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Original article

Identifying residents at greater risk for cognitive decline by Minimum Data Set in long-term care settings

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ABSTRACT

Background/Purpose: Dementia is associated with an individual's dependency and disability, and poses a great care burden to families and societies. Neuroimaging tools and screening questionnaires are important for early diagnosis. However, factors predicting cognitive decline still remain unknown among the elder population, especially in long-term care settings.
Methods: A total of 1279 residents of veteran homes in Taiwan were enrolled in this prospective study. Demographic data and items retrieved from the Minimum Data Set, including resident assessment protocols (RAPs), Minimum Data Set Cognitive Scale scores, and Resource Utilization Group-III Activities of Daily Living (RUG-III ADL) Scale scores, were analyzed. The participants were also screened using the Mini-Mental Status Examination questionnaire and assessed by the 15-item Geriatric Depression Scale.
Results: All participants were male (mean age: 83.2 ± 5.1 years), and 9.9% developed significant cognitive decline. Obvious discrepancy in the prevalence of dementia and depression was noted between the results of screening tests and physicians' diagnosis. Participants with cancer, chronic lung disease, and poor RUG-III ADL status were at greater risk of hospitalization or death. By contrast, those with poor RUG-III ADL status, positive RAP triggers for cognitive loss/dementia, and higher sum of RAP triggers were at higher risk of developing cognitive decline.
Conclusion: The diagnosis of dementia and depression remained lower than expected among the elderly population. As presented here, poor physical function, presence of RAP triggers for cognitive loss/dementia, and a higher sum of RAP triggers were strong predictors for cognitive decline.

1. Introduction

Dementia is a syndrome caused by neurodegenerative disorders, which is characterized by progressive deterioration of memory, mental functions, and physical independence.[1,2] The prevalence of dementia was approximately 4.7% among people aged 60 years or older worldwide, and doubled every 5 years beyond the age of 65 years.[1,2] Dependency and disability resulting from dementia, increasing the burden to families and societies, have made dementia the second most burdensome chronic condition and it has been recognized as a global health priority by the World Health Organization.[1] In Asia, the prevalence of dementia among the elderly population ranged from 4.2% to 33.2%, and was expected to be higher among residents of nursing homes and long-term care facilities.[3–5] In addition to genetic factors and socio-environmental backgrounds, nutrition, mid-age hypertension, diabetes, hypercholesterolemia, chronic inflammation, depression, and tobacco and alcohol consumption were found to be possible causes of dementia and cognitive decline.[6–9]

Despite the development of advanced diagnostic instruments, predicting further cognitive decline among elderly people with or

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without dementia still remains a great challenge.[4,6,10] Various ongoing studies were aimed at identifying indicators related to early cognitive decline in later life with the potential to reverse or prevent further cognitive decline. Several factors have been identified, such as slow gait, poor physical performance status, social disengagement, depression, low vitamin B12 serum level, poor diabetes management, and poor renal function.[11–18] Predictive factors for cognitive decline among the community-dwelling elderly identified in previous studies were very heterogeneous. Furthermore, such evidence was rarely generated from Chinese populations, especially among those who live in retirement communities. Residents of veteran homes in Taiwan were basically physically fit and cognitively intact, but their social engagement was infrequent and they might be more vulnerable to cognitive decline.[19] Our previous study has clearly demonstrated that both multimorbidities and care complexity significantly predicted 1-year mortality in this setting, but predictive factors for cognitive decline remained unclear.[19] Therefore, the main purpose of this study was to explore cognitive decline among residents living in veteran homes and identify its risk factors, so as to develop an early, integrated intervention program in long-term care settings.

2. Methods

2.1. Participants

The Longitudinal Older Veterans Study was started in 2006 by the implementation of the Minimum Data Set (MDS) in veteran homes in northern Taiwan for health management and care planning. Residents of two veteran homes, who were admitted due to their single or widowed status, were basically physically independent and cognitively intact even with a relatively low social engagement. The Chinese version of the MDS Nursing Home 2.1 has been used since January 2006.[20] A total of 1380 residents were enrolled in this study from January 2006 to December 2010. Participants were interviewed by well-trained research staff during the study period and were followed every 3 months for 18 consecutive months. Assessment of cognitive function, depression scale, and MDS questionnaires were all completed by specified research staff in the veteran homes in order to minimize all possible bias. All residents aged 65 years or older who consented to participate in this study and were regularly assessed in the same facilities were included for analysis. All residents were followed for 18 months to ensure that changes in cognitive status were in a steady rather than a fluctuating condition, such as delirium caused by other acute illness. Those who were in a state of advanced dementia at enrollment, had severe difficulties in communication, could not complete the evaluations for 18-month follow-up, or moved out of the facilities were not included for analysis, to avoid possible biases regarding temporal fluctuation. This study was approved by the Institutional Review Board (IRB) of the National Yang Ming University, Taipei, Taiwan (IRB No. 950045). Written informed consent was acquired from participants with intact cognition or from legally authorized representatives of those with cognitive impairment during the initial screening test.

2.2. Cognitive function

Cognitive function was evaluated using the MDS Cognitive Scale (MDS COGS), which is constructed based on eight MDS items for cognitive patterns (long- and short-term memory, location of one's own room, knowing oneself in the facilities, orientation item recall, and decision-making), communication patterns (making oneself understood), as well as physical functioning (ability to dress oneself). All participants were classified into four categories based on their cognitive status: "intact–mild impairment", "mild–moderate impairment", "moderate–severe impairment", and "severe–very severe impairment" as described previously.[21] In addition to the Cognitive Performance Scale, the MDS COGS has been proved to be as efficient as the Mini-Mental State Examination (MMSE), with good validity in dementia screening in facility settings.[22] However, the Chinese version of the MMSE was also employed during this study, and the participants were classified as those having "dementia" if the MMSE scores were < 24, or "no dementia" if the MMSE scores were equal or more than 24.[23]

2.3. Depression

Mood disturbance is evaluated by the 15-item Geriatric Depression Scale (GDS-15) with good detection sensitivity. Participants with a GDS-15 score of ≥ 5 were identified as having "depression" and those with a score of <5 as having "no depression".[24,25]

2.4. Social engagement

Social engagement is the ability to initiate social interaction and to be receptive to social overtures from others, including the development of social ties, contact, and interactions. The MDS index of social engagement is calculated based on six MDS items scored dichotomously as positive versus absent, with the sum ranging from 1 to 6.[26] Higher MDS index of social engagement scores indicate better interaction with others and better quality of life.

2.5. Physical function

Physical function was scored using MDS Resource Utilization Group-III for Activities of Daily Living (RUG-III ADL) version 5.2 revised in 2010.[27] The RUG-III ADL score calculation includes items of bed mobility, transfer, toilet use, and eating, with the total score varying from four (completely independent) to 18 (completely dependent). Physical dependence was identified by a higher RUG-III ADL score and showed a worsening status as the score increases.

2.6. Resident assessment protocol triggers

Resident assessment protocols (RAPs) were established from different combinations of MDS items to evaluate problems that residents faced and required intervention.[28] There are 18 RAP triggers for different problems, including delirium, cognitive loss/dementia, vision function, communication, ADL/functional rehabilitation, urinary incontinence, psychosocial well-being, mood, behavior, activities, falls, nutrition, enteral feeding, dehydration, dental care, pressure ulcers, psychotropic drug use, and physical restraint. The sum of RAP triggers, considered as an indicator for geriatric syndrome, was also included for analysis.[19]

2.7. Outcome measurement

Cognitive decline was defined as worsening of the baseline MDS COGS category during the follow-up period. For possible ceiling effect in multivariate analysis, residents with MDS COGS category of "severe–very severe dementia" were excluded from final analysis, and only factors of dementia diagnosed by MMSE were considered instead of MDS COGS status. As cognitive decline is frequently seen in the terminal trajectory of dementia, and because many disease factors play a role in mortality, we categorized all participants into three groups: nondecliner, decliner, and death/hospitalization due to dependent status. By such grouping method,