



Functional limitations and somatic diseases are independent predictors for incident depressive disorders in seniors: Findings from a nationwide longitudinal study



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ABSTRACT

Purpose: Few nationwide comprehensive studies analyzed the factors leading to the onset of depression in correlation with medical disease and other related factors concerning geriatric depression. This study examined medical diseases with other factors which lead to depression among the elderly.

Methods: This Taiwan-based longitudinal study examined a collection of 1467 seniors aged over 65. Subjects who fit this criteria were initially interviewed in 2003, and then four years later. Independent variables included baseline demographics, chronic medical illnesses, and the change of subjects' self-perceived health status, functional limitations including ADL, IADL and mobility limitation factors. The dependent variable was the symptoms of incident depression, as ascertained by the ten-item questionnaire during the later session. The logistic regression analyses were used to examine some of the predictors related to depressive disorders.

Results: The findings showed that heart conditions (adjusted OR = 1.55, 95% CI: 1.12–2.15, $p = 0.008$) and joint disorders (adjusted OR = 1.51, 95% CI: 1.09–2.09, $p = 0.013$), as well as functional limitations, particularly IADL (adjusted OR = 1.81, 95% CI: 1.24–2.65, $p = 0.002$) and ADL (adjusted OR = 1.77, 95% CI: 1.27–2.47, $p = 0.001$) were independently associated with the onset of depression among the elderly population.

Conclusion: These findings indicated that when classifying symptoms of depression in geriatric patients with several underlying medical diseases, keen attention should be directed to the type of medical disorders and the functional deterioration in terms of daily activities and autonomic capabilities.

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1. Introduction

The average age of 23,340,000 populations in Taiwan is increasing at an alarming rate. In the past 60 years, the percentage of elderly members in Taiwan society has been increasing from 2.5% to approximately 11%. According to one national report, it was estimated to reach 20% by 2025.

Depression is one of the most common mental disorders within the elderly population, from which 18 to 37 percent of elderly people

have some sort of symptoms of depression (Ladin, 2008). Unfortunately, these problems tend to increase with age (Mossaheb et al., 2009). Elderly depression affects the sufferers overall sense of well-being (Gallo & Lebowitz, 1999) and also results in a decline of one's ability to complete everyday tasks (Gomes et al., 2014). At the same time, it also elevates the risk of committing suicide (Chiu et al., 2004). In addition, it would increase health care costs (Unutzer et al., 1997), disability (Lenze et al., 2001; Menchetti, Fava, & Berardi, 2001), and mortality risks (Penninx et al., 1999). The effects of elderly depression would heighten for females (Ma et al., 2008) and worsen cumulatively over time (Schoevers et al., 2000). Main concerns include a reduced ability to process information (Ladin, 2008), stress over financial issues (Tsai, 2005), declining perception of their

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physical condition, and existing chronic conditions (Chang-Quan et al., 2010; Heok & Ho, 2008). Smoking (Almeida & Pfaff, 2005), living on their own (Chou, Ho, & Chi, 2006), feelings of despair (Cacioppo, Hughes, Waite, Hawkey, & Thisted, 2006), lacking of social support (Oxman, Berkman, Kasl, Freeman, & Barrett, 1992), loss of interest in hobbies (Lomranz, Bergman, Eyal, & Shmotkin, 1988), disabilities (Kennedy, Kelman, & Thomas, 1990; Lyness, Yu, Tang, Tu, & Conwell, 2009; Roberts, Kaplan, Shema, & Strawbridge, 1997; Yang & George, 2005), a greater perception of stress (Kaneko, Motohashi, Sasaki, & Yamaji, 2007; Katsumata et al., 2005; Seplaki, Goldman, Weinstein, & Lin, 2006; Yang, 2007), as well as changes within the brain as demonstrated by enhanced neuro-imaging (Steffens, 2009). In addition, elderly depression could have a significant impact on families and medical care organizations aside from affecting the senior (Malhotra, Chei, Østbye, Chan, & Matchar, 2014).

The correlation between depression and disability has been reported by many researchers (Chen et al., 2012; Diefenbach, Tolin, & Gilliam, 2012; Garber et al., 2010; Pagán-Rodríguez & Pérez, 2012). Similarly, a correlation between depression and somatic disease has also been established (Evans, Sherer, Nick, Nakase-Richardson, & Yablon, 2005; Nuyen et al., 2006; Patten et al., 2005; Vink, Aartsen, & Schoevers, 2008). However, the interrelationship among somatic disease, disability, and depression have not been defined further (Carriere et al., 2009). Although data showed that disability and somatic diseases occurred more frequently when people age, it remained unclear whether or not depression and specific somatic diseases have relations due to an etiological cause, or whether somatic diseases would contribute to disability and then lead to depression (Schillerstrom, Royall, & Palmer, 2008). The objective of this study is to investigate the interrelationships between disability, somatic diseases and the onset of depression in seniors.

This background information brings out the following research questions:

1. Are medical diseases as well as functional limitations independently correlated to depression?
2. Are the relationships (mentioned in question 1) affected if the change of elderly perception of their health status is considered?

2. Subject and method

2.1. Study population

The participants in this study were comprised from a nationwide study of random seniors that are representative of the national average. The study was initiated in 1989, with a total of five follow-up sessions conducted in 3–5 year increments. Participant data was gathered at baseline in 2003 and at a follow-up session four years later in 2007.

The first study sampling in 2003 was made up of 5377 participants. To qualify for the study, participants with the following criteria at baseline would be excluded: (1) aged under sixty-five years; (2) case-level (clinically significant) depression symptoms (3) dementia or cognitive impairment. Moreover, those lost to follow-up in 2007 were also excluded from analysis. Hence, of those approached at baseline in 2003 with eligible criteria and completed follow-up in 2007, the total number of senior participants was 1467 for further analysis.

2.2. Outcome variables

Symptoms of depression were analyzed by CESD-10, a condensed version of the full-length CESD. The CESD-10 chart asked participants to evaluate whether they experienced ten followed depressive

conditions within the past week: (1) hunger levels; (2) irritable moods; (3) feeling as if everyday tasks required a major effort; (4) inability to sleep well; (5) feelings of loneliness; (6) perceptions of unfriendliness towards them; (7) inability to get motivated; (8) sadness; (9) happiness; and (10) a positive feeling about life. Each category was given a score of 0–3 (0 = not at all, 1 = infrequently, 2 = only once in a while, 3 = very frequently). However, the positive effect of items was reverse-coded for consistency. Scores fell between the ranges of zero to thirty. Elevated scores implied more serious issues related to depression. When a cutoff CESD-10 score of ≥ 10 is used for Chinese elderly, it is of high sensitivity (0.85) and specificity (0.80), by the use of receiver operator characteristic curve, which shows the presence of clinically significant depression (Boey, 1999). In this study, the CESD-10 scores were categorized into case-level (clinically significant) and non case-level depressive symptoms according to the cutoff score of 10. From 2003 to 2007, the incident depression was defined as those free of clinically significant depression (CESD-10 score < 10) at baseline but develop case-level depression (CESD-10 score ≥ 10) at follow-up session.

2.3. Independent variables

Correlates of initial symptoms of depression gathered at baseline seemed to be possible predictors of incident depression at the follow-up session four years later. Demographic factors recorded were date of birth, age group (65–69, 70–74, more than 75 years) and gender. School completion was categorized into inability to read (illiterate, 0 years), lacking any formal education (uneducated), elementary and junior high school education (1–9 years), finishing high school or vocational school (high school), and obtaining a university degree or post graduate studies (over 12 years). Ongoing medical conditions were classified as a series of six debilitations which could be related to depression, including hypertension, diabetes, heart disease, stroke, cancer, and arthritis or rheumatism.

Perception of health status was ranked as better, worse, or no-change in the past year. Functional limitation was monitored by using three scales. (1) ADL tasks were measured as requiring help with six items identified by Katz et al. (1970): including bathing, get dressed, eating, moving from the bed to a chair, and going to the bathroom (scale range 0–3). (2) IADL tasks were measured by using six items from the Older Americans Resources and Services (OARS) survey (Duke University Center for the Study of Aging and Human Development, 1978): using a vehicle for transportation and traveling alone, daily shopping by themselves, preparing their own meals, doing household chores and handling finances (scale range 0–3). (3) Mobile-limited conditions were analyzed in terms of eight factors (Dalle Carbonare et al., 2009; Nagi, 1976; Rosow & Breslau, 1966) (1) ability to lift their arms in the air; (2) grabbing objects; (3) walking a distance of 200–300 m; (4) walking up two stair levels; (5) jogging up to 30 min; (6) standing 15 min continuously; (7) squatting (8) transporting an 11-kg weight. Skills were scored on a four-point scale (0 = easily accomplished, 1 = slightly fatigued, 2 = relatively fatigued, 3 = extremely fatigued). Elevated scores demonstrated more fatigue.

2.4. Cognitive function

Cognitive functions were recorded in 2003 via nine questions (Pfeiffer, 1975): (1) What's your current location? (2) Where do you live? (3) What's today's date? (4) What is the current month? (5) What year is it? (6) What is your age? (7) Who is the president right now? (8) Who was the former president? (9) Subtracting a number from a larger sum several times consecutively. Several mistakes in this line of questioning indicate one's cognition has declined more severely. Subjects who made four mistakes or more were classified as cognitively impaired. Those cognitively impaired at baseline were excluded in this study.

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