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An analysis of the factors influencing the demand for care in the community for older adults with mild dementia in China: a cross-sectional study

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Abstract

Introduction The care needs of older adults with mild dementia have not been studied in depth. In this study, we investigated the impairment status of patients with mild dementia and analyzed the care needs of patients with different levels of impairment in terms of activities of daily living, medical services, environmental care, psychological comfort and social participation, and the factors influencing them.

Methods This study used a cross-sectional research method to investigate mildly demented older adults aged 60 years and above in the Chinese community. A self-administered questionnaire was used to assess the care needs of mildly demented older adults in terms of daily living, medical services, psychological comfort, home environment and social participation, and the ability level of mildly demented older adults was assessed using the official Chinese Norms for Assessing the Ability of the Elderly (GB/T42195-2022). Independent samples t-test and one-way ANOVA were used to compare the differences between demographic characteristics, impairment levels and care needs. Multiple linear regression analysis was used to analyze the independent factors influencing care needs.

Results A total of 267 participants were included in this study and participated in the analyses. The results showed that there were differences in the scores of care needs between different ability levels: mildly impaired (58.74 ± 9.008), moderately impaired (78.45 ± 8.951) and severely impaired (99.67 ± 6.480), and that health care services were the main care needs of older adults with mild dementia, and older adults with mild dementia of different ability levels had high needs for health care services. For activities of daily living and psychological comfort, needs increased significantly with the severity of impairment and decreased with worsening impairment in environmental care and social participation. Comprehensive ability level for older adults: Moderately impaired (β = 0.136, *P* = 0.012), Severely impaired (β = 0.306, *P* < 0.001), Age:70-79 years (β = 0.136, *P* = 0.010), 80 years and above (β = 0.354, *P* < 0.001), Living

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with children (β = 0.267, $P < 0.001$), Living with spouse (β = 0.232, $P = 0.003$) and participation in sports and exercise (β = 0.162, $P = 0.001$)) had significant positive effects on community care service needs, drinking alcohol (β = -0.118, $P = 0.007$), and with other chronic diseases ((β = -0.130, $P = 0.004$) had significant negative effects on community care service needs.

Discussion Factors influencing the community care needs of older people with mild dementia who participated in this study included: comprehensive older adults' abilities, age, whether accompanied by other chronic diseases, history of alcohol consumption, presence of physical activity.

Practical implications Taking into account the different care needs of older adults with mild dementia at different stages of impairment, a comprehensive care program for older adults with mild dementia has been improved in a number of aspects, including daily living, medical services, home environment, psychological well-being and social participation.

Keywords Mild dementia, Older adults, Care needs, Influencing factors

Introduction

China's aging population is now in full swing and the "silver wave" is raging. According to data from the seventh national census, by the end of 2020, the number of older adults aged 60 and over in China had exceeded 264 million, accounting for 18.7% of the country's total population [1], and the number of older adults with dementia was also increasing, with epidemiological studies showing that the prevalence of dementia was around 6% among older adults aged 60 years and over, and that the prevalence among older adults aged 85 years and over had risen to 20% [2]. It is expected that by 2030, China's older population aged 60 and above with dementia will reach 16.45 million [3], accounting for a quarter of the world's older population with dementia. Dementia has become one of the major causes of health problems and even death among the older adults, after cardiovascular diseases, cerebrovascular diseases and tumor, and has also imposes a heavy burden on the state, society and families. According to the World Health Organization (WHO), the total global economic cost of dementia will be about $1.7 trillion by 2030, and in China, up to $168 billion is spent annually on dementia patients [4]. Not only that, the symptoms and pathogenesis of dementia in older adults also determine the high demands on caregivers, and research shows that caregivers suffer from lack of expertise and energy, among other things [5]. At the same time, when faced with the appearance of agitation, wandering and other behavioral psychological symptoms in older adults with dementia, caregivers are very prone to anxiety, depression and other emotions, which seriously affects their physical and mental health [6]. Therefore, how to delay the development of dementia in older adults, reduce the burden on families and society, and improve the quality of life of older adults with dementia and their caregivers has become a hot social issue that we urgently need to solve.

Dementia, refers to dysfunction in one or more cognitive domains to the extent that the cognitive impairment affects the patient's ability to carry out activities of daily living independently [7]. Depending on the severity of the disease, it can be classified as mild, moderate or severe. If older adults with dementia are in the first stage of dementia, i.e. mild dementia, early intervention at this stage may help to slow the progression of dementia [8]. Therefore, a thorough understanding of the care needs of older adults with mild dementia is critical not only for managing their disease but also for improving their quality of life. It has been shown that older adults with mild dementia have a greater need for cognitive training than those without dementia [9], and that people with dementia are more likely to have psychological problems [10]. Other studies have found a significant negative association between the frequency of participation in social activities and the risk of developing mild dementia [11]. However, current research on the care of older adults with mild dementia remains fragmented and lacks diversity, with few studies providing a comprehensive and systematic analysis of their specific care needs.

Analyzing the care needs of older adults with mild dementia from multiple perspectives is important for improving their quality of life. At the mild dementia stage, older adults may retain a degree of self-care ability; however, their cognitive functions have already declined significantly. Providing support with activities of daily living not only helps preserve their basic functional abilities and independence but may also slow the progression of functional deterioration [12]. In addition, studies have shown that environmental factors have a direct impact on the orientation and sense of security in older adults with dementia [13]. In terms of psychological needs, individuals with mild dementia often experience feelings of shame, depression, or anxiety, which, if left unaddressed, can further compromise their mental health [14]. Providing psychological support not only offers emotional comfort but also helps maintain their dignity and sense of self-worth. Moreover, given the progressive nature of dementia, early intervention by healthcare

services is essential for the effective management of the condition [15]. In addition, social isolation has been identified as a significant risk factor for the progression of dementia, while active social engagement may not only help delay cognitive decline but also enhance individuals' sense of identity and belonging [16]. In conclusion, this study conducted a comprehensive assessment of the care needs of older adults with mild dementia across five key dimensions: activities of daily living, medical services, environmental care, psychological comfort, and social participation.

This study aims to comprehensively and systematically examine the overall functional status of older adults with mild dementia, analyzing their care needs across various domains—activities of daily living, medical services, environmental care, psychological comfort, and social participation—while exploring the factors influencing these needs. The findings will provide a scientific foundation for improving the quality of care for older adults with mild dementia.

Methods

Study design and participants' recruitment

This cross-sectional study employed a convenience sampling method to recruit older adults with mild dementia from three communities in Xuzhou City, China, between April and July 2024. Based on the sample size calculation for this survey, assuming a dementia prevalence of 6%, a tolerable margin of error of 0.03 [17], and a significance level of $\alpha = 0.05$, the required sample size was determined to be 241 participants [18]. To account for potential non-response, an additional 10% was added, resulting in a final target sample size of 267 participants.

Inclusion criteria: (1) older adults with mild dementia, aged 60 years or older, diagnosed in a hospital and according to the International Classification of Diseases, 10th edition (ICD.10); (2) mild on the Brief Mental Status Examination (MMSE) scale; (3) subjects understood the questionnaire content and questions, gave informed consent, and voluntarily participated in this study. Exclusion criteria included: (1) cognitive impairment due to confirmed psychiatric illness; (2) confusion and inability to express themselves; and (3) severe hearing impairment. Patients were also excluded if they were recovering from an acute or serious illness (e.g., stroke, cardiovascular disease, malignancy, or severe renal impairment).

Data collection

Data were collected through face-to-face interviews in three community medical centers in Xuzhou City. Two nurses from our research team served as investigators. Prior to the survey, they received systematic training to ensure proficiency in administering the questionnaires. The purpose, significance, and procedures of the survey were then thoroughly explained to the older adults with mild dementia in the community. The surveyor would read the questions on the questionnaire to the participants and complete the questionnaire according to their answers. They were not given any clues about the questions or answers. The average time taken by the enumerators to complete a questionnaire was 15 min, and all questionnaires were returned on the spot.

Measurement

Care needs

The researchers developed the questionnaire based on the consensus of Chinese experts on dementia care [19]. A preliminary test conducted on a convenience sample of 30 older adults with mild dementia in Xuzhou, China, demonstrated a test-retest reliability coefficient of 0.846. A preliminary version of the questionnaire was sent to eight experts in geriatrics and public health for evaluation before the formal survey. The questionnaire was discussed and revised based on the experts' opinions. In this study, the item-level content validity index (I-CVI) ranged from 0.86 to 1.00; the scale-level content validity index (S-CVI) was 0.96; and the inter-rater agreement was 0.85. The final questionnaire created for this study consisted of two parts. The first part was general information about older adults with mild dementia. The second part of the questionnaire was a questionnaire on care needs (27 items in total), including daily living care (10 items), health services care (6 items), psychological care (4 items), home environment care (4 items), and social participation (3 items), where each item was a single-item choice, The second part of the questionnaire was scored on a 5-point Likert scale from 1 to 5 for very little need, no need, need, great need, and very great need, with higher scores indicating greater care needs (See annex 1).

Capacity assessment of older adults

Based on the "Specification for Elderly Ability Assessment" (GB/T 42195 – 2022) issued and implemented by the State Administration for Market Supervision and Administration of China and the National Standardization Administration of China, the ability level assessment of mildly demented older adults includes four first-level indicators of self-care ability, basic motor ability, mental state, sensory and social participation, and 26 s-level indicators, with a total score of 90 points, and the ability level assessment of older adults is as follows. The ability level of older adults was determined as follows: level 0 is intact, level 1 is mildly impaired, level 2 is moderately impaired, level 3 is severely impaired and level 4 is a complete loss of ability.

Cognitive function

Cognitive function was assessed using the Chinese version of the Modified Mental State Examination (MMSE) [20], which consists of 19 items assessing 7 cognitive domains, including temporal orientation, spatial orientation, transient memory, attention and calculation, and delayed memory, Verbal and visuospatial abilities, with a total score of 30 points, with one point awarded for each correct answer, scored as 21–26 points for the MMSE in mild dementia, 10–20 points for the MMSE in moderate dementia, and 0–9 points for severe dementia, depending on the severity of the dementia. The MMSE is the most influential international screening tool for cognitive deficits [20].

Data analysis

Data were analyzed using Excel input SPSS 26.0. Frequency statistics were performed for all characteristics of the study population and expressed as component proportions. Care needs scores were expressed as mean ± standard deviation. Independent samples t-test and one-way ANOVA were used to compare differences in demographic variables, comprehensive ability level for older adults and care needs, with statistical significance set at $P<0.05$. Variables that were statistically different in this study were used as independent variables, and care needs scores were used as dependent variables. Due to the presence of dummy variables, multivariate linear regression (input method) was used in the multivariate analysis with a 95% confidence level, with a confidence level of $P<0.05$ indicating a statistically significant difference.

Results

Demographic characteristics

This study investigated 267 resident mildly demented older adults aged 60 years and older in the urban community of Xuzhou, including 137 males and 130 females, with a sex ratio of 1:1.05. In terms of age distribution, older adults aged 70–79 years accounted for the highest proportion of respondents (58.1%), while older adults aged 80 years and older accounted for the lowest proportion of respondents (11.6%). The educational level of respondents was generally low, with only 34.8% having completed junior high school or higher (>6 years of education) and 42.3% having completed primary school (≤6 years of education). In terms of income, 28.1% of respondents had a monthly per capita income of less than RMB 1,000 and 39.0% had a monthly per capita income of between RMB 1,000 and RMB 2,999, indicating that the majority of respondents had a relatively low-income level. In terms of marital status, 76.8% of respondents had a spouse, of whom 45.3% lived with their spouse and 40.1% lived with their children. In addition, 71.2% of respondents had other chronic illnesses. Only 33.7% of respondents had pension insurance, but 93.6% of them had health insurance. In terms of lifestyle habits, 40.4% of respondents smoke, 52.8% drink alcohol and more than half, (55.1%) do not exercise. There was a statistically significant difference ($P<0.05$) between age, marital status, place of residence, whether they exercised, whether they had other chronic conditions, and the care needs scores (Table 1).

Competence levels and care needs

Among the older adults with mild dementia, 70.8% were mildly impaired, 24.7% were moderately impaired and only 4.5% were severely impaired. The total number of care needs scores for mildly, moderately and severely impaired were (58.74 ± 9.008), (78.45 ± 8.951) and (99.67 ± 6.840) respectively, and the difference with the care needs scores was statistically significant ($P<0.05$) (Table 2). Older adults with mild dementia of different ability levels had high health care needs. For activities of daily living and psychological comfort, needs increased significantly with the severity of impairment and decreased with worsening impairment in environmental care and social participation (Table 3).

Analysis of factors influencing the demand for care

The study used the variables that were statistically significant in the correlation analysis as independent variables, namely age, marital status, history of alcohol consumption, whether or not they exercise, whether or not they are accompanied by other chronic diseases, residential status, and level of competence, and the care needs scores as dependent variables in the multivariate linear regression model, and the results showed that age, history of alcohol consumption, whether to exercise, whether to have other chronic diseases, and the level of competence of the older adults were the factors influencing the care needs of the older adults with mild dementia, and there was no multicollinearity between the variables, and the included variables effectively explained 51.2% of the dependent variable (Table 4).

Discussion

According to the results of this study, the largest proportion of participants—189 cases (70.8%)—were classified as having mildly impaired abilities. This may be attributed to the characteristics of mild dementia, during which individuals are in the early stage of the condition and still retain a relatively acceptable level of ability to perform activities of daily living [21]. As noted by [21], functional ability is a key factor influencing the long-term care needs of older adults with mild dementia. Healthcare services and psychological comfort are the main care needs of older adults with mild dementia, and the

Table 1 Univariate screening of general information and community care service needs of older adults with mild dementia ($n=267$)

Variable		Frequency (%)	Community care service needs score ($\bar{X}\pm S$)	F (t)	*P*-value
Gender					
	Male	137(51.3)	69.88 ± 8.908	1.563	0.119
	Female	130(48.7)	68.25 ± 8.132		
Age				55.781	**<0.001**
	60–69 years	81(30.3)	64.25 ± 6.061		
	70–79 years	155(58.1)	69.36 ± 7.206		
	over80years	31(11.6)	80.35 ± 9.898		
Marital status				-2.478	**0.014**
	Without spouse	62(23.2)	71.44 ± 10.271		
	Have spouse	205(76.8)	68.38 ± 7.920		
Education level				1.214	0.305
	Illiteracy	61(22.8)	69.33 ± 6.882		
	Primary school (≤ 6years)	113(42.3)	69.66 ± 8.905		
	Middle school (7–9 years)	81(30.3)	68.73 ± 9.422		
	High school and above	12(4.5)	64.83 ± 7.284		
Residence				10.571	**<0.001**
	Live by oneself	39(14.6)	65.26 ± 5.491		
	Living with children	107(40.1)	71.72 ± 9.342		
	Living with spouse	121(45.3)	67.99 ± 7.971		
With chronic diseases				4.968	**<0.001**
	Yes	190(71.2)	70.61 ± 8.555		
	No	77(28.8)	65.34 ± 7.544		
pension insurance					
	Yes	90(33.7)	68.57 ± 8.491	-0.708	0.483
	No	177(66.3)	69.35 ± 8.668		
health insurance				0.136	0.893
	Yes	250(93.6)	69.10 ± 8.643		
	No	17(6.4)	68.82 ± 8.202		
Smoking				2.982	0.303
	Yes	108(40.4)	69.27 ± 9.355		
	No	159(59.6)	68.96 ± 8.092		
Drinking				-7.391	**<0.001**
	Yes	141(52.8)	70.72 ± 8.375		
	No	126(47.2)	67.62 ± 8.238		
Physical exercise				-4.075	**<0.001**
	Yes	120(44.9)	65.16 ± 5.969		
	No	147(55.1)	72.29 ± 9.904		
Monthly fixed income(yuan)				0.406	0.749
	Less than 1000	75(28.1)	68.35 ± 7.188		
	1000–2999	104(39.0)	68.99 ± 9.201		
	3000–4999	51(19.1)	68.82 ± 9.975		
	5000 or more	37(13.8)	69.84 ± 7.581		

Note: $\bar{X}\pm$ S mean ± standard deviation, $P<0.05$ indicates statistical significance

need for healthcare services and psychological comfort is higher among older adults with mild dementia of different ability levels, which may be related to the patients' increased cognitive dysfunction and urgent need for specialized care. Some scholars have also found that among the long-term care needs of older adults with mild dementia, care for cognitive function and psychiatric symptoms must be accompanied by a long period of time [22]. This study also found that the need for daily care of mildly demented older adults increased significantly as the level of disability worsened, which is consistent with the results of a study in the United States [23], In addition, in terms of environmental care and social participation, the social participation of mildly demented older adults relied mainly on the help of others as their disability worsened, resulting in a decrease in their social

Table 2 Distribution of comprehensive ability levels of older adults with mild dementia ($n=267$)

Variable	Frequency (*n*)	Component ratio (%)	Community care service needs scores ($\bar{X} \pm S$)	F	*P*-value
Ability levels				70.484	<0.001
Lightly impaired	189	70.8	58.74 ± 9.008		
Moderately impaired	66	24.7	78.45 ± 8.951		
Severely impaired	12	4.5	99.67 ± 6.840		

Note: $\bar{X} \pm$ S mean ± standard deviation, $P<0.05$ indicates statistical significance

participation, which may be due to the fact that their physical dysfunction limited the extent and time of their participation in social activities [24]. In conclusion, slowing the rate of impairment in mildly demented older adults and improving their ability to live independently is crucial to reducing the burden on family and society and improving the quality of life of mildly demented older adults.

The present study found that the older the age of older adults with mild dementia, the higher the needs score. Analyzing the reasons for this, on the one hand, with increasing age, patients' self-care abilities gradually decline, requiring caregivers to devote more effort to helping patients and meeting their physical needs [25]. On the other hand, with increasing age and further progression of dementia, patients' cognitive function gradually declines, their problem behaviors increase, their adaptability to the environment deteriorates, their sense of security decreases, their subjective feelings of vulnerability and loneliness increase, and their own thresholds for being cared for increase [26]. They need attention not only to meet their daily living and environmental needs, such as eating, bathing, falling and wandering, but also their psychological and social needs, such as socialization, intimacy and going out. We also need to pay attention to their psychological and social needs such as socialization, intimacy and activities.

Table 3 Table of community care service needs scores ($\bar{X} \pm S$) for different ability levels of older adults with mild dementia ($n=267$)

Dimension	Lightly impaired	Moderately impaired	Severely impaired	F	*P*-value
Daily life care	14.29 ± 2.730	26.02 ± 3.545	40.67 ± 4.313	706.567	<0.001
Health care services	23.11 ± 3.460	22.11 ± 3.064	22.83 ± 4.303	2.129	0.121
Psychiatric care	8.97 ± 1.957	12.18 ± 1.992	14.17 ± 2.691	41.382	<0.001
Home environment care	9.58 ± 0.515	8.83 ± 1.463	6.36 ± 1.707	16.192	<0.001
social participation	8.50 ± 1.901	7.18 ± 2.358	6.00 ± 2.844	32.928	<0.001

Note: $\bar{X} \pm$ S mean ± standard deviation

Table 4 Multiple linear regression analyses of factors influencing the community care service needs of older adults with mild dementia

Variable		Unstandardized Coefficients		Standardized Coefficients	t	*P*
		B	Std.Erro	Beta		
(constants)		61.144	3.149		19.417	0.000
Levels of competence	Lightly impaired	Reference				
	Moderately impaired	2.703	1.074	0.136	2.518	0.012
	Severely impaired	12.673	1.965	0.306	6.449	0.000
Marital status	have spouse	Reference				
	Without Spouse	1.006	0.549	0.099	1.832	0.068
Drinking	No	Reference				
	Yes	-2.027	0.746	-0.118	-2.717	0.007
Physical exercise	No	Reference				
	Yes	2.800	0.846	0.162	3.308	0.001
With chronic diseases	No	Reference				
	Yes	-2.472	0.840	-0.130	-2.942	0.004
Age	60–69 years	Reference				
	70–79 years	2.366	0.908	0.136	2.607	0.010
	80 years and above	9.475	1.478	0.354	6.411	0.000
Residence	Live by oneself	Reference				
	Living with children	4.686	1.213	0.267	3.861	0.000
	Living with spouse	4.003	1.331	0.232	3.007	0.003

Note: Dependent variable: community care service needs score, adjusted $R^2= 0.512$, $P<0.05$ indicates statistical significance

Marital status was included in the multiple linear regression equation in this study, and compared with mildly demented older adults with spouses, the care needs of mildly demented older adults without spouses were higher because mildly demented older adults were used to the environment and rhythm of living with their spouses, and the change in living environment after widowhood may cause them more difficulties in self-care and accelerate the rate of decline in their cognitive functions and abilities [27], and psychologically, after widowhood, the mildly demented older adults do not have their spouses as the closest object of emotional intimacy, they may become more introverted or anxious, with a more urgent need for companionship and understanding from those around them [28]. In addition, spouses are an important part of older adults' social networks, and this social support link is broken after widowhood. Older adults with mild dementia may become alienated from their original social circles [29]. Therefore, we need to pay more attention to the care of unmarried older adults with mild dementia, and when providing care services, we should be able to mobilize their positive emotions, improve the self-management skills and social participation of unmarried older adults with mild dementia, so that they can adapt better to social life.

In the living situation of this study, the care needs of mildly demented older adults living with their children are higher, which may be because mildly demented older adults living with their children become overly dependent on the care of their family members and gradually lose the ability to take care of themselves [30]. Therefore, when children live with mildly demented older adults, they should respect the older adults' personality and feelings, not hurt their self-esteem, communicate with them in a friendly way, and not easily negate their demands, and help the patients establish positive beliefs and attitudes towards rehabilitation.

This study also found that the level of competence of older adults with mild dementia was predominantly mild and was accompanied by other chronic conditions in 79.6% of the population. As the number of chronic conditions increases, so does the level of impairment in older adults with mild dementia [31]. Some academic studies show that chronic care has become the main demand for long-term care services for older adults [32]. Chronic diseases have a high disability rate, and prevention and treatment of chronic diseases are important to improve the quality of life of disabled older adults [33]. While focusing on the needs of disabled older adults, we should also strengthen chronic disease care services, consider chronic disease prevention and care as an important element of long-term care, actively carry out health education activities for hypertension, diabetes, rheumatoid arthritis, stroke, etc., and formulate case-specific long-term care services so that disabled older adults can receive holistic and comprehensive care.

In addition, the present study reveals an important finding: older adults who regularly participate in sport and exercise have relatively lower care needs. A large body of research has shown that exercise can have a significant positive effect on cognitive function in older adults [34]. Physiologically, exercise can help to increase blood flow to the brain, provide sufficient oxygen and nutrients to neurons, thus maintaining normal brain structure and function and slowing the process of cognitive decline [35]; psychologically, exercise creates opportunities for social interaction among older people, enriches their spiritual lives and effectively reduces loneliness, depression and other negative emotions, which has a positive effect on maintaining cognitive function [36]. In light of this, it is particularly important to encourage older adults with mild dementia to actively engage in physical activity, which may not only slow cognitive ageing, but is also a key intervention to improve the quality of life of older adults with mild dementia and reduce the burden of care.

To our knowledge, this study is one of the few in-depth studies to examine the care needs of older adults with mild dementia in the Chinese community. Second, this study provides a comprehensive examination of the care needs of older adults with mild dementia in terms of activities of daily living, medical environmental services, psychological comfort, home environment and social participation, thus providing valuable insights for the development of quality care programs specifically tailored to older adults in China.

Limitations

There are several limitations to this study. Firstly, our findings may not be generalizable and may not apply to noncommunity groups. In addition, we only studied older adults with mild dementia, so future studies should be extended to the whole population of older adults with dementia. Finally, due to the cross-sectional design of this study, we were not able to determine causal relationships between variables, highlighting the need for more comprehensive longitudinal data.

Conclusions

In summary, the care needs of older adults with mild dementia are differentiated at each stage of impairment. As the level of impairment increases, so does the need for care. In addition, the age factor should not be ignored. In general, the older adults with mild dementia are, the more chronic illnesses they have and the greater their need for care services. When formulating care plans, it is necessary to take into account the marital status and living situation of the patients, and to tailor a comprehensive care strategy based on the unique situation of each

older adult and their personal needs, in order to slow down the rate of cognitive decline and improve the quality of life of older adults with mild dementia, thus helping them to enjoy their twilight years in peace.

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

Author contributions

ST and SX developed the study idea and design, collected data, conducted data analysis, and drafted the manuscript. ML helped collect data, conducted data analysis, and searched literature. JL contributed to the manuscript revision. DS provided critical feedback on the manuscript. XT and YC helped with the study design and manuscript revision. All authors critically reviewed the manuscript and approved the final version.

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Data availability

Data are provided in supplementary information documents.

Declarations

Ethics approval and consent to participate

This study has been contacted according to declaration of Helsinki 1964. The study was approved by the Ethics Committee of Xuzhou Medical University (Approval No. XZHMUz-24115). Written informed consent was obtained from all participants. All methods were performed in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Yang C, Li X, Zhang J, et al. Early prevention of cognitive impairment in the community population: the Beijing aging brain rejuvenation initiative. Alzheimers Dement. 2021;17(10):1610–8. https://doi.org/10.1002/alz.12326.
2. Prince M, Acosta D, Ferri CP, et al. Dementia incidence and mortality in middle-income countries, and associations with indicators of cognitive reserve: a 10/66 dementia research group population-based cohort study. Lancet. 2012;380(9836):50–8.
3. Jia L, Quan M, Fu Y, et al. Dementia in China: epidemiology, clinical management, and research advances. Lancet Neurol. 2019;19(1):81–92.
4. Jia J, Wei C, Chen S, et al. The cost of Alzheimer's disease in China and re-estimation of costs worldwide. Alzheimers Dement. 2018;14(4):483–91.
5. Xia L, Liqun Chen, Changying J. Burden of family caregivers of senile dementia community residents: the influencing factors. J Nurs Sci 2017;32(15):91–3.
6. Wang L, Zhou Y, Fang X, et al. Care burden on family caregivers of patients with dementia and affecting factors in China: A systematic review. Front Psychiatry. 2022;13:1004552.
7. Kuehn BM, WHO. Need for global dementia care planning is urgent. Jama-J Am Med Assoc. 2021;326(15):1471.
8. Rawtaer I, Mahendran R, Kua EH, et al. Early detection of mild cognitive impairment with In-Home sensors to monitor behavior patterns in Community-Dwelling senior citizens in Singapore: Cross-Sectional feasibility study. J Med Internet Res. 2020;22(5):e16854.
9. Lowers J, Datcher I, Kavalieratos D et al. Proactive Care-Seeking strategies among adults aging solo with early dementia: A qualitative study. J Gerontol B-Psychol. 2023;79(5).
10. Massimo L, Hunt L, Buckwalter K, The Geropsychiatric Nursing, Collaborative: Addressing Behavioral Needs of Persons With Dementia Innov Aging. 2022;6:253–253.
11. Coleman ME, Roessler MEH, Peng S, et al. Social enrichment on the job: complex work with people improves episodic memory, promotes brain reserve, and reduces the risk of dementia. Alzheimers Dement. 2023;19(6):2655–65.
12. Chao LL, Lee JA, Martinez S, et al. Preventing loss of independence through exercise (PLIÉ): A pilot trial in older adults with subjective memory decline and mild cognitive impairment. J Alzheimers Dis. 2021;82(4):1543–57.
13. Weuve J, D'Souza J, Beck T, et al. Long-term community noise exposure in relation to dementia, cognition, and cognitive decline in older adults. Alzheimers Dement. 2021;17(3):525–33.
14. Orgeta V, Palpatzis E, See YN, et al. Development of a psychological intervention to promote meaningful activity in people living with mild dementia: an intervention mapping approach. Gerontologist. 2022;62(4):629–41.
15. Reuben DB. Medical care for the final years of life: when you're 83, it's not going to be 20 years. Jama-J Am Med Assoc. 2009;302(24):2686–94.
16. Clare L, Martyr A, Henderson C, et al. Living alone with Mild-To-Moderate dementia: findings from the IDEAL cohort. J Alzheimers Dis. 2020;78(3):1207–16.
17. Zhou T, Qu Z, Ge S, et al. Frailty knowledge level and its influencing factors among older adults in China. Geriatr Nurs. 2023;50:247–54.
18. Prince M, Acosta D, Ferri CP, et al. Dementia incidence and mortality in middle-income countries, and associations with indicators of cognitive reserve: a 10/66 dementia research group population-based cohort study. Lancet. 2012;380(9836):50–8.
19. Yuan Z, Xiaoping Y, Gang W. Suggestions for home care of people with dementia based on community support. China J Alzheimer's Disease Relat Disorders. 2023;6(01):77–84.
20. Cui GH, Yao YH, Xu RF, Tang HD, Jiang GX, Wang Y, Wang G, Chen SD, Cheng Q. Cognitive impairment using education-based cutoff points for CMMSE scores in elderly Chinese people of agricultural and rural Shanghai China. Acta Neurol Scand. 2011;124(6):361–7.
21. Nicosia F, Lee A, Chesney M et al. Feasibility and satisfaction with online, livestreaming, interactive, group movement classes for people with mild cognitive impairment or mild dementia and care partners Alzheimers Dement. 2022;18(S8).
22. Holden SK, Sheffler J, Stewart R, et al. Feasibility of Home-Based neurologic music therapy for behavioral and psychological symptoms of dementia: A pilot study. J Music Ther. 2019;56(3):265–86.
23. Tucker-Roghi G, Escoubas J, Tolliver R, et al. Interdisciplinary Community-Based support for caregivers of individuals living with dementia. Innov Aging. 2021;5(Supple1):806–806.
24. Sommerlad A, Kivimäki M, Larson EB, et al. Social participation and risk of developing dementia. Nat Aging. 2023;3(5):532–45.
25. Kingston A, Wohland P, Wittenberg R, et al. Is late-life dependency increasing or not? A comparison of the cognitive function and ageing studies (CFAS). Lancet. 2017;390(10103):1676–84.
26. Soleimani L, Ravona-Springer R, Lin HM, et al. Specific dimensions of depression have different associations with cognitive decline in older adults with type 2 diabetes. Diabetes Care. 2021;44(3):655–62.
27. Singham T, Bell G, Saunders R, et al. Widowhood and cognitive decline in adults aged 50 and over: A systematic review and meta-analysis. Ageing Res Rev. 2021;71:101461.
28. Wu-Chung EL, Leal SL, Denny BT, et al. Spousal caregiving, widowhood, and cognition: A systematic review and a biopsychosocial framework for Understanding the relationship between interpersonal losses and dementia risk in older adulthood. Neurosci Biobehav R. 2022;134:104487.

29. Perry BL, McConnell WR, Coleman ME, et al. Why the cognitive fountain of youth May be upstream: pathways to dementia risk and resilience through social connectedness. Alzheimers Dement. 2021;18(5):934–41.
30. Nunes W, Dias F, Nascimento J, et al. Cognition, functionality and depression indicative among elderly. Rev Rene. 2016;17(1):103.
31. Kristensen MAT, Hølge-Hazelton B, Waldorff FB, et al. How general practitioners perceive and assess self-care in patients with multiple chronic conditions: a qualitative study. BMC Fam Pract. 2017;18(1):109.
32. Archer N, Keshavjee K, Demers C, et al. Online self-management interventions fochronically ill patients: cognitive impairment and technology issues. Int J Med Inf. 2014;83(4):264–72.
33. Global regional. National burden of diseases and injuries for adults 70 years and older: systematic analysis for the global burden of disease 2019 study. BMJ. 2022;376:e068208.
34. Lenze EJ, Voegtle M, Miller JP, et al. Effects of mindfulness training and exercise on cognitive function in older adults: A randomized clinical trial. Jama-J Am Med Assoc. 2022;328(22):2218–29.
35. Casaletto KB, Staffaroni AM, Wolf A, et al. Active lifestyles moderate clinical outcomes in autosomal dominant frontotemporal degeneration. Alzheimers Dement. 2020;16(1):91–105.
36. Swinnen N, Vandenbulcke M, de Bruin ED, et al. The efficacy of exergaming in people with major neurocognitive disorder residing in long-term care facilities: a pilot randomized controlled trial. Alzheimers Res Ther. 2021;13(1):70.

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