



Quality of life of nursing home residents in mainland China: The role of children and family support

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ABSTRACT

Background and objectives: Recently China ended its one-child policy and all married couples were permitted to have two children. The objectives were to investigate: 1) whether having more children (3+ vs. ≤ 2) is positively associated with quality of life (QOL); and 2) the role of child visit frequency and family support in the relationship between number of children and QOL among nursing home residents in mainland China.

Research design and methods: This is a cross-sectional study. A total 371 residents from 33 nursing homes in Jinan, Shandong Province who completed the survey from May to September 2016 were analyzed. The mixed-effects multivariate linear or ordered logistic regression models were used to test the mediating effect of child visit frequency and family support on the relationship between the number of children and QOL. All statistical models were adjusted for resident- and facility-level variables.

Results: Nursing home residents with 3+ children received more frequent child visits and family support, and had better QOL compared with those with ≤ 2 children. However, the relationship between number of children and QOL was attenuated and no longer significant with the inclusion of child visit frequency and family support in the model.

Discussion and implications: The findings emphasized the importance of the role of children for the QOL of the older adults in a traditionally family-care oriented society like China. As China's population continues to age, having two children is necessary but may be insufficient in the context of improving nursing home residents' QOL.

1. Introduction

China's four-decade one-child policy, along with mortality decline, contributed to its aging population (Zeng & Hesketh, 2016). In 2017, 16.2 percent (230 million) of China's population were aged 65 and older. This percentage is projected to increase to 26.3 by 2050 (United Nations, 2018). In 2014, more than three million older adults lived in nursing homes (NHs) (Statista, 2015). For many of them, the NH is their home for a long period. Aside from safety and health outcomes, NH residents seek to live a normal, meaningful, and unconstrained life as much as possible (Kane & Kane, 2001). As quality of life (QOL) is recognized gradually as representing subjective and objective aspects of NH quality (Kane et al., 2005), NH care must not only achieve good

quality care but also preserve and promote residents' QOL.

Researches have demonstrated that the number of children is positively associated with QOL, well-being, or satisfaction in older age groups (Kim et al., 2015; Liu, Dupre, Gu, Mair, & Chen, 2012; Onyishi, Sorokowski, Sorokowska, & Pipitone, 2012). Previous studies have also indicated the positive effects of number of children on family support or receipt of help from children. Grundy and Read (2012) found that older parents in England who had more children had a greater chance of receiving help from a child if needed, and a greater likelihood of at least weekly face-to-face contact. Other studies have provided evidence suggesting a positive association between the number of children and parent-child contacts. Tomassini et al. (2004) found that Italian parents with one or two children had a lower chance of weekly face-to-face

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contact than parents of three or more children. Similarly, Uhlenberg and Cooney (1990) reported that older mothers in U.S. with one to three children were less likely to have weekly face-to-face contact than mothers of four or more children. Numerous studies have shown the positive effects of family support on QOL and psychological well-being of older adults (Fuller-Iglesias & Antonucci, 2016; Li, Ji, & Chen, 2014). Older adults who received a higher level of support from family members tended to have a better QOL (Ju et al., 2016), a more satisfied life (Yeung & Fung, 2007), and a lower level of depression (Werner-Seidler, Afzali, Chapman, Sunderland, & Slade, 2017). However, these studies have not examined the number of children, frequency of parent-child contacts, family support, and QOL together. Moreover, they have focused on community-dwelling older adults and overlooked the NH population. The role of parent-child contact frequency and family support in the relationship between number of children and QOL among NH residents has yet to be explored thoroughly.

Filial piety, which is a virtue of obedience, respect, and care for one's parents, is highly valued in the Chinese culture (Ikels, 2004). The cultural norm is that children provide care for their aging parents. Social life is mainly family-oriented; older adults attach high priority to close kin relations and familial interests (Lau, 1981; Yeung & Fung, 2007). Accordingly, it is significant to examine whether child-related factors (i.e., number of children, frequency of child visits, and family support) have impacts on the QOL of Chinese NH residents. As China recently ended its one-child policy, thus allowing all married couples to have two children, examining whether residents with three or more children have better QOL than those with less is important. Therefore, the present study aimed to investigate: 1) whether having more children (3+ vs. ≤ 2) is positively associated with QOL; and 2) the role of child visit frequency and family support in the relationship between the number of children and QOL among NH residents in mainland China. The conceptual framework is described in Fig. 1.

2. Material and methods

2.1. Study design and participants

This is a cross-sectional study. A convenience sampling method was employed to recruit residents from nursing facilities. The facility had at least 30 beds and has operated for at least one year. Researchers first contacted facility administrators and obtained their permission to conduct the survey. Residents from 33 NHs in Jinan, the capital city of Shandong Province were recruited from May to September 2016. The inclusion criteria were: (1) aged 60 years and older, (2) having lived in

the NH for at least a month, and (3) willingness to participate. The exclusion criteria were: (1) severe cognitive impairment, defined using the Mini-Mental State Examination (MMSE) as a total score < 10 (Olsson, Hagnelius, Olsson, & Nilsson, 2013), (2) vision or hearing impairment, affecting the completion of the survey, and (3) coma, end-stage disease, or hospice care.

The study was approved by the Shandong University Institutional Review Board. Eight research assistants, who attended the one-day training session to go over research ethics, informed consent, and each item in the questionnaires, collected the data through face-to-face interviews. A written informed consent was obtained before the interview. The residents were assured that all their responses would be kept confidential and anonymous.

2.2. Measures

2.2.1. Quality of life

The self-reported NH QOL questionnaire, a comprehensive measure pertinent to NH life, was employed (Chen, 2016; Xu et al., 2019). The 38-item QOL questionnaire used a four-point response scale and contained nine domains, namely, physical health, food enjoyment, security, environmental comfort, autonomy, meaningful activity, interrelationship, family relationships, and mood. Each domain was transformed into a 0–10 scale. The total QOL is the equally weighted sum of nine domain scores. A higher score indicated better QOL. The questionnaire was developed and validated in the Chinese NH population with good reliability and validity (Xu et al., 2019). The Cronbach's alpha coefficient was 0.891 in this study.

2.2.2. Number of children and frequency of visits

The number of children was categorized into two or less (≤ 2) and three or more (3+). The frequency of children visiting their parents in NHs was categorized into every day, at least once a month, and less than once a month.

2.2.3. Family support

The abbreviated version of the Lubben Social Network Scale (LSNS-6) was used to quantify family support, with the stable factor structures, high levels of internal consistency, and high correlations with criterion variables (Lubben et al., 2006). The six-item scale was developed specially for use among older adults (Gray, Kim, Ciesla, & Yao, 2016). The total score ranges from 0 to 30, with a higher score indicating greater support. The Cronbach's alpha coefficient was 0.643 in this study.

2.2.4. Control variables

Resident-level variables, including age, sex, race/ethnicity, marital status, educational level, cognitive impairment, functional comorbidity index (FCI), activities of daily living (ADLs), instrumental activities of daily living (IADLs), health status, length of stay, room arrangement, and facility-level variables including ownership, NH size, occupancy percentage, staff-resident ratio, staff turnover rate, and whether medical care provided or not, were collected. Cognitive impairment was measured using MMSE (Folstein, Folstein, & McHugh, 1975). Residents were categorized into moderate or mild/no cognitive impairment (Folstein et al., 1975; Honig et al., 2018). The FCI included 18 common conditions that had impacts on daily activities and function (Groll, To, Bombardier, & Wright, 2005). Each condition was scored on a binary scale, with 0 and 1 for the absence and presence of a condition, respectively. The FCI was calculated by summing up the individual condition scores. The Barthel Index was used to measure ADLs disability (Mahoney & Barthel, 1965). Total possible scores ranged from 0 to 100, with higher scores indicating increased independence. The IADLs disability was a binary variable to indicate whether residents needed help to perform light housework, use telephone, or take the right amount of medication at the right time (Pisani et al., 2017). Self-reported health status was determined by responses to the question phrased "In general,

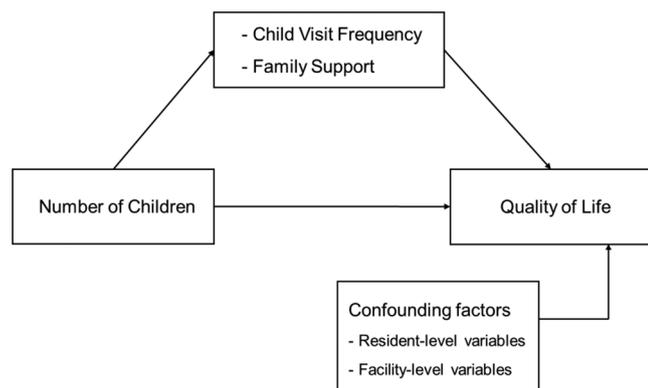


Fig. 1. Conceptual framework.

Resident-level variables included age, sex, marital status, education, cognitive impairment, functional comorbidity index, activities of daily living (ADLs), instrumental activities of daily living (IADLs), health status, length of stay, and room arrangement. Facility-level variables included ownership, nursing home size, occupancy percent, staff-resident ratio, staff turnover rate, and whether medical care provided or not.

would you say that your health is very good, good, or poor?” (Guo, Li, Liu, & Sun, 2015; Guo, Zhang et al., 2015; Jensen et al., 2007; Tigani, Artemiadis, Alexopoulos, Chrousos, & Darviri, 2012). Staff turnover rate was defined as the ratio between the number of staff who left during the past year and the average number of staff (Russell et al., 2017). The average number of staff was calculated by adding the number of staff at the beginning of the year to the number at the end and dividing by two (Adkins, 2019).

2.3. Statistical analysis

Descriptive statistics were used to describe the characteristics of NH residents. To test the mediating effect of child visit frequency and family support on the relationship between number of children and QOL, the mixed-effects multivariate linear or ordered logistic regression models were used, as appropriate, to determine whether the four criteria Baron and Kenny (1986) proposed were met: (1) number of children was significantly associated with QOL; (2) number of children was significantly associated with child visit frequency and family support respectively; (3) child visit frequency and family support were significantly associated with QOL respectively; and (4) the relationship between number of children and QOL was attenuated or no longer significant with the inclusion of child visit frequency and family support collectively. For the ordered logistic regression model, a test of the proportional odds assumption was performed; this test demonstrated the assumption held for the three-category variable: child visit frequency. All statistical models were adjusted for resident- and facility-level variables. Only seven residents had a different race/ethnicity; thus, race/ethnicity was not controlled in the models. We also checked the multicollinearity by calculating variance inflation factor (VIF). The results showed that the VIFs of all variables ranged from 1.12 to 2.47, which indicated that multicollinearity was not a concern in the analyses. All data were analyzed using Stata version 14.1 (Stata Corp, College Station, TX). In sensitivity analysis, the mediation effect in a structural equation model was tested using Mplus version 7.4 (Muthén & Muthén, Los Angeles, CA); it yielded similar results. Statistical significance was accepted at the $p < 0.05$ level.

3. Results

A total of 432 residents from 33 NHs were eligible for our study and 376 residents completed the survey (response rate 87.0%). Five were excluded because of missing data. Table 1 presents the characteristics of the 371 residents and the 33 NHs. The mean age was about 78 years; 59% were women; and 48% had 3+ children. About 5% of the residents had child visits every day, 78% had at least once a month, and 17% had less than once a month. The self-reported QOL was relatively low, with a mean score less than 65 on a scale from 0 to 90. Meaningful activity and food enjoyment domains had a lower score, and autonomy had the highest score.

The mediating effect of child visit frequency and family support on the relationship between number of children and QOL from the mixed-effects multivariate linear or ordered logistic regression models are presented in Table 2 and Fig. 2. Relative to those with ≤ 2 children, NH residents with 3+ children received more frequent child visits ($\beta = 1.001$, $p = 0.003$) and more family support ($\beta = 1.266$, $p = 0.021$). As expected, residents whose children visited them in NHs every day ($\beta = 4.845$, $p = 0.026$) or at least once a month ($\beta = 2.973$, $p = 0.014$) reported greater QOL than those whose children visited less than once a month. Residents who received more family support also reported greater QOL ($\beta = 0.512$, $p < 0.001$). Moreover, residents with 3+ children had better QOL ($\beta = 2.513$, $p = 0.012$) compared with those with ≤ 2 children. However, the relationship was attenuated and no longer significant ($\beta = 1.420$, $p = 0.134$) with the inclusion of child visit frequency and family support in the model. In other words, child visit frequency and family support mediated the relationship

Table 1
Characteristics of the Participants.

Variables	Mean \pm SD or n (%)	Variables	Mean \pm SD or n (%)
Resident-level Variables (n = 371)			
Age (years)	77.5 \pm 8.7	Health status	
< 75	120 (32.4)	Very Good	104 (28.0)
75-84	166 (44.7)	Good	165 (44.5)
85+	85 (22.9)	Poor	102 (27.5)
Sex		Length of stay (months)	30.0 \pm 33.8
Male	151 (40.7)	Room arrangement	
Female	220 (59.3)	Lived with spouse	18 (4.9)
Race/ethnicity		Lived alone	104 (28.0)
Han	364 (98.1)	Lived with others	249 (67.1)
Other	7 (1.9)	Number of Children	
Marital status		≤ 2	192 (51.8)
Married and lived together	30 (8.1)	3+	179 (48.2)
Married and separated	44 (11.9)	Child visit frequency	
Not-for-profit	30 (90.9)	Medical care	
Size (total beds)	105.5 \pm 57.7	Provided	26 (78.8)
Occupancy percent	0.6 \pm 0.3	None	7 (21.2)

Note: SD = standard deviation; ADLs = activities of daily living; IADLs = instrumental activities of daily living.

between number of children and QOL among NH residents.

In addition, NH residents who were female, had fewer comorbidities, were more independent on ADLs, or had better health status, reported better QOL (Table 2). Residents who lived with a spouse in the same room or alone in a single room had greater QOL than those who shared room with others. Residents who lived in NHs with a higher staff turnover rate reported worse QOL. Residents in NHs providing medical care had better QOL than those in NHs that provided only basic care activities. Online appendix Table A1 provides the unadjusted results of each variable with QOL.

4. Discussion

Using a large sample of NH residents in China, this study examined the relationship between number of children and self-reported QOL, focusing on the role of child visit frequency and family support. Previous research on QOL among NH residents was expanded in this study. First, a reliable, valid, and comprehensive questionnaire pertinent to NH life in China was used to assess residents' QOL. Second, there might be a nonlinear association between number of children and indicators of older parents' receipt of support provided by children (Grundy & Read, 2012). To address this issue and consider the current family planning policy change, number of children (3+ vs. ≤ 2) was used as a categorical variable. Third, this study adds to the small body of literature, by probing the mediation effect of child visit frequency and family support on the relationship between number of children and residents' QOL. The results showed that residents with 3+ children were more likely to have a better QOL than those with ≤ 2 . Moreover, residents with 3+ children received more frequent child visits and family support, which could be reasons for these residents to report better QOL.

In traditional Chinese filial piety culture, the concepts that “more children, more happiness” and “raising children to have someone to take care of you in old age” are generally accepted (Shi, 2016), and were supported by the results in this study. These results are congruent with previous studies, which have indicated that having more children had a positive impact on improving older parents' QOL, well-being, or life satisfaction (Kim et al., 2015; Liu et al., 2012; Onyishi et al., 2012). Our study extends research that not only the quantity of children mattered but also the quality of parent-child relationships. Having 3+ children increased the likelihood of child visit frequency and family

Table 2
The Mediating Effect of Child Visits and Family Support on the Relationship Between the Number of Children and Quality of Life.

	Model Without Mediators			Model With Mediators		
	Coefficient	SE	P	Coefficient	SE	P
Children (3+ vs. ≤2)	2.513	0.998	0.012	1.420	0.949	0.134
Child visits (ref. < once a month)						
≥ once a month	–	–	–	2.973	1.213	0.014
Everyday	–	–	–	4.845	2.179	0.026
Family support	–	–	–	0.512	0.094	< 0.001
Age (ref. < 75)						
75–84	–1.356	1.151	0.239	–1.419	1.081	0.189
85+	–2.099	1.398	0.133	–1.916	1.311	0.144
Sex (female vs. male)	4.636	0.993	< 0.001	2.865	0.971	0.003
Marital status (ref. married and lived together)						
Married and separated	–3.543	2.040	0.082	–2.709	1.912	0.156
Single/divorced/widowed	–3.365	1.657	0.042	–1.124	1.585	0.478
Educational level (ref. illiterate)						
Staff-resident ratio	0.798	3.776	0.833	1.275	3.539	0.719
Staff turnover rate	–7.873	3.416	0.021	–7.437	3.212	0.021
Medical care (provided vs. none)	4.402	1.317	0.001	3.888	1.235	0.002

Note: SE = standard error; FCI = functional comorbidity index; ADLs = activities of daily living; IADLs = instrumental activities of daily living.

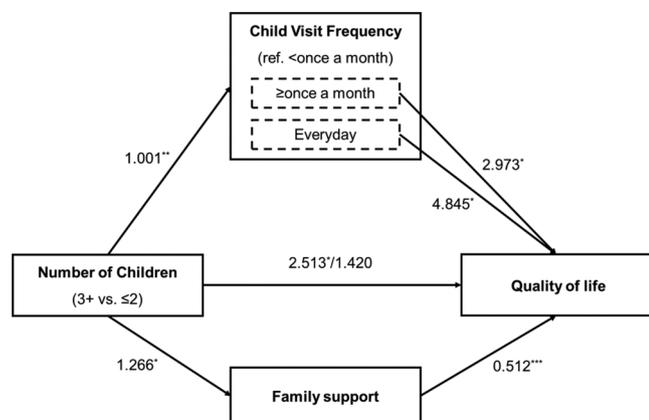


Fig. 2. Result of the mediator model.

The numbers are coefficients. 2.513 = the coefficient before introducing child visit frequency and family support into the model; 1.420 = the coefficient after introducing child visit frequency and family support into the model. All regression models were adjusted for the following variables: age, sex, marital status, education, cognitive impairment, functional comorbidity index, activities of daily living (ADLs), instrumental activities of daily living (IADLs), health status, length of stay, room arrangement, ownership, nursing home size, occupancy percent, staff-resident ratio, staff turnover rate, and whether medical care provided or not. * P < .05, ** P < .01, *** P < .001.

support, and thus greatly enhanced their parents' QOL in NHs. This may reflect the fact that the current family planning policy of having two children is necessary but maybe insufficient in the context of improving nursing home residents' QOL. The one-child policy led to a smaller family size and changes in family structure and relations, such as the rapid growing number of "empty nesters" referring to older parents living alone without their children (Fang et al., 2015; Zeng & Hesketh, 2016). The decline in family size limits the support and care that family provides for older adults, and puts more pressure on children who do not have siblings to help them (Gui & Koropeckyj-Cox, 2016; Guo, Zhang et al., 2015; Liu & Bern-Klug, 2016). At present, China lacks social welfare capabilities; only a small proportion of government resources are directed toward older adult care (Hao et al., 2012; Zeng & Hesketh, 2016). This study's findings underscore the importance of family support for older adults even in the NH environment, and have important implications for China to reevaluate and relax its family planning policy to meet the needs of older adults.

In this study, NH residents reported a relatively low QOL, especially

in the meaningful activity and food enjoyment domains. A study conducted among 1316 residents from 40 NHs in five American states demonstrated that meaningful activity had the lowest score among the 10 QOL domains (Kane et al., 2003). These results are congruent with previous studies that have found residents spent a small proportion of their time on meaningful activities and stayed in their rooms, sitting or alone for the most of their time (Cheng, Rosenberg, Wang, Yang, & Li, 2011; Palacios-Cena et al., 2016). To change the inactive, immobile, bored, and alone life, NHs must develop diverse and meaningful activity programs based on residents' real needs and preferences. The results in this study suggest that residents did not have pleasurable experiences with their food, which could be influenced by, among others, food quality and choice, or loss of taste and smell (Cheng et al., 2011; Crogan, Evans, & Velasquez, 2004). Interventions focusing on adequate food intake and food enjoyment are warranted to improve QOL, maintain weight, and prevent malnutrition among NH residents.

This study found several NH characteristics that were significantly associated with residents' QOL. Residents who lived in a private room with or without a spouse had a significantly better QOL than those who shared a room with others; this finding is consistent with a study indicating that residents had higher QOL in NHs with ≥70% of private rooms than those with < 70% of private rooms (Kane et al., 2004). It is also congruent with previous findings that NHs providing medical care had better QOL than those that provided only basic care activities (Collet, de Vugt, Verhey, Engelen, & Schols, 2018). NHs without medical care services had limited capabilities to respond to residents' health-related needs for assistance. A significant association between high staff turnover rate and worse QOL was also found. Similarly, Bishop et al. (2008) indicated that an increased proportion of nursing assistant on a unit who intended to stay was associated with greater QOL. Similar to previous findings (Serrano, Garrido, Fuentes, Simon, & Diaz, 2017), female residents reported better QOL than their male counterparts. Associations with functional ability and health status were as expected from the literature (Klapwijk, Caljouw, Pieper, van der Steen, & Achterberg, 2016), and showed that residents with higher levels of functional comorbidity index and ADLs dependence, and poorer health status were more likely to report worse QOL. These results may reflect the negative effects of poor health on QOL.

This study has several limitations. First, the NHs were located in urban areas; thus, no rural NH was included. The traditional concept of "more children, more happiness" is more prevalent in rural China; the strict one-child policy is relaxed to rural couples who are eligible for a second child if their first-born is a girl. As a result, this study's findings may not be generalized to rural NHs. Second, a self-reported QOL

questionnaire was used; residents with severe cognitive impairment were not recruited. Therefore, the generalizability of the results is limited. Third, information on the sex of children and children's socioeconomic levels was not collected. These potentially confounding variables may have led to a certain bias in the results.

Compared with NH residents with ≤ 2 children, those with 3+ received frequent child visits and more family support, and thus had better QOL. The findings emphasize the important role of children for QOL of older adults in a traditionally family-care oriented society. As China's population continues to age, having two children is necessary

but may be insufficient in the context of improving NH residents' QOL.

Declaration of conflicting interests

We have no conflict of interest to declare.

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Appendix A

Table A1
Unadjusted Results of Each Variable with Quality of Life.

Outcome: quality of life	Coefficient	SE	P
Children (3+ vs. ≤ 2)	2.903	1.015	0.004
Child visits (ref. < once a month)			
\geq once a month	5.850	1.326	< 0.001
Everyday	11.564	2.444	< 0.001
Family support	0.625	0.098	< 0.001
Age (ref. < 75)			
75-84	1.186	1.179	0.315
85+	2.464	1.395	0.077
Sex (female vs. male)	3.967	1.023	< 0.001
Marital status (ref. married and lived together)			
Married and separated	-7.369	2.307	0.001
Single/divorced/widowed	-4.642	1.870	0.013
Educational level (ref. illiterate)			
Elementary school	-0.500	1.340	0.709
Middle school	-2.965	1.633	0.069
High school or more	-3.177	1.425	0.026
Cognitive impairment (moderate vs. mild/no)	0.718	1.030	0.486
FCI	-1.746	0.306	< 0.001
ADLs	0.111	0.020	< 0.001
IADLs	4.890	2.205	0.027
Health status (ref. very good)			
Good	-4.681	1.140	< 0.001
Poor	-10.238	1.266	< 0.001
Length of stay	-0.006	0.015	0.690
Room arrangement (lived with spouse/lived alone vs. lived with others)	3.339	1.092	0.002
Ownership (government vs. not-for-profit)	-1.227	1.970	0.533
Size (total beds)	0.007	0.010	0.469
Occupancy percent	-0.187	2.430	0.939
Staff-resident ratio	2.064	3.939	0.600
Staff turnover rate	-3.115	3.963	0.432
Medical care (provided vs. none)	2.964	1.390	0.033

Note: SE = standard error; FCI = functional comorbidity index; ADLs = activities of daily living; IADLs = instrumental activities of daily living.

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