

Association of empty nest with depressive symptom among Chinese elderly population

The China Longitudinal Aging Social Survey

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Abstract

Currently, empty nest has become one type of the family pattern among the old population and it influences the old population's mental health. The current study aimed to explore the association between the empty nest and depressive symptoms (DSs) among the elderly population in China. Data were obtained from baseline of the China Longitudinal Aging Social Survey. Logistic regression was used to examine the association between the empty nest and DS among Chinese older adults. In the current study, 48% of the subjects were empty-nest elderly. The prevalence of DS was 43.7% among the empty-nest old population, which was higher than the nonempty nesters. A positive association was found between the empty nest and DS; the odds ratio (95% confidence interval) was 1.28 (1.16–1.42). No matter living with a spouse or living alone, empty nesters were more likely to have DS than nonempty nesters. Empty nest is a risk factor for having DS among the old population in China, especially among those who live without a spouse. Our result is valuable for the development of special family support DS prevention programs for those who were empty nest.

Abbreviations: CLASS = China Longitudinal Aging Social Survey, CES-D = Center for Epidemiological Studies Depression Scale, OR = odds ratio.

Keywords: China, depressive symptoms, empty nest, older adults

1. Introduction

The characteristics of depressive symptoms (DSs) are symptoms of sadness, depressed mood, and loss of interest, especially for the old population.^[1–3] People with DS are more likely to have a low quality of life, chronic diseases, and engage in suicide.^[2,4–6] DS brings a heavy burden on families, communities, and health care services across the world.^[7,8] The prevalence rate of DS varied widely from 1% to 16% in developed countries.^[9–11] Recently, the prevalence rate of DS has been increasing rapidly among elderly people in China.^[12–14]

Empty nest has become one of the main family patterns in China. Nearly half of the entire older population was empty-nest older adults in 2010.^[15] The estimated percentage

of empty nest among the old population can research by 90%.^[16] Chinese older people usually have a strong connection with their adult children through emotional dependence. Old adults will become frustrated, lonely, depressed, and anxious when their children live without their parents.^[17–19] However, older adults may adapt to changes in their family patterns from living with their children to living without their children.^[20]

Few epidemiologic studies provide evidence on the empty nest with DS risk among the Chinese older population. Therefore, we investigated the association between the empty nest and DS risk using data from the Chinese Longitudinal Aging Social Survey (CLASS) in China.

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Informed consent was obtained in the study from the research participants.

The authors have no conflicts of interest to disclose.

The datasets generated and/or analyzed during the current study are available in the China Longitudinal Aging Social Survey (CLASS) repository, <http://class.ruc.edu.cn/index.php?r=index/index&hl=en>.

All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The survey was also conducted within Articles 38, 39, and 40 of the Constitution of the People's Republic of China and the legal framework governed by Chapter I, Article 9 from the Statistics Law of the People's Republic of China. Therefore, the study was not reviewed by an ethics committee. Verbal informed consent was obtained from all individual participants included in the study. The design of this survey was adhered to Articles 38, 39, and 40 of the Constitution of the People's Republic of China and the legal framework governed by Chapter I, Article 9 from the Statistics Law of the People's Republic of China. Verbal informed consent was considered acceptable and this was not reviewed by an ethics committee. Moreover, the interviewer also had documented more detailed information

on the process of obtaining informed consent, which included whether participants agreed to attend this study, the time of agreement, the reasons for not agreeing, etc. Details of informed consent were stored by the Institute of Gerontology and the National Survey Research Center at Renmin University of China.

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2. Methods

2.1. Study sample

Details of the CLASS design and conduct were described elsewhere.^[21] In the present study, the sample comprised 7496 subjects aged ≥ 60 years who completed the survey on DS and other independent variables of interest, including demographic variables, health, health care services, socioeconomic variables, and social support. All of the participants were interviewed face-to-face by trained interviewers. During the interview, interviewers were asked to choose a neutral and quiet environment and avoid the presence of people or other distractions.

2.2. Measurement

DSs were assessed using the 9-item Center for Epidemiological Studies Depression Scale (CES-D), which includes 3 items assessing positive feelings, 2 items assessing negative emotions, 2 items assessing somatic symptoms, and 2 items assessing the sense of marginalization. The 9-item CES-D is reliable and valid for detecting nonpsychotic mental disorders among older Chinese adults.^[22] Each item either had a score of 0 (rarely or none of the time), 1 (some of the time), or 2 (most of the time), with the total score ranging from 0 to 18. By reversing the coding of the positive effect items, the result was that higher scores indicated a higher level of DSs. The total score of 18 was divided by 60 (the total possible score on the full 20-item CES-D), which equals 0.3.^[23] This result was then multiplied by 16, resulting in a standardized cut score of 4.8 for the 9-item form of the CES-D. In this study, the internal Cronbach alpha for the 9 items was 0.75.

Whether or not a participant had an “empty nest” was determined by responses to the following questions: how many people lived with you in your house in the past year? If the answer was not 0, the participants were then asked whether they were the spouse, a child, or “other.” Older adults who lived alone or with a spouse only were defined as empty-nest older adults; otherwise, they were defined as nonempty nest older adults. In the current study, living arrangements were categorized into nonempty nest, empty nest-living with spouse, and empty nest-living alone.

The following socioeconomic characteristics were included in our study: age (60–64, 65–69, 70–74, 75–79, ≥ 80), gender (male, female), residence (rural, urban), marital status (married, widowed/divorced/unmarried), education level (junior high school and above, primary school, never attended school), and ethnicity (Han, other). Income was categorized into 5 levels using the quintiles of household income (Yuan) (Q1: ≤ 3000 , Q2: >3000 and $\leq 10,000$, Q3: $>10,000$ and $\leq 24,000$, Q4: $>24,000$ and $\leq 36,000$, Q5: $>36,000$). We dichotomized physical disability status, which was assessed by using the 10-item version of the activities of daily living scale, into 2 groups (no functional problems = 0, has at least 1 limitation = 1).^[24] The participants were also asked whether they had any of the 23 chronic diseases (yes, no), including hypertension, diabetes mellitus, arthritis, cerebrovascular disease, liver disease, and so on. The number of comorbid chronic diseases was further categorized into 0, 1, and ≥ 2 .

2.3. Statistical analysis

All data were shown as numbers (percentage). The difference between with/without DSs was tested by the χ^2 test and Fisher χ^2 test with proportions. Logistic regression was used to evaluate the association between having an empty nest and DSs. Odds ratios (ORs), 95% confidence intervals (95% CIs), and corresponding *P* values for risk of having DSs were calculated. Covariates in logistic regressions were age groups, gender, residence, marital status, education level, ethnicity, wealth quantile, physical disability, and number of comorbid chronic diseases.

3. Results

Selected characteristics of subjects with/without DSs stratified by empty-nest status are presented in Table 1. Around 48% of the current subjects were empty nesters. The prevalence of DS among the empty nest Chinese old population was higher than those who were nonempty nest Chinese old population (*P* = .049). As compared with the without DS, the old population with DS were significantly different among men, not among empty nest or nonempty nest. Intake of n-3 PUFA was slightly lower in the cases than in the controls in men, and intake of retinol was lower in the cases than in the controls in women. In the current study, male subjects, urban residents, people living with others, and Han nationality accounted for the majority of the old Chinese population.

The associations of the empty nest with DS risk are presented in Table 2. Empty nest was a risk factor for DS among the old Chinese population after adjustment for the confounding factors (*P* < .001). Age and gender (interaction *P* = .98) did not modify the association with DS. We further analyzed the association between the different living arrangements of the empty nest and DS risks (Table 3). After controlling for confounding factors, empty nest-living with a spouse (OR: 1.14, 95% CI: 1.02–1.29) and empty nest-living alone (OR: 1.65, 95% CI: 1.39–1.95) were associated with having DSs.

4. Discussion

Overall, the percentage of empty nesters was 48% in the current study. The prevalence of DSs was 43.7% among the empty-nest old population, which was higher than the prevalence of DS among nonempty-nest old population. The result shows that living arrangement is a determinant of having DS among the older Chinese population.

Due to the inconsistent criteria of the measuring tools used and differences in sample sizes, previous studies suggested that the prevalence rate of DS among older adults varied from 6.4% to 60.3%.^[25,26] A meta-analysis estimated the prevalence of DS to be 23.6% in the older adult Chinese population and it has been increasing significantly.^[13] The prevalence found in our study was higher than in an observational study among the empty-nest old population in China.^[19] Currently, more and more adult children choose to leave their parents' homes; thus empty-nest family is becoming the main family pattern in China, which is weakening family ties and influencing the traditional family patterns. In the current study, we found a significantly positive association between the empty nest and DS, which hinted that the empty nest might trigger DSs among elderly.

Family members play an important role in maintaining mental health among the old population by providing emotional support.^[27] Elderly who live with their children can receive more instrumental help, thus in turn, better health.^[28] Empty nest elderly experienced deteriorated health problems and economic difficulties,^[29] poor health-related quality of life,^[30,31] and subjective well-being.^[32] A case indicated that empty-nest elderly faced social exclusion risk, weakened social relationships, limited participation in social activities, restricted basic services, and so on.^[33] Because Chinese people put a high value on the notion of raising children for the purpose of being looked after in old age, older people have a strong emotional dependence and high expectations from their adult children.^[34] After children left home, many elderly parents would feel lonely, while loneliness was found to be associated with depression in many studies.^[17,35]

Empty nesters were more likely to have DS in the current study, whether those living with a spouse or living alone. After children leave home, the traditional and primary support for the aged would be weakened. Compared with empty-nest elderly who lived with a spouse, the empty-nest elderly who lived without spouse had increased risk of DS by 45%. It

Table 1
Subjects' characteristics by their depression status according to the 9-item CES-D among elder population in China.

Characteristics	Empty nest		Nonempty nest		P value	P value
	Without depressive symptoms (n = 2021)	With depressive symptoms (n = 1568)	Without depressive symptoms (n = 2288)	With depressive symptoms (n = 1619)		
Age groups (yr), n (%)					.01	<.001
60–64	648 (58.3)	464 (41.7)	955 (61.3)	604 (38.7)		
65–69	458 (55.3)	371 (44.8)	530 (61.4)	333 (38.6)		
70–74	430 (60.1)	286 (39.9)	336 (56.3)	261 (43.7)		
75–79	278 (62.3)	254 (47.7)	252 (53.7)	217 (46.3)		
≥80	207 (51.8)	193 (48.3)	215 (51.3)	204 (48.7)		
Gender, n (%)					.01	<.001
Male	1159 (56.1)	835 (41.9)	1265 (61.5)	791 (38.5)		
Female	862 (54.0)	733 (46.0)	1023 (55.3)	828 (44.7)		
Residence, n (%)					<.001	<.001
Rural	526 (44.6)	653(55.4)	681 (50.7)	662 (49.3)		
Urban	1495 (62.0)	915 (38.0)	1607 (62.7)	957 (37.3)		
Marital status, n (%)					<.001	<.001
Married	1677 (60.3)	1103 (39.7)	1639 (63.7)	935 (36.3)		
Widowed/divorced/unmarried	344 (42.5)	465 (57.5)	649 (48.7)	684 (51.3)		
Education level, n (%)					<.001	<.001
Never attended school	279 (42.0)	385 (58.0)	372 (46.3)	431 (53.7)		
Primary school	579 (49.6)	589 (50.4)	830 (55.1)	677 (44.9)		
Junior high school and above	1163 (66.2)	594 (33.8)	1086 (68.0)	511 (32.0)		.18*
Ethnicity, n (%)					.77	
Han	1941 (56.4)	1499 (43.6)	2133 (58.9)	1491 (41.1)		
Others	80 (53.7)	69 (46.3)	155 (54.8)	128 (45.2)		
Physical disability, n (%)					<.001*	<.001*
No function problems	1931 (58.4)	1374 (41.6)	2176 (61.2)	1377 (38.8)		
One and more functioning limitations	90 (31.7)	194 (68.3)	112 (31.6)	242 (68.4)		
Wealth quantile, n (%)					<.001	<.001
Q1 (lowest)	241 (36.7)	415 (63.3)	450 (46.9)	510 (53.1)		
Q2	333 (47.2)	373 (52.8)	361 (51.2)	344(48.8)		
Q3	466 (59.4)	318 (40.6)	600 (60.8)	387 (39.2)		
Q4	508 (64.9)	275 (35.1)	494 (66.9)	245 (33.2)		
Q5 (highest)	473 (71.7)	187 (28.3)	383 (74.2)	133 (25.8)		
No. of comorbid chronic disease, n (%)					<.001	<.001
0	692 (72.5)	262(27.5)	771 (72.7)	289 (27.3)		
1	593 (57.8)	433 (42.2)	714 (59.6)	484 (40.4)		
≥2	736 (45.7)	873 (54.3)	803 (48.7)	846 (51.3)		

CES-D = Center for Epidemiological Studies Depression Scale.

*Fisher exact test.

Table 2**Association between empty nest and depressive symptom in all participants.**

Model	OR	95% CI	P value
Model A	1.10	1.00–1.20	.049
Model B	1.09	0.99–1.20	.065
Model C	1.28	1.16–1.41	<.001
Model D	1.28	1.16–1.42	<.001

Model A was the basic model and did not adjust any variable.

Model B was adjusted for age groups and gender.

Model C was adjusted for variables in model B plus residence, marital status, education level, ethnicity, and wealth quantile.

Model D was adjusted for variables in model C plus physical disability and number of comorbid chronic disease

CI = confidence interval, OR = odds ratio.

Table 3**Association of empty nest in different living arrangement with depressive symptom.**

Nonempty nest	Crude OR (95% CI)		Adjusted OR (95% CI)	P value
	Reference	P value		
Empty nest-living with spouse	0.90 (0.82–0.996)	.042	1.14 (1.02–1.29)	.026
Empty nest-living alone	1.91 (1.65–2.21)	<.001	1.65 (1.39–1.95)	<.001

Adjusted for age groups, gender, residence, marital status, education level, ethnicity, wealth quantile, physical disability, and number of comorbid chronic disease.

CI = confidence interval, OR = odds ratio.

suggested that to prevent the consequences of mental disorders and to improve the quality of life for the elderly, the screening and treatment of DS should be strengthened in empty-nest elderly.

Our study has many strengths, including large sample size, a population-based design, and adjustment for a wide range of socioeconomic characteristics. Another noticeable strength is that the measure of all physical illnesses took place prior to the CES-D measurement, minimizing the risk of reverse causation. However, our study also has several limitations, which should be a consideration for further research. The cross-sectional design of the baseline of the CLASS does not provide direct evidence of causality. We will be able to extend the current study to determine causality when longitudinal data are available. The CLASS does not provide sufficient information on lifestyle factors (i.e., weight, height, smoking, alcohol drinking, and so on), which were suggested as risk factors for depression. Moreover, in the current study, we do not consider the association between interpersonal relationships and mental health because CLASS does not have sufficient and credible factors on evaluating interpersonal relationships, which should be cautioned for further study.

5. Conclusions

In this large population-based study among older Chinese population, we found that 43.7% of the empty-nest elderly have DS. Family members should be encouraged to care more about their parents and keep in contact with the empty-nest elderly as much as possible to improve their mental health.^[36] In addition, developing healthy lifestyle is essential for easing depression. In this way, depression in empty nesters will be relieved and their mental health will improve. The findings of our study are valuable for the development of prevention programs, especially for those who were empty-nest older adults.

Author contributions

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