-behind	Migrant
Age	68.23*	68.83	67.51	66.04
	(7.1)	(7.35)	(6.63)	(6.34)
Female (%)	42.1*	43.8	37.1	59.4
Married (%)	69.9*	67.7	74.2	64.2
Number of children	3.23	3.22	3.28	3.07
	(1.44)	(1.52)	(1.30)	(1.33)
Presence of children (%)	43.6*	45.8	37.6	64.2
Secondary education or above (%)	17.6	16.8	18.2	22.6
Annual personal income (in RMB)	6888.08	7226.56	6410.41	6193.16
	(9966.36)	(11444.33)	(7091.9)	8281.23
Number of chronic diseases	1.91*	1.82	2.09	1.74
	(1.86)	(1.77)	(2.00)	(1.73)
Index of functional limitation	1.57	1.68	1.39	1.58
	(3.15)	(3.37)	(2.64)	(3.81)
LSNS family ties subscale	8.53*	8.87	8.00	8.36
	(3.23)	(3.17)	(3.27)	(3.14)
LSNS friendship ties subscale	5.90	5.99	5.87	4.94
	(4.79)	(4.87)	(4.70)	(4.41)
Depressive symptoms	5.50*	5.28	5.90	5.26
	(3.84)	(3.81)	(3.88)	(3.72)
N	2472	1475	891	106

Notes: Values for categorical variables are in percent. The mean values, followed by standard deviations in parentheses, are presented for all other variables.

*Indicates a significant difference ($p < 0.05$) between three groups older adults based on chi-square test or one-way ANOVA.

Multivariate Regression Analysis

Results from the regression analyses are shown in Table 2. In Model 1, family ties were dependent variable. Having controlled for other covariates, left behind was associated with the lowest level of family ties across all residential types. The family ties of the migrant older adults were relatively lower than that of general older adults, but the coefficient is just marginally significant (p=0.092). In Model 2, friendship ties were the dependent variable. The migrant older adults showed the lowest friendship ties

Depressive symptoms were the dependent variable in model 3 and model 4. No matter family ties and friendship ties were added in model or not, the older adults left-behind was associated with highest depressive symptom scores. However, compared with general older adults, migrant older adults have the similar different level of depressive symptom scores. It was noteworthy that the coefficients of older adults left behind decrease from model 3 to model 4. It means that family ties and friendship ties might be the mediating variables on the relationship between residential types and depressive symptom. The interaction between residential types and two subscales of social networks were added in model 5, and no moderating effects of family ties and friendship ties were verified.

Table 2. Linear Regression Models Predicting Family Ties, Friend Ties and Depressive Symptoms of Rural Older Adults, Total Sample, CLASS 2014

Dependent variable	Family ties	Friend ties	Depressive symptom	Depressive symptom	Depressive symptom
Group (*ref*. General)					
Left-behind	-0.836***	-0.075	0.583***	0.387***	0.353
	(0.133)	(0.202)	(0.150)	(0.148)	(0.407)
Migrant	-0.593^{+}	-1.348**	-0.012	-0.166	-1.602
	(0.313)	(0.476)	(0.354)	(0.347)	(0.985)
Age	0.005	-0.03	-0.029*	-0.029*	-0.029*
	(0.011)	(0.017)	(0.013)	(0.012)	(0.012)
Female	-0.005	0.451*	-0.113	-0.109	-0.100
	(0.134)	(0.204)	(0.151)	(0.148)	(0.148)
Married	0.610***	0.01	-1.063***	-0.921***	-0.922***
	(0.150)	(0.228)	(0.169)	(0.166)	(0.166)
Number of children	0.485***	0.116	-0.084	0.03	0.031
	(0.049)	(0.075)	(0.056)	(0.056)	(0.056)
Presence of grandchild	1.177***	0.571**	-0.528	-0.247	-0.251**
	(0.127)	(0.194)	(0.144)	(0.143)	(0.143)
Secondary education and above	0.176	0.639*	-0.584**	-0.535**	-0.533**
	(0.168)	(0.257)	(0.191)	(0.187)	(0.187)
Log annual personal income	0.187*	0.065	-0.343***	-0.299**	-0.296**
	(0.080)	(0.122)	(0.090)	(0.088)	(0.089)
Number of chronic diseases	-0.084*	-0.291***	0.526***	0.503***	0.502***
	(0.034)	(0.053)	(0.039)	(0.038)	(0.038)
Index of functional limitations	-0.027	-0.17***	0.263***	0.254***	0.253***
	(0.021)	(0.033)	(0.024)	(0.024)	(0.024)
Family ties				-0.233***	-0.225***
				(0.024)	(0.030)
Friend ties				-0.012	-0.035^{+}
				0.015)	(0.020)
Left-behind*Family ties					-0.034
					(0.047)
Left-behind*Friend ties					0.054^{+}
					(0.032)
Migrant*Family ties					0.094
					(0.117)
Migrant*Friend ties					0.128
					(0.083)
Constant	5.553	7.271	8.579	9.96	10.003
	(0.896)	(1.366)	(1.014)	(1.002)	(1.012)
R^2	0.094	0.041	0.178	0.214	0.215
N	2472	2472	2472	2472	2472

*** $p<.001$, ** $p<.01$, * $p<.05$, + $p<.1$ (two-tailed tests)

The mediating effects of family ties and friendship ties were tested by Bootstrap method, and results are showed in table 3. The mediating effects of family ties on the association between being left-behind and depressive symptoms were demonstrated. The direct effect of being left-behind to depressive symptom was 0.387 (p=0.010). The indirect effect from being left-behind to depressive symptom through family ties was between [0.129, 0.273]. A partial mediation model was identified indicating that family ties were partially mediated the relationship between left-behind and depressive symptom with a direct effect form left-behind. Except for the above two effects, no directs from being migrant to depressive symptoms or indirect effects from being migrant to depressive through social networks were discovered.

Table 3.Bootstrap test of Mediating Effect of Family ties and Friend Ties on depression (n=2472)

		β	SE	LLCI	ULCI	P
Direct effect	Left-behind	0.387	0.148	0.097	0.677	0.010
	Migrant	-0.166	0.347	-0.846	0.514	0.632
Indirect effect						
Family ties	Left-behind	0.195	0.037	0.129	0.273	
	Migrant	0.138	0.074	-0.003	0.291	
Friend ties	Left-behind	0.001	0.004	-0.004	0.164	
	Migrant	0.016	0.023	-0.023	0.074	

Discussion

In this study, we focused on social ties and depressive symptoms among older adults who are influenced by the population migration. The left-behind older adults and migrant older adults were distinguished from general older rural adults in China. The level of family ties, friend ties and depressive symptoms among the two target groups are compared with that of the general older adults.

As our expected, the scores of family ties of left-behind older adults are lowest among the three groups, but the scores of friend ties are almost as high as that of general older adults. The migration of adult children has really reduced the kinship connection of older adults. The adult children migrate out of the county, then the long distance between the older adults and adult children make older adult have difficulty to see, talk with and seek help from the children who usually are the most important support resource of Chinese rural older adults Since the left-behind older adults still live in the original communities, the decades of friendship with the neighbors and friend were kept almost intact. The social networks of migrant older adults change in a totally different way. Elderly new migrants who move to urban areas are highly integrated into their families (NHFPC, 2016), so the percentage of co-residence with children of migrant older adults is significantly highest among the three groups. Consequently, the family ties of older adults are not as low as that of left-behind older adults. But as we know, the family members who the migrant older adult live with or live close to in the urban areas usually are only parts of their whole kinship members. So the family ties of migrant older adults are still marginally significantly lower than that of general groups. Due to the enormous change of in the living situation, the social networks of friend ties among migrant older adults are almost broken. Just like the elderly newcomers to US from other countries, China rural older adults move to the urban areas after 50 years old do not have the same high level of sociability that they once had at home (Treas & Mazumdar, 2002). And based on the socioemotional selectivity theory, that believes older people tend to restrict their networks as the get older

(Carstensen, 1995), the migrant older adults have not so strong motivation as the younger migrants to form new friendship when facing the difficulties, such as the languages obstacles, complicated traffic systems, and life habit difference. Then, the friendship ties of migrant older adults shrink with the transition of life situations.

Unsurprisingly, depressive symptoms of left-behind older adults are significantly higher than that of general counterpart. It is consistent with almost studies concerning the psychological well-being of left-behind older adults in developing countries. Out of our expectation, the migrant older adults do not show more depressive symptoms than general rural older adults. Plenty researches since most of the previous studies found the immigrant older adults were poor in psychological well-being compared with the native/local residents. Since the migrant older adults were seldom be compared with the non-migrant older adults living in the hometowns, not to say with the left-behind older adults. As we know, there is only one paper that compared the Chinese immigrant elders in the US and Chinese elder in China (Wu et al., 2010) included the migrant and non-migrant older adults in the same framework, and found that Chinese immigrants have a significantly lower score of depressive symptoms. We would like to explain current results with the mediating effect of social networks.

The regression models on depressive symptoms show that the family ties can significantly decrease the depressive symptoms among Chinese rural elderly, the main effect of social networks on health are verified. However the friendship tie can not protect the psychology well-being of older adults as family ties. Studies from some Western countries have consistently shown that friendship interaction is positively

related to self-esteem, morale and psychological well-being among older adults, while family ties are not always beneficial, being dependent on the quality of the relationship (Chopik, 2017; Gary R & Shehan, 1989; Lee & Ishii-Kuntz, 1987). However, the effects of family ties are found to have greater effects than friend ties on emotional well-being in later life in non-Western contexts (Alegria, Sribney 2007; Lei, Shen, et al., 2015; T. Li & Zhang, 2015; Lee,2017). China is a country with a strong traditional culture of filial piety that emphasizes adult children's responsibilities to their aging parents (Z. Lin & Pei, 2016; Pei, Luo, Lin, Keating, & Fast, 2017; Silverstein et al., 2006). Family members, mostly the adult children, are the main resource financial, instrumental and emotional supports for the elderly. It is not surprised to see the difference in effects of family ties and friends.

The family ties are verified to be a mediating variable on the association between being left-behind and the depressive symptoms. The family ties are so critical for the depressive symptoms among Chinese rural older adults that the migration of adult children negatively impact on the psychological well-being of left-behind elderly partly through reducing the family ties. The friend ties are not as important as family ties for Chinese rural elderly's psychological well-being, so the dramatically shrinkages in friend ties combined with not significant declining family ties among migrant older adults do not have serious negative impacts on their psychological well-being.

Family ties are the most important section of the Chinses rural elderly's social networks. The migrations of children reduce the family ties of older parents then are

detrimental to the rural left-being older adults. Although the friend ties of the migrant older adults reduce compared with general counterparts, but their depressive symptoms are not be affected. Compared with being left-behind, migrating to the urban areas to live with of near the migrant children might be a better option for the Chinese rural older adults.

Limitation

Several limitations must be considered when interpreting the results of present study. First, the self-selection of left-behind and migrant older adults may make the result conservative. The self-selection process of immigration is well known. Compared with the population in both sending and receiving areas/countries, the immigrants are likely to be healthier, have less chronic disease and lower mortality given their socio-economic status (Jesson, Massey, Rosenzweig, 2004, Chen et al, 1996; Wu, 2010). Meanwhile, the older adults who are will to live the villages where they have lived in decades are usually extroverted and have high adaptability. So, negative effect of migration on older adults might be offset by their own relatively good health status and positive personality characteristic. Second, the sample size of migrant older adults is really small that we must be careful when promoting the results. CLASS is the only data by which we can distinguish the left-behind older adults, migrant older adults and general older adults based on the concept of migration in China. We need more sufficient data, especially longitudinal data, to clarify the effects of migration on rural older adults' psychological well-being and help the rural older adult individuals and families to make better choices.

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