Preplanned Studies

Limited Social Support, but Comparable Health Literacy and Service Utilization, Among Elderly People Living Alone — Six PLADs, China, May–September 2020

Hao Lin[1,2]; Meijun Chen[3]; Yuhui Shi[1,2]; Ying Ji[1,2]; Yuting Lin[1,2]; Wangnan Cao[1,#]; Chun Chang[2,#]

Summary

What is already known about this topic?

The proportion of elderly living alone in China is approximately 10%. Living away from family poses enormous challenges for older adults.

What is added by this report?

Compared to those living with family, elderly individuals living alone exhibit a lower registration rate with general practitioners and have less social support.

What are the implications for public health practice?

While the current health service system for elderly people living alone is working relatively well, there is a need for additional programs to enhance social support and improve their social well-being.

As the world experiences an aging population, elderly individuals living alone have become a particularly vulnerable subgroup. Living alone is associated with feelings of loneliness and insecurity, as well as difficulties in daily living. It has been shown to be a risk factor for a range of adverse health outcomes, including physical and mental health (1). In this study, a nationally representative sample of 2,959 elderly people in China was selected using a stratified multi-stage random sampling method from May to September 2020. Each participant completed a cross-sectional questionnaire with the support of a local research assistant. The questionnaire consisted of validated scales measuring health literacy, service utilization, and social support. Descriptive statistics and chi-square tests were performed, adjusting for potential confounding factors. This study found that elderly individuals living alone in China have a lower registration rate with a general practitioner (GP), limited social support, but comparable health literacy and service utilization compared to elderly individuals living with family. Targeted and effective community care interventions should be developed to improve the

quality of life of elderly individuals living alone.

The 2015 China Family Development Report found that around 10% of the elderly population in China lived alone, and these individuals often experienced loneliness, which limited their access to social support (2). However, current research on this topic has some limitations. First, existing data mostly focus on specific provincial-level administrative divisions (PLADs) or cities and lack national-level representation. Second, previous research has primarily examined the health and mental well-being of elderly people living alone. These assessments often focus on individual levels, while overlooking important factors such as health literacy, social support, and service utilization, especially community health education and public health services. These factors can be comprehensively evaluated from 3 aspects: individual capabilities, interpersonal skills, and service utilization, which can be modified through intervention programs. The aim of this study was to compare the differences in health status, service utilization, and social support between elderly people living alone and those living with family in China to inform medical resource allocation and policy decision-making.

A stratified, multistage, cluster sampling method was used to randomly select six PLADs in China from May to September 2020. First, two PLADs were randomly selected from the eastern, western, and central regions of Chinese mainland. Second, the provincial capital and another randomly selected cities/districts (below the median GDP) were selected from each PLAD. Overall, a total of 3,009 participants were selected from Zhejiang, Jiangxi, Chongqing, Gansu, Liaoning, and Beijing. The sampled cities were further stratified by urban and rural areas, and participants were randomly selected from household registration lists. According to the guidelines of the National Human Rights Action Plan (2016–2020), more than 90% of adults aged ≥60 years are registered at their local community health centers. The inclusion criteria were

as follows: 1) aged ≥60 years; and 2) agreement to participate. Participants with dementia or mental disorders were excluded. Participants were recruited from community health centers with support from GPs. The methodology of this study has been described previously (3). This study was approved by the ethics committee of Peking University Health Science Center (ethical approval number: IRB00001052-19143). Informed consent was obtained from all participants.

The questionnaire was developed by a multidisciplinary research team and pilot tested before use. The measurements included socio-demographic information, health status (whether participants had chronic diseases, hospitalizations in the past year, and outpatient visit within two weeks), GP registration status, service utilization (regular physical examination, oral examination, regular blood pressure monitoring, and blood sugar measurement), health literacy, social support, and self-reported anxiety/depression status. Health literacy, with a full score of 26, was measured with reference to the Core Information on Elderly Health released by the National Health Commission of China (4). A health literacy questionnaire score of 80% or above was judged as high health literacy (5). The Social Support Rate Scale (SSRS) developed by Xiao (6) was used to measure social support. The SSRS has 10 items and a score range of 12–83. Descriptive statistics were calculated for all participant characteristics. Categorical variables are presented as frequency (n) and percentage (%). Differences between groups were examined using an independent-samples t-test. The comparison of categorical variables was examined using a chi-square test. Additional adjustments for potential confounders (gender, age, marital status, education level, and income) were made using covariate analysis or stratification analysis. The statistical significance level was P<0.05. All tests were two-tailed. Statistical analyses were conducted with SPSS (version 27, IBM Corp., Armonk, New York, United States).

In this cross-sectional study, a total of 3,009 participants over the age of 60 were approached for the survey, of which 50 (1.7%) were excluded due to incomplete or ambiguous answers. Among the 2,959 elderly people included in the analysis, 260 (8.8%) lived alone. Of the participants, 56.0% (1,657/2,959) were women, and 75.4% (2,230/2,959) were aged 65 and above. Nearly half of the participants (48.8%, 1,445/2,959) had attained primary school education or

below, and 51.2% (1,515/2,959) were registered urban residents. Of all participants, 46.4% (1,374/2,959) were of low- and middle-income [600–3,500 Chinese Yuan (CNY) per month] (Table 1). Overall, 10.4% (309/2,959) had high health literacy. Furthermore, 59.7% (1,766/2,959) reported having a diagnosis of at least one chronic disease, 13.5% (399/2,959) had a hospitalization experience in the past year, and 72.9% (159/218) had an outpatient experience in the past two weeks (Table 2). Females accounted for 65.0% (169/260) among elderly living alone, while 55.1% (1,488/2,699) of the elderly living with family were female; the difference was statistically significant (P=0.002). Of the elderly living alone, 58.0% (151/260) were in the senior age group (70 and above), while 40.3% (1,088/2,699) of those living with family were over 70 years old. Overall, the elderly living alone were more likely to be in higher age groups (P<0.001) (Table 1).

After adjusting for confounding factors, there was no significant difference in the outpatient rate between older adults living alone (76.9%, 20/26) and those living with family (72.4%, 139/192) in the past 2 weeks. Furthermore, the GP coverage rate for older adults living with family was 47.8% (1,289/2,699), which was higher than the rate of 42.7% (111/260) for those living alone (P=0.024). The total social support score for older adults living alone was 33.1±8.1, compared to 39.3±7.5 for those living with family. The mean subjective social support (20.5±4.9 vs. 23.6±4.8) and objective social support (5.7±3.1 vs. 8.7±2.7) scores of older adults living alone were lower than those of older adults living with family (P<0.001). There was no significant difference in the utilization of social support between the two groups (6.8±2.4 vs. 7.1±2.3). The health literacy score of older adults living alone (12.1±5.6) was significantly lower than that of older adults living with family (13.1±5.6) (P<0.001). Only 6.2% (16/260) of older adults living alone had high health literacy, compared to 10.9% (293/2,699) of those living with family. However, the difference was non-significant in the adjusted analysis. In total, 85.8% (223/260) of older adults living alone and 89.3% (2,409/2,699) of older adults living with family reported no anxiety or depression. The differences were not statistically significant (Table 2).

DISCUSSION

This study found that elderly people living alone tended to be female, older, have lower education and

TABLE 1. Comparison of demographic characteristics of elderly living alone and living with family in six PLADs of China, May–September 2020.

Items, n (%)*	Total (n=2,959)	Elderly living alone (n=260)	Elderly living with family (n=2,699)	P[†]
Gender				
Male	1,302 (44.0)	91 (35.0)	1,211 (44.9)	0.002
Female	1,657 (56.0)	169 (65.0)	1,488 (55.1)	
Age, years				
60–64	729 (24.6)	47 (18.1)	682 (25.3)	
65–69	991 (33.5)	62 (23.8)	929 (34.4)	<0.001
70–79	1,001 (33.8)	108 (41.5)	893 (33.1)	
≥80	238 (8.0)	43 (16.5)	195 (7.2)	
Marital status				
Married	2,414 (81.6)	50 (19.2)	2,364 (87.6)	<0.001
Widowed/divorced/unmarried	545 (18.4)	210 (80.8)	335 (12.4)	
Highest education obtained				
Primary school or below	1,445 (48.8)	164 (63.1)	1,281 (47.5)	
Middle school	876 (29.6)	70 (26.9)	806 (29.9)	<0.001
High school or above	638 (21.6)	26 (10.0)	612 (22.7)	
Type of registered permanent residence				
Urban	1,515 (51.2)	129 (49.6)	1,386 (51.4)	0.604
Rural	1,444 (48.8)	131 (50.4)	1,313 (48.6)	
Scale of incomes[§]				
Low-income	798 (27.0)	100 (38.5)	698 (25.9)	
Low- and middle-income	1,374 (46.4)	106 (40.8)	1,268 (47.0)	<0.001
Middle- and high-income	650 (22.0)	51 (19.6)	599 (22.2)	
High-income	137 (4.6)	3 (1.2)	134 (5.0)	
Source of personal income (multichoice)				
Endowment insurance system/savings	1,372 (46.4)	114 (43.8)	1,258 (46.6)	0.398
Retirement pension	959 (32.4)	77 (29.6)	882 (32.7)	0.332
Household income/family support	950 (32.1)	80 (30.8)	870 (32.2)	0.677
Government aid	87 (2.9)	20 (7.7)	67 (2.5)	<0.001

Abbreviation: PLADs=provincial-level administrative divisions; SD=standard deviation; CNY=Chinese Yuan.
* Data are n (%) or mean±SD.
[†] Chi test was performed and the corresponding P value was listed.
[§] Urban elderly income standards (personal monthly income): Low-income < 600 CNY; Low- and middle-income 600–3,500 CNY; Middle- and high-income 3,500–6,500 CNY; High-income ≥ 6,500 CNY. Rural elderly income standards (annual household income): Low-income <17,000 CNY; Low- and middle-income 17,000–65,000 CNY; Middle- and high-income 65,000–100,000 CNY; High-income ≥100,000 CNY.

income levels, lower GP registration rates, and lower social support compared with elderly people living with family. However, the level of service utilization and health status of elderly people living alone was similar to that of elderly people living with family. Elderly people living alone need extra attention in terms of health literacy and social support.

Social support for older adults is complicated by the different needs of those living alone versus those living with family, placing significant pressure on individuals

living alone. Dong et al. (7) demonstrated that older adults living alone reported higher levels of loneliness. Lower social support is associated with a 29% increased risk of heart disease and a 32% higher risk of stroke. Social support can significantly reduce feelings of loneliness in older adults. Moreover, better social support can promote disease recovery and treatment, improve quality of life, and enhance mental well-being (8). These findings suggest that policymakers should prioritize initiatives that foster social support for older

TABLE 2. Comparison of characteristics related to health status and social support of elderly living alone and living with family in six PLADs of China, May-September 2020.

Items, n (%)*	Total (n=2,959)	Elderly living alone (n=260)	Elderly living with family (n=2,699)	P†
High health literacy§				
No	2,650 (89.6)	244 (93.8)	2,406 (89.1)	0.217
Yes	309 (10.4)	16 (6.2)	293 (10.9)	
Any diagnosis of chronic disease				
No	1,193 (40.3)	106 (40.8)	1,087 (40.3)	0.974
Yes	1,766 (59.7)	154 (59.2)	1,612 (59.7)	
Hospitalization experience in the past year				
No	2,560 (86.5)	223 (85.8)	2,337 (86.6)	0.602
Yes	399 (13.5)	37 (14.2)	362 (13.4)	
Outpatient experience in the last two weeks¶				
No	59 (27.1)	6 (23.1)	53 (27.6)	0.443
Yes	159 (72.9)	20 (76.9)	139 (72.4)	
Regular blood pressure measurement				
No	1,039 (35.1)	89 (34.2)	950 (35.2)	0.386
Yes	1,920 (64.9)	171 (65.8)	1,749 (64.8)	
Regular blood sugar measurement				
No	1,645 (55.6)	144 (55.4)	1,501 (55.6)	0.956
Yes	1,314 (44.4)	116 (44.6)	1,198 (44.4)	
Regular physical examination				
No	563 (19.0)	56 (21.5)	507 (18.8)	0.141
Yes	2,396 (81.0)	204 (78.5)	2,192 (81.2)	
Oral examination within six months				
No	659 (22.3)	47 (18.1)	612 (22.7)	0.720
Yes	2,300 (77.7)	213 (81.9)	2,087 (77.3)	
Contracted with a general practitioner				
No	1,559 (52.7)	149 (57.3)	1,410 (52.2)	0.024
Yes	1,400 (47.3)	111 (42.7)	1,289 (47.8)	
Self-reported anxiety/depression status				
No anxiety/depression	2,632 (88.9)	223 (85.8)	2,409 (89.3)	
Mild anxiety/depression	313 (10.6)	35 (13.5)	278 (10.3)	0.753
Moderate anxiety/depression	14 (0.5)	2 (0.8)	12 (0.4)	
Social support** (mean±SD)				
Total score	38.76±7.74	33.07±8.09	39.31±7.48	<0.001
Subjective support score	23.32±4.89	20.51±4.92	23.59±4.80	<0.001
Objective support score	8.39±2.88	5.74±3.06	8.65±2.73	<0.001
Utilization of support	7.05±2.30	6.82±2.39	7.07±2.28	0.609

Abbreviation: PLADs=provincial-level administrative divisions; SD=standard deviation.
* Data are n (%) or mean±SD.
† Adjusted for gender, age, marital status, education level and scale of incomes.
§ The full score of health literacy is 26. A score of 80% or more (≥21) on the health literacy questionnaire is considered high health literacy.
¶ Outpatient rate of elderly who have fallen ill in the past two weeks. A total of 218 people falling ill in the past two weeks, including 26 elderly living alone.
** The social support revalued scale (SSRS) contains 10 items in total. Subjective support score: the sum of 1, 3, 4 and 5; Objective support score: the sum of 2, 6 and 7; The utilization of support: the sum of 8, 9 and 10.

adults. Ensuring GP registration for older adults living alone is crucial, as this population is vulnerable due to their distance from family and potential lack of healthcare access. Community-based GP health services are particularly important for older adults living alone to ensure appropriate health management (9). Juan Zheng et al. found that 29.3% of older adults in China intended to register for GP services, with influencing factors including self-reported health status, medical treatment history, chronic disease status, and understanding of the GP registration system (10). Promoting accessible and comprehensive healthcare services for older adults living alone is essential to address their unique needs and foster a sense of community and well-being. The present study found similar levels of chronic disease management and physical examination participation between older adults living alone and those living with family. This might be explained by the Essential Public Health Services program in China, which offers highly accessible and affordable care to all older adults.

This study is subject to several limitations. First, data were collected from May to September 2020. Although China's COVID-19 lockdown had been lifted and the government had implemented routine epidemic prevention and control measures, some older adults still chose to stay home or did not actively participate in this study. Additionally, only those willing to participate were included, potentially introducing selection bias. Therefore, the findings may not represent the entire target population, reflecting only the views and characteristics of individuals who actively volunteered. Second, because this study used cross-sectional data from a single year, the results can only demonstrate differences in the distribution of social characteristics, health literacy, and social support among older adults living alone, without verifying causality. Despite these limitations, this study included representative provinces and cities, enabling the generalizability of the conclusions. Additionally, this survey was based on officially published standards and guidelines in China, using a reliable scale suitable for measuring health literacy and service utilization among older adults from the perspective of national basic public health services.

This study examined elderly individuals aged 60 years and above living alone in China. The comprehensive measurements provide a potential reference for Chinese health service policymakers to promote comprehensive healthcare for this population. Targeted public health actions for elderly individuals living alone should prioritize health literacy and social support. Strengthening health literacy programs, establishing social support networks, and improving healthcare accessibility will enhance the health status and quality of life for this demographic.

Corresponding authors: Wangnan Cao, wangnancao@bjmu.edu.cn; Chun Chang, changchun@bjmu.edu.cn.

1 Department of Social Medicine and Health Education, School of Public Health, Peking University Health Science Center, Beijing, China; 2 Center for Healthy Aging, Peking University Health Science Center, Beijing, China; 3 School of Public Health, The University of Hong Kong, Hong Kong Special Administrative Region, China.

REFERENCES

1. Lech S, Mümken S, Kessler EM, Gellert P. Life-space mobility among home-living older adults with care needs and clinical depression-A cross-sectional analysis. Int J Geriatr Psychiatry 2023;38(1):e5875. https://doi.org/10.1002/gps.5875.
2. Wang Z, Wang H, Cai F. China Family Development Report (2015). China Population and Development Studies 2017;1(1):98 – 115 https://doi.org/10.1007/BF03500920.
3. Chen MJ, Wang XQ, Yun QP, Lin YT, Wu QQ, Yang QH, et al. Would older adults perform preventive practices in the post-COVID-19 era? A community-based cross-sectional survey in China. Int J Environ Res Public Health 2021;18(19):10169. https://doi.org/10.3390/ijerph181910169.
4. National Health Commission of the People's Republic of China. National Health Commission Releases "Core information on elderly health". 2014. http://www.nhc.gov.cn/rkjcyjtfzs/pgzdt/201410/0e88f6ba111942a182b995e5477d9979.shtml. [2024-3-16]. (In Chinese).
5. Nie XQ, Li YH, Li L. Statistic analysis of 2012 Chinese residents health literacy monitoring. Chin J Health Educ 2014;30(2):178 – 81. https://doi.org/10.16168/j.cnki.issn.1002-9982.2014.02.021.
6. Lin Y, Wang H, Tian Y, Gong L, Chang C. Factors influencing cognitive function among the older adults in Beijing. Journal of Peking University (Health Sciences) 2024;56(3):456 – 461 https://doi.org/10.19723/j.issn.1671-167X.2024.03.012.
7. Jiang N, Wu B, Lu N, Dong T. Neighborhood-based social capital and cognitive function among older adults in five low- and middle-income countries: Evidence from the World Health Organization study on global ageing and adult health. Int J Geriatr Psychiatry 2020;35(4):365 – 75. https://doi.org/10.1002/gps.5239.
8. Shah SJ, Fang MC, Wannier SR, Steinman MA, Covinsky KE. Association of social support with functional outcomes in older adults

who live alone. JAMA Intern Med 2022;182(1):26 – 32. https://doi.org/10.1001/jamainternmed.2021.6588.

9. Lloyd T, Crellin E, Brine RJ, Shen JY, Wolters AT. Association between household context and emergency hospital use in older people: a retrospective cohort study on indicators for people living alone or living with somebody with frailty, developed from routine healthcare data in England. BMJ Open 2022;12(5):e059371. https://doi.org/10.1136/bmjopen-2021-059371.

10. Zheng J, Xu JQ, Xu LZ, Wang H. Study on middle-aged and elderly people' willingness for family doctor contracting and its influencing factors. Chin J Hosp Adm 2021;37(7):560 – 4. https://doi.org/10.3760/cma.j.cn111325-20210107-00016.