

# Depression is the Strongest Independent Risk Factor for Poor Social Engagement Among Chinese Elderly Veteran Assisted-living Residents

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**Background:** Social engagement prolongs the lifespan and preserves cognition in the elderly. However, most studies concerning social engagement have been conducted in Western countries; few have been performed in the Chinese population. This study attempted to identify the risk factors for poor social engagement among elderly veterans in Taiwan.

**Methods:** A total of 597 male veterans were enrolled, with a mean age of  $80.8 \pm 5.0$  years. This cross-sectional study employed the Resident Assessment Instrument (RAI) Minimum Data Set (MDS), the Geriatric Depression Scale–Short Form (GDS-SF), and the Mini-Mental State Examination (MMSE). Multivariate logistic regression analysis was done to investigate significant independent risk factors for poor social engagement, which were identified using the MDS Index of Social Engagement (ISE).

**Results:** Mean ISE score was  $1.5 \pm 1.3$  (range, 0–5); 52% of subjects had poor levels of social engagement ( $ISE < 2$ ;  $312/597$ ). Regression analyses suggested that depression (OR, 6.6; 95% CI, 2.7–16.1;  $p < 0.001$ ), illiteracy (OR, 2.2; 95% CI, 1.3–3.8;  $p = 0.003$ ), the presence of unsettled relationships (OR, 3.6; 95% CI, 1.5–8.7;  $p = 0.004$ ), and cognitive impairment (OR, 2.0; 95% CI, 1.1–3.9;  $p = 0.03$ ) were significant independent risk factors for poor social engagement, after controlling for age, marital status, level of daily living activity and degree of sensory impairment.

**Conclusion:** Poor social engagement is common among Chinese assisted-living veteran home residents. Depression is the greatest risk factor of poor social engagement in this population. [*J Chin Med Assoc* 2009;72(9):478–483]

**Key Words:** assisted-living, depression, elderly, risk factor, social engagement

## Introduction

Social engagement refers to performance of meaningful social context for either leisure or productive activity. It has been defined as “the ability to take advantage of opportunities for social interaction and to initiate actions that engage in the life of the home”.<sup>1</sup> Its importance in the elderly population has come under scrutiny in the last few decades. Most studies have revealed that poor social engagement results in poor quality of life.<sup>2</sup> Higher levels of social engagement have been associated with higher levels of wellbeing and longer survival

in the elderly.<sup>3,4</sup> These benefits include protective effects on mortality in long-term care populations, along with cognitive preservation and reduced depressive symptoms in community-dwelling elderly.<sup>5–7</sup>

Several factors have been proven to inhibit elderly social engagement, such as functional impairment in the activities of daily living (ADL), poor cognitive function and sensory impairment that inhibits communication.<sup>8,9</sup> Many studies have revealed strong inverse links between depression and social activities, but most looked at social interaction as a dependent variable.<sup>7,10–12</sup> To the best of our knowledge, only 1



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recent study has found social engagement to be independently correlated with depressive symptoms by using social engagement as an outcome measure.<sup>13</sup> However, other studies did not include depression as a variable to assess the risk factors of limited social engagement in nursing home or continuing-care facility populations.<sup>8,9,14,15</sup> Resident–resident and resident–care provider relationships have also been reported to be related to residents’ social interaction,<sup>16–18</sup> but the previous study did not control for interpersonal relationship issues.<sup>8,9,13</sup> Further comprehensive research on factors that influence social engagement is worth undertaking.

Since there are few studies concerning social engagement in Chinese populations, this study was undertaken to investigate its related factors in a group of Chinese male veteran assisted-living home residents. It investigated prevalence rates and independent predictors of social engagement using validated instruments.

## Methods

### *Study design, participants and data collection*

The veterans home care system was established by the Veterans Affairs Commission in Taiwan to provide public housing and living assistance for generally healthy veterans in need. This study is a sub-study of the Longitudinal Older Veterans (LOVE) study, which is characterized by systematic implementation of the Resident Assessment Instrument (RAI) Minimum Data Set (MDS) in Banciao Veterans Home, the largest facility for elderly veterans in Northern Taiwan.<sup>19,20</sup> Although the Banciao Home is more like an assisted-living facility, this study employed the MDS Nursing Home version 2.1 because the MDS Assisted Living instruments currently lack a Chinese translation.<sup>21</sup> This instrument has also been shown to have good reliability and validity in several countries.<sup>22,23</sup>

All facility residents were invited to participate; those who agreed were screened on enrolment after informed consent was obtained. Exclusion criteria included altered consciousness and acute physical illnesses. The rate of participation was 68%, and a total of 597 subjects were enrolled into the study. The study was approved by the Institutional Review Board and Ethics Committee of National Yang-Ming University, and the use of the RAI-MDS was authorized by InterRAI Headquarters and InterRAI Taiwan.

### *Measurement*

Demographic data gathered included age, sex, marital status, years spent living in facilities, and level of

education. The MDS/RAI definition of “level of education” we used was as follows: level 1, illiterate; level 2, non-formal education; level 3, elementary school; level 4, junior high school; level 5, senior high school; level 6, 14 years of education; level 7, college or university education. All instruments were performed by trained nurses at bedside.

### *Social engagement*

Social engagement was measured using the Index of Social Engagement (ISE), which is constructed from 6 dichotomous MDS items: (1) at ease interacting with others; (2) at ease doing planned or structured activities; (3) at ease doing self-initiated activities; (4) establishes own goals; (5) pursues involvement in life of facility; and (6) accepts invitations into most group activities.<sup>1</sup> The items of ISE in MDS version 2.1 are the same as those in MDS version 2.0. The ISE ranges from 0 (lowest) to 6 (highest) and has good interrater reliability and internal consistency.<sup>23</sup> In order to examine the factors associated with poor social engagement, lower cutoffs were used in this study; scores < 2 were considered to indicate poor social engagement.

### *Interpersonal relationships: emphasis on unsettled relationships (Un-SR)*

The Index of Unsettled Relationships (Un-SR) was evaluated using 7 dichotomous MDS items: (1) covert/open conflict with or repeated criticism of staff; (2) unhappy with roommate; (3) unhappy with residents other than roommate; (4) openly expresses conflict/anger with family/friends; (5) absence of personal contact with family/friends; (6) recent loss of close family member/friend; and (7) does not adjust easily to change in routines.<sup>21</sup> The score ranges from 0 (lowest) to 7 (highest). A score of 0 is dichotomized as *no problem*, while scores higher are categorized as problems.

### *ADL*

ADL classification was based on MDS items on self-performance of ADLs, ranging from independent to totally dependent. The 7-category (hierarchical) ADL index ranges from minor to highly dependent. The ADL index is dichotomized, with the 4 highest scores classified as dependent, and the 3 lower scores classified as relatively independent.<sup>24</sup>

### *Sensory impairments*

Hearing impairment was measured using the 4-level ordinal MDS items that assess the ability to hear with environmental adjustments. Scores range from 0 (adequate) to 3 (severe). Visual impairment was measured

using the 5-level ordinal MDS items that assess the ability to see with environmental adjustments. The scores range from 0 (adequate) to 4 (severe). Adequate is considered *no problem* and *minimal*, *moderate* and *severe* impairment are dichotomized as problems.

### Depression

The Geriatric Depression Scale–Short Form (GDS-SF) consists of 15 dichotomous questions, with a higher score indicating severe depression, and is as effective as the complete GDS in depression screening; the Chinese version has also been validated.<sup>25,26</sup> The GDS was used to assess the severity of depression because the MDS-based Depression Rating Scale seemed to be inadequate in previous research.<sup>13,27</sup> A score of  $\geq 6$  was defined as positive for depression in the current study.<sup>26</sup>

### Cognition

Cognitive functions were assessed using the Mini-Mental State Examination (MMSE).<sup>28</sup> The MMSE is one of the most widely used instruments for screening cognitive functions among the elderly; the total score ranges from 0 to 30 (a lower score indicates a greater degree of impairment). Performance on the MMSE is highly influenced by educational level. Cognitive impairment in this study was defined according to the education-adjusted cutoffs of 23/24 for literate subjects and 13/14 for illiterate subjects.<sup>29</sup>

### Statistical analyses

Data were analyzed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA). ANOVA and  $\chi^2$  test were used to examine the relationships between ISE and demographic variables. The prevalence of poor social engagement was calculated by dividing the number of subjects whose ISE scores were lower than 2 by the total number of surveyed persons. Multivariate logistic regression was used to examine the independent risk factors for poor social engagement, such as depression, cognitive impairment, unsettled relationships, illiteracy, level of ADL, marital status, age, hearing impairment and visual impairment. Two-tailed tests were used throughout, and a  $p$  value  $< 0.05$  was considered to indicate statistically significant difference.

## Results

### Demographics

In total, 597 elderly males participated in this study. Participants were significantly younger than those who refused ( $80.8 \pm 5.0$  years *vs.*  $84.1 \pm 2.8$  years;  $p < 0.001$ ). Of all participants, 93% were aged  $\geq 75$  years, and

65% had been institutionalized for longer than 5 years (86% of them at the same institution for more than 5 years). Mean ISE was  $1.5 \pm 1.3$  (range, 0–5); 52% ( $n = 312$ ) of subjects had poor social engagement (ISE 0 or 1), 20% ( $n = 120$ ) had moderate social engagement (ISE 2), and 28% ( $n = 165$ ) had a high degree of social engagement (ISE 3, 4 or 5). Among those with a high level of social engagement, only 3 had a score of ISE 5; none obtained the full score of ISE 6. Mean GDS-SF score was  $2.0 \pm 2.3$  (range, 0–12); 8.7% ( $n = 52$ ) of subjects were considered to be depressed. Mean MMSE score was  $26.7 \pm 3.6$  (range, 10–30); 10.4% ( $n = 62$ ) of subjects were considered to be cognitively impaired. Mean level of education was  $3.0 \pm 1.5$  (range, 1–7); 14.3% of subjects were illiterate. Ninety-six percent of subjects were independent in their ADL, and 6.7% had unsettled relationships. Seventy-nine percent had adequate vision, and 82.5% had adequate hearing. Subjects were divided into 3 groups according to their level of social engagement, and significant differences were noted in severity of depression, cognitive impairment, unsettled relationships, education level, level of ADL, and marital status. However, no differences were noted in age or functional visual/hearing impairments. The demographic characteristics of the subjects are listed in Table 1.

### Risk factors of low ISE by multivariate logistic regression analyses

Stepwise regression analyses were performed to ascertain which variables were independently associated with ISE. The following factors were found to be significantly related to ISE: depression (OR, 6.6; 95% CI, 2.7–16.1;  $p < 0.001$ ); cognitive impairment (OR, 2.0; 95% CI, 1.1–3.9;  $p = 0.03$ ); unsettled relationships (OR, 3.6; 95% CI, 1.5–8.7;  $p = 0.004$ ) and illiteracy (OR, 2.2; 95% CI, 1.3–3.8;  $p = 0.003$ ). Table 2 shows the results of the regression model. The other previously mentioned variables were not significantly associated with level of social engagement.

## Discussion

The elderly Chinese male veterans in this study often (52%) had poor social engagement (ISE  $< 2$ ). Depression, poor cognition, unsettled relationships and illiteracy were all independent predictive factors for poor social engagement. The rate of low ISE in our population was higher, even when using equal cutoffs, when compared with previous research in other countries (United States, Europe, Japan) of nursing home populations (99% *vs.* 51–68%, ISE  $< 5$ ),<sup>8,9</sup> and when

**Table 1.** Demographic characteristics of Chinese male veteran assisted-living residents with poor, moderate and high levels of social engagement\*

	Total (n = 597)	Level of social engagement			P
		Poor (ISE < 2) (n = 312)	Moderate (ISE = 2) (n = 120)	High (ISE = 3, 4, 5) (n = 165)	
Age	80.8 ± 5.0	81.2 ± 4.8	80.0 ± 5.1	80.6 ± 5.2	0.07 <sup>†</sup>
65–74	7.0	5.1	9.2	9.1	0.25 <sup>†</sup>
75–84	73.6	73.1	73.3	74.5	
≥ 85	19.4	21.8	17.5	16.4	
Severity of depression					< 0.001 <sup>†</sup>
GDS ≥ 6	8.7	14.6	3.4	1.2	
GDS ≤ 5	91.3	85.4	96.6	98.8	
Education-adjusted cognitive impairment					0.02 <sup>†</sup>
Impaired	10.4	13.8	5.8	7.3	
Non-impaired	89.6	86.2	94.2	92.7	
Unsettled relationship subscale, 0–7					< 0.001 <sup>†</sup>
Score ≥ 1: problems	6.7	10.6	1.7	3.0	
Score = 0: no problems	93.3	89.4	98.3	97.0	
Educational level					0.01 <sup>†</sup>
Illiterate	14.3	18.4	11.8	8.2	
Non-formal education	32.7	28.7	35.3	39.0	
Elementary school	23.9	26.5	21.8	19.5	
High school or above	29.0	26.5	31.1	33.3	
Activities of daily living					0.009 <sup>†</sup>
Hierarchy score > 2: dependent	3.8	6.1	2.5	0.6	
Hierarchy score ≤ 2: independent	96.2	93.9	97.5	99.4	
Functional visual impairment					0.81 <sup>†</sup>
0: adequate function	79.4	80.1	79.2	77.6	
> 0: impaired	20.6	19.8	20.9	22.4	
Functional hearing impairment					0.96 <sup>†</sup>
0: no impairment	82.5	82.7	81.7	82.9	
> 0: impaired	17.5	17.3	18.3	17.1	
Marital status					0.001 <sup>†</sup>
Married	23.3	26.0	23.7	17.8	
Single	53.1	60.7	45.8	44.2	
Divorced	5.9	2.6	7.6	11.0	
Separated	5.8	1.6	6.8	12.9	
Widowed	11.9	9.1	16.1	14.1	

\*Data presented as mean ± standard deviation or %; <sup>†</sup>ANOVA; <sup>‡</sup>χ<sup>2</sup> test. ISE = Index of Social Engagement; GDS = Geriatric Depression Scale.

compared with a study in a Dutch nursing home population (72% vs. 51%, ISE < 3).<sup>7</sup> The present data suggest that low levels of social engagement is a general problem among Chinese elderly veterans in assisted-living homes. In addition, these results may reflect Chinese male veteran population characteristics, especially when they get older. Research on male veterans has shown that symptoms of post-traumatic stress disorder (such as emotional numbing) result in social-interpersonal impairment.<sup>30,31</sup> Poor attachments throughout life may

hinder social engagement in the elderly.<sup>32</sup> The poor social engagement levels we found in our veteran population may stem from post-traumatic stress disorder suffered after World War II.

Depression appeared to be the strongest independent factor associated with poor social engagement. Core DSM-IV (*Diagnostic and Statistical Manual of Mental Disorders*, 4<sup>th</sup> Edition) diagnostic criteria, such as psychomotor retardation, loss of interest, loss of energy, and poor concentration, could be barriers to

**Table 2.** Predictive factors of poor social engagement in Chinese male veteran assisted-living residents

	Odds ratio	95% confidence interval	p
Depression: GDS $\leq 5$ vs. $\geq 6$	6.6	2.7–16.1	<0.001*
Education-adjusted cognitive impairment: yes vs. no	2.0	1.1–3.9	0.03*
Unsettled relationship: yes vs. no	3.6	1.5–8.7	0.004*
Illiterate: yes vs. no	2.2	1.3–3.8	0.003*
Activities of daily living: dependent vs. independent	3.6	1.0–13.6	0.05
Visual impairment: yes vs. no	–	–	0.13
Hearing impairment: yes vs. no	–	–	0.42
Single/divorced/widowed/separated vs. currently married	–	–	0.14
Age (continuous variable)	–	–	0.21

\* $p < 0.05$ , multivariate logistic regression model:  $r^2 = 0.20$ . GDS = Geriatric Depression Scale.

the joining and performing of social activities.<sup>33</sup> A recent cross-sectional study reported that depression was an important independent risk factor for poor social engagement in a Dutch nursing home.<sup>13</sup> However, that study assessed residents within 10 days of admission, while our subjects were long-term residents. Our data confirm and extend the finding that depression is the strongest risk factor for poor social engagement not only in newly admitted residents but also in those who are acclimated to assisted-living facilities.

One longitudinal study of community-dwelling elderly showed that social engagement reduced the severity of depression among initially non-depressed residents (Center for Epidemiologic Studies Depression Scale, CES-D < 16).<sup>7</sup> Longitudinal studies that use social engagement as an outcome measure are required in future to elucidate the causal relationship.

In this study, poor cognition was found to be a risk factor for poor social engagement. It should come as no surprise that any deficits in cognitive function with regard to memory, orientation, and language will inhibit social participation or interaction.<sup>1,8</sup>

Our data also revealed that the greater the number of unsettled relationships, the poorer the level of social engagement. The MDS index of unsettled relationships includes several domains (staff–resident, family–resident, resident–resident). Some studies have indicated that the care provider–resident relationship is key to the quality of care in long-term care facilities.<sup>16,17</sup> Other research has indicated that resident friendships hold much social meaning and appear to reduce mortality rates among the elderly.<sup>18,34</sup>

Illiteracy was also found to be a predictor of poor social engagement in this study. Activities may need to be modified to make them more suitable for illiterate residents. A generally low level of education among our residents heightens the need for this.

Compared to previous reports, functional sensory impairments and ADL functioning seemed to be less

related to social engagement among our subjects. This may be because our subjects are more independent and healthy, with better vision and hearing, than those who live in nursing homes.<sup>8,9,15</sup>

This study had some limitations. The findings do not indicate cause and effect relationships due to the cross-sectional design. The ISE cutoff used in the present study is lower than that used in previous investigations, so any direct comparison should only be made with caution. Limited information from those who refused to participate in the study made it difficult to compare their characteristics with those of study participants. Finally, this study focused on elderly male veterans, which limits its applicability to those who do not fall into this category.

Assisted living is one of the fastest growing types of senior housing in developed countries.<sup>35</sup> Understanding the significance of social engagement in this setting is crucial if we are to provide the best level of care to the aging population.

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