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Relationship between activities of daily living and depression among older adults and the quality of life of family caregivers†

Original article

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Abstract: **Objective:** The purposes of this study were to explore the associations of activities of daily living (ADL) and depression among older adults with family caregivers' quality of life and provide evidence for improving family caregivers' quality of life.
Methods: Older adults (n=395) and their family caregivers (n=395) were selected as participants. The ADL scale and Geriatric Depression Scale were used to assess ADL and depression among older adults, and the 36-Item Short Form Health Questionnaire (SF-36) was used to assess family caregivers' quality of life. Descriptive statistics and multiple linear regression were used to analyze the data.
Results: The older adults' ADL and depression scores were 21±7 and 11±6, respectively. Approximately 69.9% of older adults had declining or severely impaired ADL, and 47.1% had mild or moderate-to-severe depression. Family caregivers' mean quality of life score was 529±100. There was a negative correlation of older adults' ADL and depression with caregivers' quality of life. The correlation coefficient between ADL and the SF-36 mental component summary score was stronger than it was with the SF-36 physical component summary score.
Conclusions: The ADL and depression of older adults influenced family caregivers' quality of life. Psychological health deserves closer attention, especially that of caregivers of disabled older adults.

Keywords: *older adults • activities of daily living • depression • family caregiver • quality of life*

1. Introduction

In China, older adults who are disabled comprise approximately 19% of adults aged 60 years or older. By 2015, older adults with partial and complete disabilities will reach 40 million.[1] Given the accelerated growth of China's aging population, accompanied by the impact of traditional culture and the relative shortage of health-care resources for this population, the majority of older adults receive traditional care based on kinship and blood as their primary family care model, and more than 90% of them rely on family caregivers at home.[2] Family caregivers are family members who have provided care for at least 3 months and more than 1 hour per day to a family member, e.g., a spouse, child, or relative.[3] Most family caregivers have not received professional training and lack knowledge of nursing, and some must work and care for their children, which might cause them to experience various types of pressure and burden.[4] Therefore, to alleviate the social pressures brought about by aging and improve the quality of family care for older adults, we must pay attention to the health of family caregivers.

Depression, which is a common emotional problem for some and a mental disorder for others, has serious effects on the physical health and mental health of

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the older population. Its detection rate is 6%–54.67%,[5,6] resulting in a deterioration of the quality of life and suicide among the older population, as well as a large economic burden on their families and the society.[7] However, there are a few studies on the influence of older adults' activities of daily living (ADL) and depression on their family caregivers; the studies published have only measured outcome variables of a single dimension, such as depression or burden on family caregivers.[8,9] Quality of life reflects many factors, such as physiology, emotion, and society, which are appropriate indicators for the design and provision of service plans.[10] Therefore, by analyzing the relationship between the ADL and depression of older adults and the quality of life of their family caregivers, this study should provide a basis for improving caregivers' quality of life.

2. Materials and methods

2.1. Participants

A total of 840 older adults and their family caregivers were recruited from six communities in Bengbu, a medium-sized city in the Anhui Province of China. These adults met the following study criteria: age >60 years; normal cognitive ability, as indicated by a score of >27 on the Mini-Mental State Examination; ability to communicate; receiving care services consistent with the inclusion criteria for family caregivers; and provided informed consent. Family caregivers met the following inclusion criteria: age >18 years, have been providing care services to an older adult free of charge for not less than 5 hours per week and for a continuous care period of not less than 3 months (e.g., spouses, children, or relatives),[11] and provided informed consent.

2.2. Measurements

Sociodemographic characteristics included age, sex, marital status, education, employment status, average monthly income, and number of chronic diseases of the older adults and the family caregivers.

Quality of life of the family caregivers was measured using the 36-Item Short Form Health Questionnaire (SF-36).[12] Items measuring physical functioning, role limitations due to physical functioning, pain, and general health comprised the physical component summary (PCS) score, and items measuring energy, social functioning, role limitations due to emotional problems, and mental health comprised the mental component summary (MCS) score. Scores ranged from 0 to 100, with a higher score indicating a better quality of life. Cronbach's α for the current sample was 0.88.

The ADL of the older adults were measured using the ADL scale,[13] which includes six items that assess physical ADL and eight items that assess instrumental ADL. Respondents rated items using a scale ranging from 1 to 4: 1="do it yourself," 2="some difficulty," 3="need help," and 4="totally dependent on others." The total possible score ranged from 14 to 56 with a total score <16 indicating normal, a score >16 indicating a decline in functioning, and two or more items with ratings ≥3 or a total score ≥22 indicating significant functional impairment.[14] Cronbach's α for the current sample was 0.93.

Depressive symptoms of the older adults were evaluated using the Geriatric Depression Scale (GDS), which includes 30 items,[15] with a total possible score ranging from 0 to 30. A higher score indicates the presence of severe symptoms of depression, a score of 10 or less within the normal range, 11–20 mild depression, and 21–30 moderate to severe depression. Cronbach's α for the Chinese version of the GDS was 0.846 in an urban sample of community-dwelling older adults.[16]

2.3. Procedure

Trained investigators, with the cooperation of the community health service center, went to families, explained the purpose of the research to the older adults and their family caregivers, and obtained their informed consent. The questionnaires were mailed to the older adults and their family caregivers. The researchers assisted those who required clarification of the items or were unable to fill in the answers on the questionnaire by explaining the questions item by item; they collected the questionnaires immediately after completion. A total of 420 questionnaires were distributed to the older adults and their family caregivers, and 395 valid questionnaires were collected. Information about chronic diseases was missing on the questionnaires returned by six family caregivers, information about monthly income was missing on 18 questionnaires, and one scale (the GDS) had invalid responses, which excluded 25 families. The effective recovery rate was 94.1%.

2.4. Data analysis

Data were double entered and analyzed using SPSS 17.0 software. Descriptive statistics were calculated to examine the distribution of the sociodemographic variables and to calculate prevalence rates. Mean (*M*) and standard deviation (SD) values were calculated for scores on the measures of quality of life, ADL, and depression. Analysis of variance, correlation analyses,

and multiple linear regression analyses were used. The level of statistical significance was set at $P<0.05$.

3. Results

Table 1 displays the sociodemographic and depression data for the samples. The 395 older adults ranged in age from 60 to 96 years (M=72, SD=7), and 41.5% of them were males. The 395 family caregivers ranged in age from 25 to 80 years (M=51, SD=13), and 43.5% were males, 27.3% were spouses, 50.2% were children, and 22.5% were relatives.

The ADL scores of the older adults ranged from 14 to 54 (M=21, SD=7) compared with the average standard; the ADL of 170 (43%) older people were lower by varying degrees, and 106 (26.9%) of the elderly had significant

Variables	*n*	PCS	*t/F*	*P*	MCS	*t/F*	*P*	Total score	*t/F*	*P*
Gender			0.21	0.837		0.94	0.341		0.60	0.549
Male	172	276±62			249±50			524±105		
Female	223	282±55			250±51			532±97		
Age (years)			2.93	<0.001		1.66	0.005		2.26	<0.001
20–39	61	284±56			259±52			543±101		
40–59	221	278±60			246±49			524±101		
≥60	113	272±55			234±44			506±88		
Marital status			0.08	0.973		0.02	0.997		0.03	0.993
Married	371	284±47			251±61			535±94		
Unmarried	16	279±59			249±50			528±101		
Other	8	284±46			248±58			532±101		
Educational level			4.63	<0.001		0.26	0.936		1.99	0.080
Illiterate	45	252±66			243±60			495±120		
Primary school	67	270±70			252±57					
Junior-high school	139	287±53			251±48			522±116		
High school	95	282±49			248±45			538±94		
Junior college	37	302±45			250±38			530±87		
Bachelor's or above	12	257±64			243±75			552±75		
Employment status			9.48	<0.001		2.50	0.042		6.22	<0.001
Employed	198	290±50			252±46			542±88		
Retired	80	248±68			238±57			485±114		
Plan to retire	8	271±64			222±69			493±158		
Never employed	53	271±92			248±53			521±110		
Others	56	295±39			260±48			555±78		
Average monthly income (yuan)			4.58	0.001		2.61	0.035		3.42	0.009
0–499	26	266±63			236±41			502±100		
500–999	76	258±68			243±58			501±120		
1000–1999	110	282±52			257±54			539±96		
2000–2999	102	293±52			257±47			549±90		
≥3000	81	283±56			239±50			523±100		
Number of chronic diseases			24.65	<0.001		4.97	0.002		15.31	<0.001
None	253	295±47			255±45			550±84		
1	103	260±60			241±51			501±100		
2	23	238±71			243±75			481±141		
≥3	16	214±73			214±66			529±100		

Table 1. PCS, MCS, and total quality of life scores of family caregivers (N=395).
Notes: PCS=physical component summary; MCS=mental component summary.

barriers to their daily life. The older adults' scores on the GDS ranged from 1 to 29 (*M*=11, SD=6); 155 (39.2%) of them had mild depression, and 31 (7.9%) had moderate and severe levels of depression.

The mean quality of life score of the 395 family caregivers was 529±100. Their PCS score was 279±58, and their MCS score was 249±55. The PCS scores of family caregivers of different ages, educational levels, occupations, average monthly incomes, and numbers of chronic diseases were significantly different (*P*<0.01). Family caregivers >60 years old, retired, with a low educational level, a monthly income <1000 yuan, and more than three chronic diseases had lower PCS scores than other family caregivers. The MCS scores of family caregivers of different ages, occupations, average monthly incomes, and numbers of chronic diseases were significantly different (*P*<0.05). Family caregivers >40 years old and retired, with a monthly income less than 1000 yuan, and more than three chronic diseases had lower MCS scores than other family caregivers. The quality of life scores of family caregivers of different ages, occupations, average monthly incomes, and numbers of chronic diseases were significantly different (*P*<0.01). Family caregivers of age >60 years, retired, with a monthly income less than 1000 yuan, and more than two chronic diseases had a lower quality of life scores than other family caregivers (Table 1).

The quality of life, PCS, and MCS scores of the caregivers by the levels of ADL and depressive symptoms of the elderly adults differed significantly (*P*<0.01). The total quality of life, PCS, and MCS scores of family caregivers who cared for older adults with a significant impairment in ADL functioning were lower than the scores of other family caregivers. The PCS, MCS, and quality of life scores of the family caregivers were significantly different among the older adults with different levels of depression (*P*<0.01). The total quality of life, PCS, and MCS scores of family caregivers who cared for depressed older people were lower than those of family caregivers who cared for older adults without depression (Table 2).

After adjusting for age, educational level, employment, average monthly income, and the number of chronic diseases, with the PCS, MCS, and total quality of life scores as dependent variables, ADL in the older adults were found to be negatively correlated with the PCS, MCS and total quality of life scores of the family caregivers (β=−0.18, −3.00, −0.25, respectively). The relationship between the ADL scores of the older adults and the MCS scores of the family caregivers was stronger than that between the ADL scores of the older adults and the PCS scores of the family caregivers. Depression among the older people was negatively correlated with the PCS, MCS, and quality of life scores of the family caregivers (β=−0.15, −0.14, −0.18, respectively). Family caregivers who cared for the adults with lower ADL and higher GDS scores had a lower quality of life (Table 3).

Variables	Quality of life of family caregivers		
	PCS	MCS	Total score
ADL of the older adults			
Normal	283±61	269±59	553±115
Decline in functioning	284±56	257±49	541±98
Significant impairment in functioning	263±59	222±42	485±92
F	4.69	20.36	12.23
P	0.010	<0.001	<0.001
Depressed symptoms of the older adults			
No depression	290±52	259±48	549±91
Mild depression	269±61	240±50	510±103
Moderate to severe depression	274±71	244±60	519±115
F	5.84	6.17	7.10
P	0.003	0.002	0.001

Table 2. The influence of older persons' ADL and depressive symptoms on the quality of life of family caregivers (*N*=395).

Notes: ADL= activities of daily living; PCS=physical component summary; MCS=mental component summary.

4. Discussion

As older adults age, their physical functioning gradually declines and various types of physical illnesses, especially chronic noncommunicable diseases, lead to a decline in their ADL to varying degrees. Approximately 69.9% of the older adults showed a decline in their ADL or serious impairment. Persistent chronic diseases and a decrease in ADL have been reported to reduce the ability to interact with the social environment on an individual level, thereby increasing the risk for depression.[17] The results of the present study showed that the incidence of depression was higher among patients with chronic diseases, whereas moderate depression was more common among patients with chronic diseases.[18] The incidence of depression among the older adults in this study was 47.1%, which was higher than that found in similar studies.[19,20] Approximately 69.9% of the older adults had a different level of decline in their ADL, which increased the occurrence of depression. Therefore, given their decline in ADL, older adults in need of care should pay attention to and seek professional help to prevent the occurrence of depression.

The results showed that ADL and depression were important predictors of PCS, MCS, and quality of life

Dependent variables	Independent variables	β	SE	β	T	P
PCS[a]	Age	−1.37	0.24	−0.30	−5.69	0.000
	Level of education	−1.55	2.46	−0.03	−0.63	0.529
	Employment status					
	Retired	−1.85	8.48	−0.13	−0.22	0.828
	Plan to retire	16.05	18.13	0.04	0.89	0.377
	Never employed	8.67	8.14	0.05	1.07	0.288
	Other	9.32	7.49	0.06	1.24	0.214
	Monthly income	1.55	2.42	0.03	0.64	0.523
	Number of chronic diseases	−20.65	3.70	−0.28	−5.59	0.000
	ADL of the older adults	−1.38	0.39	−0.18	−3.52	0.000
	Depressive symptoms of the older adults	−1.40	0.48	−0.15	−2.92	0.004
MCS[b]	Age	−0.53	0.22	−0.13	−2.44	0.015
	Employment status					
	Retired	−8.52	6.57	−0.07	−1.30	0.195
	Plan to retire	−9.81	17.21	−0.03	−0.57	0.569
	Never employed	4.64	7.56	0.03	0.61	0.540
	Other	9.36	7.11	0.07	1.32	0.189
	Monthly income	−1.96	2.26	−0.05	−0.87	0.386
	Number of chronic diseases	−9.47	3.59	−0.15	−2.63	0.009
	ADL of the older adults	−2.07	0.33	−3.00	−6.24	0.000
	Depressive symptoms of the older adults	−1.15	0.42	−0.14	−2.76	0.006
Total quality of life scores[c]	Age	−1.91	0.41	−0.24	−4.70	0.000
	Employment status					
	Retired	−1.37	15.13	−0.01	−0.09	0.928
	Plan to retire	8.35	32.33	0.012	0.26	0.796
	Never employed	16.49	14.51	0.056	1.14	0.257
	Other	19.51	13.36	0.068	1.46	0.145
	Monthly income	−1.10	4.23	−0.01	−0.26	0.795
	Number of chronic diseases	−29.67	6.73	−0.23	−4.41	0.000
	ADL of the older adults	−3.45	0.67	−0.25	−5.18	0.000
	Depressive symptoms of the older adults	−2.55	0.83	−0.18	−3.09	0.002

Table 3. Multiple linear regression analysis of factors affecting the quality of life of family caregivers.
Notes: Employment status was a dummy variable; the reference was employed. [a]R^2=0.536, [b]R^2=0.385, and [c]R^2=0.489. PCS=physical component summary; MCS=mental component summary; ADL=activities of daily living.

scores of family caregivers. The lower the older adults' abilities to perform ADL, the higher the level of care activities required of family caregivers, which reduces the amount of time they can work or participate in social activities and, in turn, increases their caregiving burden.[21] Depression affects not only the emotions, hobbies, thinking, judgment, and decision-making abilities of the older adults but also their social activities, family life, and intimate relationships.[18] Family caregivers, who care for older adults with declining ADL and depression, are prone to physical discomfort and fatigue, long-term depression, and behavior or emotional abnormalities, which affect their own health. Owing to the influence of traditional culture and ideas, some family caregivers quit their jobs in order to care for their older relatives, causing increased economic pressure and reduced time

and opportunities for contact with others in the society, which affect their own physical, psychological, and social health.[22]

Therefore, we should fully recognize the effects of a decline in ADL and depression among older adults, specifically, the adverse impact on family caregivers, the government, and the society. Families should take appropriate measures to help lighten the burden of family caregivers for older adults in order to improve caregivers' quality of life.

Compared with measures that use physiology or psychology as a single dimension, the quality of life of family caregivers can be evaluated comprehensively on physiological, emotional, and social dimensions. The present study found that there were differences in the relationship between the decline of ADL and the physical and mental health of the family caregivers. On one hand, quality of life was used as the comprehensive index when investigating the influence of the care required for older adults on the family caregivers. We can further compare the differences in the physical and psychological effects of care activities on the family caregivers, which should help us to acquire an in-depth understanding of the associated problems. On the other hand, the relationship between the decline in ADL and the mental health of the family caregivers was more closely related to older persons' physical health than their mental health.[23] Li et al.[24] and Xie et al.[22] also found that the physical condition and mental health of the family caregivers were better than the norm. Furthermore, the level of disability among the older adults was a common and primary factor related to psychological stress among the caregivers.[25] Caring for the disabled elders made family caregivers feel tired, irritable, and depressed, which they coped with through social withdrawal.[26] In this study, 50.2% of the family caregivers were family members, and they had to bear the pressures of work, children, and finances. Therefore, attention should be paid to the evaluation of ADL among older adults, which should be regarded as the basis for evaluating the mental health of family caregivers and providing them with help.

5. Conclusions and suggestions

5.1. Early detection of interventions for older people with declining ADL and depression

Depression among the older population is usually mild or moderate. The family and community have poor recognition of depression and are liable to mistake it for a normal phenomenon related to aging or to physical diseases and therefore do not pay sufficient attention to it. Some older people have had depressive symptoms for years that have gradually increased, even to the point of causing them to become suicidal, yet their symptoms have not received timely recognition and effective interventions.[27] Depression in older people also harms their spouses, who also may suffer from depression.[28] Therefore, in the community health service, we should strengthen interventions to repair the damage of ADL functioning of older adults, increase third-level prevention efforts by targeting mental disorders among the older population, and conduct regular screenings for depression. It is important to create a harmonious community environment for couples, children, family, friends, and older adults and provide evidence-based effective interventions to help all cope with the decline in older adults' ADL and depression.

5.2. The use of multidimensional indicators for the comprehensive assessment of family caregivers of older adults

The purpose of paying attention to the living conditions of family caregivers of older adults is to ensure a healthy quality of life for both caregivers and older adults. Thus, the choice of indicators for measures is based not only on science but also on an instrument's capacity to provide an accurate evaluation of the quality of life. It can also provide a basis for making determinations regarding work pensions. The effects of the ADL and depression of older adults on family caregivers' physical and mental health varied. Therefore, when evaluating the quality of life of family caregivers, we should adopt multidimensional indicators that provide a comprehensive assessment, which include physical health, mental health, economic status, family emotional support, as well as social interaction, cognitive functioning, life satisfaction, health service availability, and happiness. Furthermore, the social living conditions of family caregivers, (e.g., education, health, culture, transportation services, social customs, and social security) and their natural living conditions (e.g., environmental purification and beautification) should also be included.

5.3. Roles of governments, communities, and families in helping family caregivers of older adults with declining ADL and depression

The government should increase its support for homecare services and provide family caregivers with services that include supportive care, spiritual comfort, medical care, and emergency relief. Attention to the effects of

older adults' decline in ADL and depression on their families should reduce family caregivers' stress levels and burden, thereby improving the quality of life of older adults and family caregivers. Community healthcare workers should maintain health records for older adults and their family caregivers, organize educational and training activities for family caregivers, and follow up regularly. In particular, for caregivers of older adults with disabilities, community healthcare workers should continue to assess their mental health, provide more counseling and support services, enrich their spiritual and cultural lives, and organize forums for them to communicate with each other. Families can provide more support for family caregivers by helping their older members with their rehabilitation exercises to develop strength, encouraging them to complete daily tasks by themselves, and promoting a sense of self-efficacy in their family caregivers. Finally, families can ensure that their caregivers have adequate nutrition and sleep, proper exercise, and regular physical examinations and develop a healthy lifestyle for themselves and the older adults for whom they care.

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Conflict of interest

All contributing authors declare no conflicts of interest.

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