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DEMOGRAPHICS, ACTIVITIES OF DAILY LIVING AND CARE NEEDS IN ELDERLY CHINESE VETERANS: BASELINE INFORMATION OF A CROSS-SECTIONAL SURVEY FOR NEUROLOGICAL DISEASES IN BEIJING MILITARY COMMUNITY

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Abstract: *Background: Objective:* In China, veterans form a special group who live in veterans' communities, and facilitate research in elderly populations that include formerly underrepresented males and well-educated individuals. The aim of the paper was to analyze activities of daily living and care needs in elderly Chinese veterans living in Beijing. *Design and Setting*: A cross-sectional study with 44 veterans' communities in Beijing for investigations. *Participants*: Veterans aged ≥60 years and lived in veterans' community for more than 1 consecutive month. *Measurements*: We collected the information of demographics and past medical history and evaluated functional status and care needs. Functional status was evaluated by the Chinese version of activities of daily living (ADL) scale. *Results:* 95.8% of veterans were ≥70 years old, 30.8% were ≥80 years old and 94.4% were males. The proportions of veterans rated as dependent, by personal ADL (PADL) and instrumental ADL (IADL) were 24.7% and 34.6% respectively. Age was positively correlated with the proportions of PADL and IADL dependent veterans and veterans requiring care (24.1%). Spouses and housemaids were primary caregivers. 62.5% of veterans were empty nesters, who were less rated as IADL dependent than non-empty nesters. *Conclusions:* In our study, ADL dependent is associated with age and some neurological diseases, such as dementia, Parkinson's disease, hemorrhagic stroke, ischemic stroke, insomnia. Therefore, it is necessary to perform a cross-sectional survey for neurological diseases in the setting of Beijing military community.

Key words: Chinese veterans, Activities of daily living, Care needs, Empty nesters.

Introduction

China's population is aging rapidly; in 2008, an estimated 11 million Chinese elderly individuals (>65 years of age), accounting for 8.05% of China's total population and 21.9% of the global population in the same age group (1). In Europe, the direct costs of caring for persons with Alzheimer's disease have exceeded those associated with heart disease, cancer, and stroke combined (2). In China, the annual cost of caring for such a patient is 15,552 CNY (2521 USD) in Beijing (3) and 19,001 CNY (3080 USD) in Shanghai (4), which exceed the annual per-capita disposable income of China's urban residents in 2009 (17,175 CNY (2784 USD) (5). Family members provide most of the necessary care for elderly individuals in China. Due to the growing number of empty-nest households who live alone and the shrinking of Chinese families, dependence in ADL and care needs of the growing elderly population have placed a heavy financial burden on families.

Most of previous studies (6-9) were conducted before the recent drastic changes in population structure and are limited by the younger age structure (fewer individuals ≥80 years of age), lower education levels (up to 50% illiterate individuals), and life-expectancy-related female gender bias of study samples. For example, in an international multicenter study involving 1160 urban and 1002 rural Chinese subjects, 19.7% and 12.1% of these populations, respectively, were ≥80 years of age and 57.8% of the rural population was illiterate (8). Thus, the results of these surveys may not fully reflect the overall functional status of China's current elderly population.

In China, veterans form a special group who live in veterans' communities, and facilitate research in elderly populations that include formerly underrepresented males and well-educated individuals. Therefore, we

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designed a cross-sectional study to investigate neurological diseases in elderly Chinese veterans living in Beijing with three stages: baseline data collection; initial diagnosis of neurological diseases through the systematic assessment; and confirmation of the diagnoses during a 6-month follow-up period. We mainly analyze baseline characteristics in this paper.

Study design and methods

Sample size determination

Previous research has found a 10% prevalence of MCI in people ≥60 years of age (10, 11). With a permissible error of 10%, we thus determined that the required sample size for this research was 3600 individuals.

Participants and tools

Veterans included in this study were ≥60 years of age and had lived in a veterans' community in Beijing for more than 1 consecutive month. Based on age and gender composition, we used cluster sampling to select 44 veterans' communities in Beijing for investigations. At baseline, we collected the information of demographics (age, gender, education and marital status), past medical history and evaluated functional status and care needs. The functional status was evaluated by the Chinese version of the ADL-20 scale, which was developed according to Lawton and Brody's ADL scale (12). The Chinese version consists of 10 items evaluating personal ADL (PADL) and 10 items evaluating instrumental ADL (IADL) with confirmed reliability and validity. Subjects who had difficulty in performing any IADL or PADL task were considered dependent (13).

Quality control

Neurologists and residency in clinical neurology participated in the study. All the staff received strict training and passed qualification tests. Training included instruction in standard survey methods, questionnaire guidance, scaling, and scoring methods. Twenty staff members completed the training program and showed acceptable interrater reliability (κ=0.872-0.934). Two pre-surveys were conducted to evaluate the quality of training and questionnaire completion, investigator compliance, and subject cooperation. Problems identified in the pre-surveys were addressed through staff retraining and improvement or revision of questionnaire items.

Database creation and statistical analyses

We created a database using Lauritsen JM & Bruus M. EpiData (version 3). Data were entered separately by two certified neurologists to allow verification. Prior to statistical analysis, the outliers for each variable were checked to minimize data-entry errors. SPSS software (ver. 12.0; SPSS, Inc., Chicago, IL, USA) was used to generate descriptive statistics and perform Kappa analysis. The chi-squared ($\chi 2$) test was used to compare in different groups. Correlation between variables was calculated by Spearman's rho. Stepwise logistic regression was used to determine the independent effects of diseases in different systems on PADL and IADL.

Ethics

The study protocol was approved by the Chinese PLA General Hospital Ethics Committee. Each subject was informed of the objective, significance, and content of the study. Informed written consent was obtained from all participants or their legal guardians.

Results

4219 veterans aged ≥60 years were screened; 413 of these individuals did not meet the inclusion criteria, 217 refused to participate and 116 suffered from serious diseases that prevented their full cooperation with the study requirements. Therefore, 3473 veterans were enrolled. The overall response rate was 91.3%.

Demographic characteristics

Table 1 presented the demographics of participants. The mean age of all participants was 77.97 ± 5.10 years; 95.8% were ≥70 years of age and 30.8% were ≥80 years of age. Most participants (94.4%) and individuals ≥80 years of age (95.9%) were male. The majority of the study population (98.3%) was of Han ethnicity. The veterans had received an average of 9.93 ± 4.18 years of education and 78.8% had received more than 6 years; those ≥80 years of age had received an average of 9.18 ± 4.02 years of education and 74.7% had received more than 6 years. The percentages of widowed, divorced and remarried veterans were 10.1%, 0.2% and 1.2%, respectively.

PADL and IADL scores indicated (Table 2), respectively, that 24.7% and 34.6% of veterans were dependent. The number of dependent veterans increased with age and we found significant positive correlations between age and the proportions of PADL and IADL dependent veterans ($r = 0.302, 0.383$; $P < 0.001$ for both). 62.5% of veterans were belonged to empty nesters. The proportion of empty nesters differed significantly among different age groups ($P < 0.001$). PADL scores classified

Table 1
Demographics of participants

Variable	Male		Female		Total	
	No.	%	No.	%	No.	%
Age (yrs)						
60–69	143	4.4	38	19.4	181	5.2
70–79	2109	64.4	114	58.2	2223	64.0
80–89	985	30.1	42	21.4	1027	29.6
90–100	40	1.2	2	4.8	42	1.2
Education duration (yrs)						
<1	17	0.5	3	1.5	20	0.6
1–6	698	21.3	19	9.7	717	20.6
>6	2532	77.3	170	86.8	2702	77.8
N/A	30	0.9	4	2.0	34	1.0
Marital status						
Married	2951	90.1	119	60.7	3070	88.4
Widowed	276	8.4	74	37.8	350	10.1
Divorced	4	0.1	3	1.5	7	0.2
Remarried	42	1.3	0	0.0	42	1.2
N/A	4	0.1	0	0.0	4	0.1

Table 2
ADL and care needs of veterans in different age groups

	60-69		70-79		80-89		≥90		Total		χ2	P
	No.	%	No.	%	No.	%	No.	%	No.	%		
Empty nesters	79	43.6	1,437	64.6	636	61.9	18	29.3	2170	62.5	38.854	< 0.001
Dependent veterans (PADL)	11	6.1	385	17.3	428	41.7	35	83.3	859	24.7	349.688	< 0.001
Dependent veterans (IADL)	16	8.8	559	25.1	593	57.7	35	83.3	1203	34.6	534.635	< 0.001
Veterans requiring care	9	5.0	333	15.0	458	44.6	36	85.7	836	24.1	462.161	< 0.001

23.6% of empty nesters and 26.6% of non-empty nesters as dependent without significant differences (P = 0.137), while IADL scores classified 33.4% and 36.7%, respectively, as dependent with significant differences (P = 0.017). By stepwise logistic regression of past medical history, PADL dependent was associated with neurological diseases (dementia (B [SE] 2.68 [0.32], P < 0.001), Parkinson's disease (B [SE] 1.87 [0.27], P < 0.001), hemorrhagic stroke (B [SE] 1.45 [0.30], P < 0.001), ischemic stroke (B [SE] 1.18 [0.10], P < 0.001), insomnia (B [SE] 0.26 [0.13], P = 0.047), Falls (B [SE] 0.46 [0.09], P < 0.001)], cardiovascular diseases [coronary heart disease (B [SE] 0.48 [0.10], P < 0.001), heart failure (B [SE] 1.45 [0.37], P < 0.001)], chronic obstructive pulmonary disease (B [SE] 0.27 [0.09], P = 0.004), renal dysfunction (B [SE] 0.44 [0.17], P = 0.010) and dysaudia (B [SE] 0.36 [0.10], P < 0.001). While IADL dependent was associated with neurological diseases [dementia (B [SE] 2.98 [0.44], P < 0.001), Parkinson's disease (B [SE] 1.95 [0.32], P < 0.001), hemorrhagic stroke (B [SE] 1.04 [0.31], P = 0.001), ischemic stroke (B [SE] 1.08 [0.10], P < 0.001), insomnia (B [SE] 0.52 [0.12], P < 0.001), Falls (B [SE] 0.48 [0.08], P < 0.001)], cardiovascular diseases [coronary heart disease (B [SE] 0.57 [0.09], P < 0.001), heart failure (B [SE] 2.14 [0.51], P < 0.001), hypertension (B [SE] 0.29 [0.09], P = 0.001)], chronic obstructive pulmonary disease (B [SE] 0.58 [0.09], P < 0.001), diabetes (B [SE] 0.29 [0.09], P = 0.002), dysaudia (B [SE] 0.46 [0.10], P < 0.001) and glaucoma (B [SE] 0.46 [0.18], P = 0.010).

In our study, 24.1% of veterans required care (Table 2). The proportion of veterans requiring care increased significantly with age (r = 0.351, P < 0.001), and 46.2% of veterans ≥80 years of age required care. Approximately 60.1% of veterans received care from family members. Spouses and housemaids were the primary caregivers for veterans; few offspring or other persons provided care. We found significant positive correlations between the proportions of PADL and IADL dependent veterans and that of veterans requiring care (r = 0.607, 0.521; P < 0.001 for both). 22.3% of empty nesters and 27.1% of non-empty nesters required care with significant difference (P = 0.001).

Discussion

In the present study, most participants were men ≥70 years of age (30.8% were ≥80 years of age). The biased

gender composition of the study population reflects the gender distribution of veterans. The data of individuals ≥80 years of age, especially males, can compensate for the deficiencies of previous studies. Education levels of veterans and those ≥80 years of age were also significantly higher in this study than in the general elderly population of China, addressing this weakness in previous research. The proportions of divorced, remarried, and widowed people in this study are significantly lower than in the general elderly population of China (0.6%, 2.3%, 26.9%) (1), suggesting that marital status was more stable in our sample of veterans.

The consistently increasing proportions of PADL and IADL dependent veterans by age group indicated that the functional status of veterans decreased significantly with age. However, the functional status of our veterans, by age group, was better than that of China's general urban elderly population. This may be attributed to the high-quality support and professional healthcare services provided in veterans' communities. Previous study pointed out the association between ADL and mortality (14). In this study, we found PADL and IADL dependent were associated with highly fatal diseases, such as neurological, cardiovascular and respiratory diseases. In the meantime, we found the proportion of ADL dependent in Chinese veterans were higher than general American elderly population but lower than elderly American veterans (15, 16).

Although 'empty-nest crisis' has gradually attracted wide attention, the status of empty-nest elderly people in China remained unknown. We found a high percentage of empty-nest households among veterans aged 70-79 and 80-89 years. Empty nesters had better overall functional status than non-empty nesters, reflected by lower proportions of PADL dependent veterans and of veterans requiring care. In contrast, we found no significant difference between these two groups in the proportion of IADL dependent veterans. Therefore, better functional status can be an important factor for empty nesters to live independently.

The results suggested that age, PADL and IADL scores were positively correlated with the proportion of veterans requiring care. Therefore, ADL criteria can be used to evaluate the levels of care needed by elderly people. For instance, elderly people who cannot take care of themselves require rehabilitative care, while those who can care for themselves require only basic daily care. In veterans' community, management teams and outpatient clinics provide basic healthcare services, timely and effective visits and referrals, and comprehensive care for the daily needs of veterans, such as traveling, eating and drinking, laundry, shopping, and entertainment (15). A rigorous evaluation and management system ensures the quality of community healthcare, nursing, and life care.

In conclusion, ADL dependent is associated with age and some neurological diseases, such as dementia, Parkinson's disease, hemorrhagic stroke, ischemic stroke, insomnia. Therefore, it is necessary to perform a cross-sectional survey for neurological diseases in the setting of Beijing military community.

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Conflict of interest: We declare that we have no conflict of interest.

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