Predictors of functional recovery (FR) for elderly hospitalized patients in a geriatric evaluation and management unit (GEMU) in Taiwan

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1. Introduction

With advances in modern technology and medicine, we are now facing an aging world with a rapidly increasing elderly population. Older people often have multiple comorbidities and are, therefore, at higher risk of iatrogenic conditions and admission due to acute illness (Saltvedt et al., 2002). In frail elderly patients, hospitalization is associated with functional decline that can lead to premature institutionalization, caregiver burden, higher resource utilization, and death (Covinsky et al., 1997; Carlson et al., 1998). Measurements of functional status are better predictors of hospital outcome than admitting diagnosis, diagnosis-related groups, and standard indices of illness burden (Winograd et al., 1991; Inouye et al., 1993, 1998). For clinicians, the recognition of predictive factors for functional change is of great value to target high-risk frail elderly patients during hospitalization and start appropriate interventions.

In elderly hospitalized patients, the functional trajectory, defined as the change in physical performance over a period of time, can be either decline or recovery, depending on the recruited patients’ characteristics and the treatments delivered. A recent systematic review of predictors for functional decline in elderly hospitalized patients reported a variety of clinical parameters, including age, diagnosis, activities of daily living (ADL), cognitive dysfunction, and residence (McCusker et al., 2002). However, the majority of prior studies focused on functional decline rather than functional recovery (FR), and studies targeting prognostic factors for functional gain have been lacking.
Diabetes mellitus and functional impairment in Taiwanese older men and women

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Abstract

Type 2 diabetes mellitus is strongly related to many kinds of functional impairment, even after adjusting for demographic and comorbid conditions. The current study examined sex differences in the relationships between Type 2 diabetes mellitus and functional impairment in an Asian population sample. Data were obtained from a national survey, the Social Environment and Biomarkers of Aging Study (SEBAS) in Taiwan. A total of 652 older adults aged ≥65 years were included in the study. Pearson’s $\chi^2$-test and multiple logistic regression analysis were used to examine the relationships between diabetes and functional impairments in older men and women. The reported numbers of impairments were significantly higher in women, in those aged ≥75 years, and in those with diabetes. There were sex and age differences in the relationships between diabetes and functional difficulties. Even after adjustment for age, education, and co-morbid conditions, men with diabetes were about four times more likely to have difficulties related to self-care, and women with diabetes were about two to three times more likely to have difficulties related to higher functioning than their non-diabetic counterparts. Sex differences should be considered when understanding the relationships between diabetes and functional impairments in older adults.

1. Introduction

Several cross-sectional and longitudinal studies have found that type 2 diabetes mellitus (DM) is strongly related to many kinds of functional impairments, including problems with mobility, balance, housework, and self-care, in older adults. These relationships remained significant even after adjusting for demographic factors (e.g., age, sex, education, and ethnicity) and common diabetes-related and diabetes-unrelated comorbidities (e.g., Rekeneire et al., 2003; Wray et al., 2005). Gender differences in functioning have been found in many studies involving older adults (Rahman and Liu, 2000; Liang et al., 2008). Although most of the studies focusing on diabetes and functioning partially accounted for the sex effect, only a few further explored the differences in the relationship between diabetes and functional impairment between older men and women (Gregg et al., 2000). Furthermore, it is unclear whether the results are applicable to older Asian people, because most of these studies took place in Western populations (e.g., Maty et al., 2004; Sinclair et al., 2008); Asian studies have been relatively rare (Chou and Chi, 2005).

In 2006, the prevalence of diabetes in Taiwan was around 14.5% in elderly men and 13.9% in elderly women (Chen et al., 2001); people with diabetes had relatively higher mortality rates (Tseng, 2004), and diabetes was ranked the fourth cause of death (Department of Health, Taiwan, 2006). The current study aimed to assess the sex differences in functional impairment related to diabetes in elderly Taiwanese people, and to examine if these relationships remained significant after adjusting for demographic factors and comorbidities.

2. Sample and methods

2.1. Study population

The data used in this study were from the Social Environment and Biomarkers of Aging Study (SEBAS) in Taiwan, which was a random subsample of an ongoing survey, the Taiwan Longitudinal Study on Aging (TLSA). The TLSA began in 1989 with a nationally representative sample of persons 60 years and older. The SEBAS survey procedures were approved by the institutional review boards at the Bureau of Health Promotion of the Department of Health, Taiwan, Princeton University, and Georgetown University, and conformed to the principles embodied in the Declaration of Helsinki. Details of the study are stated elsewhere (Bureau of Health Promotion, Department of Health, Taiwan, 2000). Among the 1,713 randomly selected respondents, 1,497 were interviewed, and...
Factors affecting the use of health examinations by the elderly in Taiwan

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\textbf{A R T I C L E   I N F O}

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\textbf{A B S T R A C T}

This study evaluated the factors associated with use of health examinations by the elderly. Data were obtained from the 2005 National Health Interview Survey (NHIS) in Taiwan for 2,482 individuals aged 65 years or older. The Andersen model was used as the analytic framework, and all variables were categorized into four factors: predisposing, need, health-related behavioral, and enabling factors. The $\chi^2$-test and a hierarchical multiple logistic regression model were used to examine the association between these variables and the use of health examinations. Nearly half (46.8\%) of the elderly had used the service previously. In the final model, those with older age, a spouse, Hakka origin, higher educational level, hypertension, bodily pain, and moderate to high exercise were more likely to use health examinations. On the other hand, older adults who usually used alternative medicine, were missing cognitive test results, were current smokers, and had functional limitations were less likely to use the service. The study results showed that the utilization rate of health examinations was low, suggesting that there is a need to increase its utilization through health education. Furthermore, the factors found in the study may be further used for promoting health examinations.

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1. Introduction

As the elderly population increases rapidly worldwide, aging-related diseases and disability have imposed huge health and economic burdens on many developed countries. Delaying or even avoiding these unwanted outcomes through health prevention or preservation across different age spectra has become a key element in dealing with these problems. The health examination is an important health promotion strategy. For older adults, health examinations can help identify diseases or conditions at an early stage and thus help postpone the development of subsequent adverse outcomes.

In Taiwan, preventive health services have been covered by the National Health Insurance (NHI) program since 1996. One of the services important for the elderly is the annual health check. However, the utilization rate for this service has been very low. According to the statistics from the Department of Health (2007) the participation rate from 1999 to 2005 was from 30.6\% to 41.2\%. Better understanding of the factors influencing this utilization would greatly assist the implementation of the health examination.

Most of the previous studies focusing on the use of preventive health services were limited to a single test or screening, such as mammography, cervical cancer screening, influenza vaccination, and prostate examination (Fontana et al., 1997; Preisser et al., 1998; Pirraglia et al., 2004; Sohn and Harada, 2004; Chen et al., 2005; Ostbye et al., 2005; Pham et al., 2005; Tabaei et al., 2005; Weyer et al., 2005; Benjamins, 2006, 2007; Fiscella et al., 2006; Larson and Correa-de-Araujo, 2006; Oladele and Barnett, 2006; Thorpe et al., 2006; Patel et al., 2007; Shenson et al., 2007), with rare studies on the comprehensive health examination (Culica et al., 2002). In Taiwan, there have been some studies of the use of the health examination, but they were based on only a small regional sample (Yu, 1994; Chiou et al., 1999; Hsu and Gallinagh, 2001) or limited information in relation to potential factors predicting the use of the health examination (Chiou et al., 1999; Li and Yang, 2002; Ma et al., 2006). Hence, there is still a lack of nationwide data that fully explores the factors associated with the use of the health examination by the elderly. The aim of the present study was to use nationally representative data to analyze the use of the health examination and its related factors in the older population, mainly based on the Andersen (1995) model, in which factors are categorized into several groups (Hsu and Gallinagh, 2001; Culica et al., 2002; Lai and Kalyniak, 2005).

2. Materials and methods

2.1. Study population

Data were obtained from the 2005 NHIS in Taiwan. The NHIS is a nationwide survey of the general health of the community-
Vitamin D insufficiency and frailty syndrome in older adults living in a Northern Taiwan community

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**Abstract**

This study explored the association between vitamin D insufficiency and frailty syndrome defined by the Fried Frailty Index (FFI) and the Edmonton Frail Scale (EFS) in a northern Taiwan community. Data of 215 subjects participating in an integrated interventional trial involving community-dwelling older adults with a high frailty risk were analyzed. Subjects were first screened by telephone interview and then evaluated at a local hospital with questionnaires, physical performance tests, and serum 25(OH)D measurements. Of the 215 participants, 31% had 25(OH)D insufficiency (<20 ng/ml). Frail subjects based on the FFI were older, had lower Mini-Mental Status Exam (MMSE) scores, Barthel Index (BI) scores, and 25(OH)D levels. The odds ratio of 25(OH)D insufficiency was 10.74 (95% CI 2.60–44.31) for frail versus robust individuals. The prevalence of vitamin D insufficiency was high in this population. There was a strong association between vitamin D insufficiency and the FFI. Vitamin D measurements and supplements are suggested for high-risk older people.

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A hospital-based multidisciplinary approach improves nutritional status of the elderly living in long-term care facilities in middle Taiwan

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ABSTRACT

Improvement in nutritional status using two different care models was assessed in 374 elderly people (mean ± S.D. age = 78.8 ± 7.2 years) living in eight long-term care facilities in middle Taiwan. The subjects were divided into two groups using randomized block design; a hospital-based multidisciplinary team was responsible for the care of the intervention group, and the control group received usual care for 6 months. A structured questionnaire, anthropometric measurements, and biomedical markers were checked for each subject before and after the intervention. No significant differences were observed in age, height, weight, body mass index, hemoglobin, and albumin between the intervention (n = 125) and control (n = 249) groups at baseline. After 6 months of intervention, 83 subjects in the intervention group and 182 subjects in the control group completed the study. The change in albumin level was greater in the intervention group (1.58 g/l) than in the control group (0.15 g/l, p < 0.05). The prevalence of hypoalbuminemia (albumin < 35 g/l) decreased from 69.2% to 52.9% in the intervention group and from 70.3% to 67.0% in the control group. In conclusion, a hospital-based multidisciplinary care effectively improved the nutritional status of elderly patients living in long-term care facilities in middle Taiwan.

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1. Introduction

According to WHO (2007), there were 650 million elderly adults worldwide in 2006; there will be 1.2 billion by 2025 and 2 billion by 2050. Our world is rapidly aging, and the elderly are the fastest-growing age group. In 2007, 12.6% of the population was aged over 65 years in the United States, and the proportion of the elderly has been increasing each year (U.S. Census Bureau, 2007). In Taiwan, 8.3% of the population were aged over 65 years in 1998, which increased to 10.4% in 2008 (Department of Statistics, 2008). The National Center for Health Statistics in the United States also reported that 90% of the 1.5 million people residing in nursing homes in 2004 were aged over 65 years (U.S. Census Bureau, 2007). A similar situation was also found in Taiwan, as well as other developed countries. Since medical expenditures increase with aging, medical care in long-term care facilities has become increasingly important.

The prevalence of malnutrition varies depending on the population studied and the definition of malnutrition. In a nationally representative sample of Taiwanese elderly aged 65 years and older, the prevalence of malnutrition using a low body weight cutoff was 1.7% in men and 2.4% in women (Tsai et al., 2008). However, the prevalence of malnutrition increased to 30% in institutionalized elderly people (Hernandez Mijares et al., 2001). Malnutrition in the elderly can lead to increased length of stay (in hospital), infections, poor wound healing, pressure sores, increased readmission rates, decreased cognitive function, and increased medical expenditures (Goodwin et al., 1983; Pinchofsky-Devin and Kaminski, 1986; Breslow et al., 1991; Morley and Silver, 1995; Elmstahl et al., 1997; Corish et al., 2000; Jensen et al., 2001). Malnutrition is a major risk factor for all-cause mortality in the elderly (Elmstahl et al., 1997; Otero et al., 2002; Henderson et al., 2008). Appropriate nutritional support not only improves nutritional status but also prolongs life expectancy (Schlierf, 1998; Persson et al., 2007; Rypkema et al., 2004). However, the best care model to improve nutritional status of the elderly remains controversial. To the best of our knowledge, there have been no randomized, controlled, interventional studies related to nutritional status designed for the elderly living in long-term care facilities in Taiwan. Therefore, in this study, the improvement of nutritional status in the elderly living in long-term care facilities of middle...
Evaluating probability of cancer among older people with unexplained, unintentional weight loss

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Abstract

Unexplained, unintentional weight loss (UUWL) in older people is usually multi-factorial and poses a diagnostic challenge, with cancer being the major concern. The main purpose of this study was to evaluate the effectiveness of a cancer scoring system for predicting cancer in elderly UUWL patients. From 2006 to 2007, 50 patients (mean age, 78.8±4.7 years, 82% male) who lost >5% of usual body weight were enrolled. The subjects’ mean body weight loss was 14.1±6.6% (8.7±4.6 kg). After evaluation, the common diagnoses were non-malignant organic disorder (22/50, 44%), neuropsychiatric disorder (17/50, 34%), unknown (8/50, 16%), and cancer (3/50, 6%). The most rapid weight loss occurred with cancer (6.5% per month), followed by non-malignant organic disorders (5.6% per month), neuropsychiatric disorders (2.8% per month), and unknown causes (2.4% per month); the difference among the groups was significant (p=0.023). Using a previously proposed scoring system, 42 patients (84%) had a low probability of cancer; all three cancer patients (2.4% per month) were in this category. In conclusion, the annual incidence of cancer among elderly UUWL patients was 6%, and the previously developed cancer scoring system did not effectively predict cancer occurrence. Further study is needed to develop an effective instrument to predict cancer in elderly UUWL patients.

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1. Introduction

Unexplained unintentional weight loss (UUWL) is common in older adults and is always difficult to evaluate and manage. Since UUWL in older patients is frequently associated with increased morbidity and mortality (Reynolds et al., 1999; Newman et al., 2001), accurate evaluation of underlying pathologies is of great importance. A previous study showed that senior nursing home residents had a higher 6-month mortality rate after they lost 10% of their usual body weight (Murden and Ainslie, 1994). Another study demonstrated that institutionalized older adults who lost 5% of their body weight in one month were four times more likely to die within a year (Ryan et al., 1995). Our previous work also indicated a higher chance of hospitalization when care-home residents lost 5% of their usual body weight (Chen et al., 2007), which was also linked to various biomarkers of malnutrition (Peng et al., 2009). In the outpatient setting, the annual incidence of UUWL among elderly male veterans was estimated to be 13.1%, and the mortality rate was significantly higher than among those who did not lose weight (Wallace et al., 1995). Moreover, UUWL in older patients with dementia was associated with disease progression and a weight loss of >5% was a significant predictor of mortality (White et al., 1998). It is well known that normal aging is associated with progressive body weight loss, which may be explained by the so-called “physiological anorexia of aging” that alters food intake regulation and various circulating hormones and cytokines (Levine and Morley, 1982; Smith and Gibbs, 1988; Morley et al., 1994). Therefore, weight loss beyond that of normal aging (0.1–0.2 kg/year) in older adults deserves extensive diagnostic work-up (Chumlea et al., 1988). Underlying etiologies of UUWL in older patients are usually multi-factorial and inter-related, which poses a diagnostic challenge to physicians. Common causes of UUWL in older adults include depression, cancer, gastrointestinal disorders, and many others (Marton et al., 1981; Rabinovitz et al., 1986; Thompson and Morris, 1991; Morley and Kraenzle, 1994; Gazewood and Mehr, 1998). Most UUWL in older patients can be explained by acute and chronic physiological, psychiatric, and social disorders, but a quarter of patients may lack a conclusive diagnosis (Thompson and Morris, 1991). Of all underlying causes of UUWL in older patients, cancer is always the ultimate concern, and the prevalence has been
Outcomes of hospitalized elderly patients with geriatric syndrome: report of a community hospital reform plan in Taiwan

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\textbf{ABSTRACT}

The purpose of this study was to evaluate the outcomes of elderly inpatients with geriatric syndromes. A prospective study involving patients aged 65 years and older in 12 community hospitals was performed. Baseline data, which included demographic characteristics, mini mental status exam, geriatric depression scale (GDS), mini nutritional assessment (MNA), activities of daily living (ADL), and instrumental activities of daily living (IADL), were collected in geriatric assessments. The primary outcome was functional deterioration; additional outcomes included mortality, re-hospitalization, and emergency department visits, as identified by telephone interview and chart review. A total of 1,006 patients were recruited: 31.2% of the participants were ADL intact, 21.3% were IADL-intact, 11.5% had depression, 29.3% had nutritional problems, and 60.3% had impaired cognition at baseline. During follow-up, 172 patients (19.3%) died, 43.8% reported ADL deterioration, and 45.9% reported IADL deterioration. On multivariate analysis, older age, low mini mental state examination (MMSE) score, and low MNA score were predictors of functional deterioration. Under the interdisciplinary team care of the Community Hospital Reform Plan (CHRP), most of the elderly patients maintained or increased their functional capacity; the one-year mortality rate was higher than that of the general population but lower than that of other studies targeting the frail elderly.

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1. Introduction

Older patients have a higher medical utilization rate than the general population. According to the report of the Bureau of National Health Insurance of Taiwan, people aged 65 years and older accounted for 10% of the population in 2007, but they accounted for 23.0% of total outpatient visits, 31.7% of total outpatient medical expenses, 33.1% of total hospitalization cases, and 45.2% of the total inpatient medical expenses. Some explanations for the figures above include multiple co-morbidities, impaired functionality, and impaired immunologic response in the elderly. Geriatricians frequently use the term "geriatric syndromes" to highlight the features of common health conditions in the elderly. These syndromes are highly prevalent, multi-factorial, and associated with substantial morbidity and poor outcomes in hospitalized elderly patients (Flood et al., 2006, 2007; Pilotto et al., 2009). They are central medical manifestations of aging or even the final common pathway, and their management plays a crucial role in the quality of care for the elderly.

A list of medical conditions that could be referred to as geriatric syndromes include losses in activities of daily living, cognitive dysfunction, delirium, dementia, depression, dizziness, osteoporosis, falls, sensory loss, malnutrition and weight loss, pain, substance abuse, urinary incontinence, and iatrogenic problems (Olde Rikkert et al., 2003). Though the central concepts of geriatric syndromes are still poorly defined, a recent literature search identified four risk factors (older age, baseline impaired cognitive function, baseline function impairment, and impaired mobility) across five geriatric syndromes (pressure ulcers, incontinence, falls, functional decline, and delirium) (Inouye et al., 2007). Managing these conditions properly leads to better outcomes, including lower mortality, less nursing home placement, shorter length of stay, and less hospital readmission (Rubenstein et al., 1984; Applegate et al., 1990).

In order to help the elderly with geriatric syndrome maintain independence and reduce adverse medical events, some care models have been developed, including geriatric wards, comprehensive assessment, discharge planning, discharge support management, exercise programs, and telephone follow-up programs (Caplan et al., 2004; Courtney et al., 2009). The landmarks of these models that distinguish them from usual care are geriatric assessment and interdisciplinary team management of geriatric syndromes. Comprehensive geriatric assessment (CGA) is a multidimensional, interdisciplinary, diagnostic process focused on determining a frail elderly person's medical, psychological, social, and functional...
Health, financial stresses, and life satisfaction affecting late-life depression among older adults: a nationwide, longitudinal survey in Taiwan

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Abstract

The purpose of this study was to determine the incidence of depression in late life and to explore associated risk factors among Taiwanese elderly. The analyses were based on nationally representative data from the Survey of Health and Living Status of the Elderly in 1999 and 2003. A total of 1,487 respondents aged 65 years and older who completed the 10-item Center for Epidemiological Survey Depression (CES-D) scale in these two surveys and without depression in 1999 were included in the final analyses. Depression was defined as a CES-D score equal to or greater than 10. The independent variables included sociodemographic characteristics, occurrence of new diseases, social support, perceived health and financial stresses, life satisfaction, and functional condition. The incidence rate of depression over 4 years was 19.7%. Multivariate regression analyses revealed that women who perceived greater health or financial stress and who had greater life dissatisfaction or worsened functional condition were more likely to suffer depression. These findings imply that healthcare programs for older adults should include cognitive and behavioral interventions in order to prevent the development of depression in late life.

1. Introduction

Depression, which is prevalent in older adults, is associated with serious consequences, such as increased risk of morbidity, increased risk of suicide, decreased physical, cognitive, and social functioning, and adversely affects the outcome of comorbid problems, all of which are, in turn, associated with increased mortality and health-service utilization (Cuijpers and Smit, 2002; Blazer, 2003).

The prevalence of depressive symptoms among community-dwelling older adults ranged from 8% to 20% in studies done in the United States and internationally (Blazer et al., 1988, 1991; Beekman et al., 1995), while in Taiwan's community studies it was 13–26% (Wu and Chang, 1997; Chiu et al., 2005). Therefore, investigating this critical public-health issue in Taiwan, where adults 65 years and older account for 10.53% of a total population of 23 million people, is of great urgency (Council for Economic Planning and Development, 2008).

The etiology of depression in older adults has been suggested to be an interaction between certain vulnerabilities, including genetic factors, cognitive diathesis, age-associated neurobiological changes, and the stressful events that occur more frequently in late life (Fiske et al., 2009). As older adults age, they inevitably have to face their failing physical health or diseases. In addition to actively managing their physical illnesses, understanding and mastering the psychosocial risk factors might be an effective way to prevent the development of depression in later life.

Among psychosocial factors, neurotic personality (Kendler et al., 2006), ruminative and avoidant coping styles (Garnefski and Kraaij, 2006), stressful events in late life, such as deterioration of financial status (Fiske et al., 2003), a new physical illness, or disability and loneliness (Nolen-Hoeksema and Ahrens, 2002), as well as inadequate social support (Krause and Liang, 1993; Brummett et al., 2000; Chi and Chou, 2001), have all been shown to be associated with depression. However, most of these studies were cross-sectional, so the causal relationship between depression and these risk factors could not be determined.

The present study aimed to assess the incidence of depression in late life and to explore associated risk factors from a sample representative of community-dwelling older adults who were followed-up longitudinally in Taiwan.

2. Subjects and methods

2.1. Sample

The data of this study were derived from the Survey of Health and Living Status of the Elderly in Taiwan, a representative nationwide longitudinal survey starting in 1989 and followed-up in 1993, 1996, 1999, and 2003. The sampling involved a three-stage probability sampling technique, and township was used as the primary sam-
The effectiveness of a comprehensive geriatric assessment intervention program for frailty in community-dwelling older people: a randomized, controlled trial

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Keywords: Frailty of elderly, Comprehensive geriatric assessment, Barthel Index, Randomized controlled trial

Abstract

This randomized, controlled trial assessed the effectiveness of comprehensive geriatric assessment (CGA) and subsequent intervention in pre-frail and frail community-dwelling elderly based on the Fried Frailty Criteria (FFC) and the Barthel Index (BI). A total of 310 pre-frail or frail elderly from a single community were identified using the FFC. Of these, 152 were randomly assigned to the intervention group for CGA and appropriate intervention by medication adjustment, exercise instruction, nutrition support, physical rehabilitation, social worker consultation, and specialty referral. Clinical outcome was re-evaluated by the FFC and BI 6 months later. Compared to the control group, the intervention group tended to have a better outcome, with an odds ratio (OR)=1.19, 95% confidence interval (95% CI) = 0.48–3.04, p=0.71) and 3.29 (95% CI = 0.65–16.64, p=0.15), respectively, and were less likely to deteriorate, with an OR=0.78 (95% CI = 0.34–1.79, p=0.57) and 0.94 (95% CI = 0.42–2.12, p=0.88), respectively. Although no significant differences were observed, the CGA and subsequent intervention showed a favorable outcome in frail and pre-frail elderly based on the frailty status and BI. Inability to complete the CGA and poor compliance with the intervention program appear to be the main reasons for unfavorable outcomes.

1. Introduction

Frail individuals are at high risk of becoming disabled and are the most likely to benefit from preventive interventions (Ferrucci et al., 2004). Independent of the presence of co-morbid diseases, health habits, and psychosocial characteristics, frailty predicts mobility and progressive disability in activities of daily living (ADL) in the elderly (Fried et al., 2001; Boyd et al., 2005). The investigation of effective intervention strategies to prevent or delay disability in older people is a priority issue in community medicine. Although there is evidence showing the effectiveness of performing CGA and interventions targeting multiple risk factors in community-dwelling frail elderly patients (Fabacher et al., 1994; Stuck et al., 1995; Leveille et al., 1998; Cohen et al., 2002; Gill et al., 2002; Villareal et al., 2006; Huss et al., 2008; Melis et al., 2008), and randomized controlled trials of physical exercise training (Chandler et al., 1998; Brown et al., 2000; Binder et al., 2002, 2004; Gill et al., 2002; Ferrucci et al., 2004; Faber et al., 2006; Peterson et al., 2007) have shown beneficial results in frail elderly, the search for agreed-upon criteria to be used as objective indicators has continued.

The FFC were developed by Fried et al. (2001); they consist of unintentional weight loss of at least 4.5 kg in the previous year, self-reported exhaustion, weakness (grip strength), slow walking speed, and low physical activity. These criteria have been recognized as being among the best diagnostic criteria for frailty. The objective of this study was to assess the effectiveness of CGA and relevant interventions in prefrail and frail community dwelling elderly based on the FFC (Fried et al., 2001).

2. Subjects and methods

2.1. Study design

A prospective, randomized, controlled study with study enrollment from November, 2007 to January, 2008 was conducted. The study was approved by the Institutional Review Board of National Taiwan University Hospital.

2.2. Setting and subjects

This study was conducted in an urban community in Taipei city, Taiwan. The community has a high percentage of senior residents who mostly receive medical care from the same community hospital. The community hospital is affiliated to and staffed by a...
The prevalence of subjective frailty and factors associated with frailty in Taiwan

Chin-Ying Chen, Shwu-Chong Wu, Liang-Ju Chen, Bee-Horning Lue

Abstract

This study estimated the prevalence of frailty and identified the factors associated with frailty in Taiwan using data from the Survey of Health and Living Status of the Elderly. A nationwide probability sample including 2,236 individuals aged ≥65 years was interviewed in 2003. Based on the Cardiovascular Health Study conducted by Fried, five phenotypes of frailty were selected: poor appetite, exhaustion, low physical activity, poor walking ability, and poor twisting ability of fingers. Participants were classified as nonfrail, prefrail, and frail if they met 0, 1 or 2, and ≥3 criteria. The prevalences of nonfrailty, prefrailty, and frailty were 55.1%, 40.0%, and 4.9%, respectively. The prevalence of frailty increased with age and was greater in women. Frailty was associated with less education, no spouse, disability, higher rates of comorbid chronic diseases, depressive symptoms, and geriatric syndromes. Specific drug use, such as hypnotics, analgesics, herbal drugs, and parenteral fluid supplements was positively associated with frailty. The use of multivitamins, fish oil, and vitamin E was negatively associated with frailty. The prevalence of frailty is lower in Taiwan than in Western countries. Depressive symptoms, geriatric syndromes, and specific medication use are potential fields for frailty prevention in community-dwelling older adults.

Keywords:
Frailty of elderly in Taiwan

1. Introduction

The discovery of effective interventions to prevent or delay disability in older persons is a public health priority. Most likely to benefit from such interventions are frail individuals who are not yet disabled and those with early disability who are at high risk of progression (Ferrucci et al., 2004). Randomized, controlled trials of exercise, comprehensive geriatric assessment (Gill et al., 2002; Reuben, 2002), and interventions targeting multiple risk factors have shown promising early results (Tinetti et al., 1994). The recommendations of the Frailty Working Group focus on preventing progressive disability, not disability caused by acute events such as stroke or hip fracture (Ferrucci et al., 1996). Although progressive disability is common, preventive approaches have rarely been studied. The concept of physical frailty was used to create a working definition of the population at high risk for disability onset or progression (Ferrucci et al., 2004).

Frailty is considered to be highly prevalent with increasing age and to confer a high risk for adverse health outcomes, including mortality, institutionalization, falls, and hospitalization (Speechley and Tinetti, 1991; Winograd, 1991; Rockwood et al., 1999; Espinoza and Walston, 2005; Bandeen-Roche et al., 2006; Gill et al., 2006). Geriatricians define frailty as a biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, and causing vulnerability to adverse outcomes (Fried et al., 2001). This concept distinguishes frailty from disability. Because of the similarity with disability in associated outcomes (with the exception of frailty itself being a cause of disability), and the frequency of the co-occurrence of frailty and disability, there has been much definitional confusion between frailty and disability/dependence. However, there is an increasing consensus that differentiating frailty from disability may improve our understanding of the aging process and offer new opportunities for prevention and care in clinical geriatrics (Fried et al., 2004).

Physical frailty is an abnormal physiological state that can range from mild to severe stages (Ferrucci et al., 2004). Frailty is thought to be present along a continuum of severity (Fried et al., 2005). A physical frail state may be clinically detected before disability, as well as a more advanced state of “clinically overt” physical frailty (Ferrucci et al., 2004). Interventions for those with physical frailty might only target disability prevention, whereas interventions for those with clinically overt physical frailty might target the delay or reversal of disability progression (Ferrucci et al., 2004).

The overall prevalence of frailty in the community-dwelling population of Western countries has been reported to be around 6–20% using different definitions of frailty (Chin et al., 1999; Fried et al., 2001; Binder et al., 2005; Goggins et al., 2005; Semba et al.,...
Body mass index (BMI) at an early age and the risk of dementia

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ABSTRACT

BMI change and BMI at an early age have not been investigated as risks for dementia. This case-control study included 286 dementia patients and 268 controls from two medical centers between 2007 and 2009. BMI information was collected from medical records and questionnaires. Men and women with low BMIs at the time of the study, in their 20s, and in their 40s had significantly increased risks of Alzheimer's disease (AD) (odds ratio = OR=2.62–3.97) and increased vascular dementia (VaD) risk (20s and 40s: OR=6.23–11.11) compared with those with normal BMIs. High BMI in the 20s and 40s was associated with increased VaD risk (OR=15.29 and 10.32) among women. For BMI changes from the 20s or 40s, the second and third tertiles were significantly associated with decreased AD risk among women (OR=0.15–0.35) compared to the first tertile. The third tertile of BMI change from the 20s or 40s was associated with decreased VaD risk among women (OR=0.06 and 0.14). Low BMIs in the 20s and 40s were stronger predictors of AD and VaD. There was a U-shaped association between BMI at different ages and dementia among participants with VaD.

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1. Introduction

In the USA, dementia has become the fifth and eighth leading cause of death in men and women aged ≥65 years, respectively (Centers of Disease Control and Prevention, 2001). Dementia affects 6% to 10% of people aged 65 years or older, and Alzheimer’s disease (AD) accounts for two-thirds of the population with dementia (Hendrie, 1998). In Taiwan, the prevalence of dementia was around 2% to 4% in the year 2000, which may be due to underdiagnosis and the small number of very old people (Liu et al., 2000). The best approach to dementia includes not only early diagnosis and management, but also prevention. Overweight and obesity have been identified as risk factors for AD (Luchsinger and Mayeux, 2007). However, the evidence for the association between body mass index (BMI) and the risk of dementia has been inconclusive.

A recent meta-analysis (Beydoun et al., 2008), including 10 follow-up studies with participants aged between 40 and 80 years at baseline, showed a U-shaped relationship between BMI and dementia (Beydoun et al., 2008). In contrast, a recent follow-up study (Fitzpatrick et al., 2009) demonstrated an increased risk of dementia among obese persons (BMI >30 kg/m\textsuperscript{2}) compared to those with normal weight (BMI between 20 to 25 kg/m\textsuperscript{2}) at age 50 years. The study also observed a reverse association between BMI and the risk of dementia at age ≥65 years (Fitzpatrick et al., 2009). However, BMI in young adulthood or middle age may be a better predictor for dementia than current BMI because true risk relationships and reverse causality may become confused.

In addition, weight gain has been shown to be related to an increased risk of death (Beydoun et al., 2008). Another study found that a steady annual weight loss of 1 kg/m\textsuperscript{2} among old people was related to a 35% increase in AD risk compared to individuals without BMI changes (Buchman et al., 2005). Weight loss may reflect underlying disease, and obesity may be related to subsequent vascular diseases.

Because the association between BMI and dementia is inconclusive, the objectives of this study were to examine whether BMI at different ages was related to the risk of dementia, including AD and vascular dementia (VaD), in a Chinese population. The study also explored the association between BMI change over time and dementia. This information is important for preventing dementia.
Determinants of cognitive impairment over time among the elderly in Taiwan: results of the national longitudinal study

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\textbf{A B S T R A C T}

This study aimed to identify the risk factors for cognitive impairment among the elderly population in Taiwan. Data were drawn from three waves of the “Survey of Health and Living Status of the Elderly in Taiwan”, a national longitudinal study started in 1989. We included respondents without dementia or cognitive impairment at baseline in 1993 and followed them over a 10-year period. Cognitive function was measured by the nine-item Short Portable Mental Status Questionnaire in 1993, 1999, and 2003. Independent variables, including age, sex, marital status, education, ethnicity, ADLs, IADLs, physical function, social participation, chronic diseases, smoking, and alcohol drinking, were collected at baseline in 1993. Depressive symptoms were assessed by the 10-item Center for Epidemiologic Studies Depression Scale (CES-D). Logistic regression was used to evaluate the predictive factors for cognitive impairment. Of the eligible 1,626 respondents, 72 (4.43%) and 484 (29.77%) individuals did not complete follow-up in 1999 and 2003, respectively, mostly due to death. Our results showed that older age (OR = 2.60, 95% CI = 1.79–3.78), being female, lower educational level, IADL disability (OR = 2.06, 95% CI = 1.38–3.09), and having a history of diabetes (OR = 1.70, 95% CI = 1.06–2.74) or stroke (OR = 2.36, 95% CI = 1.06–5.26) were independent predictors for cognitive impairment in Taiwan.

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\textbf{1. Introduction}

Taiwan has one of the most rapidly growing elderly populations in the world. Between 1950 and 2009, the percentage of individuals aged 65 years and above increased from 2.4% to 10.5% in Taiwan. According to a national report, the percentage of the elderly population will reach 20% by the year 2025. Identification of risk factors among the growing number of patients over the age of 65 years in Taiwan is increasingly important.

Cognitive function declines with age (Euser et al., 2008). As the proportion of the elderly in the world population increases dramatically (Kalache and Keller, 2000), cognitive impairment has become an important issue in healthcare delivery due to its tremendous impact on medical and socioeconomic systems. Cognitive impairment is the core clinical feature contributing to the diagnosis of dementia. However, even among those without dementia, cognitive impairment contributes to decreased quality of life, increased disability (Lyketsos et al., 2002), healthcare costs (Albert et al., 2002) and mortality (Lee et al., 2006). Therefore, it is crucial to accurately estimate the prevalence of cognitive impairment in our aging society, and at the same time, identify its risk factors in order to implement effective strategies to cope with this particular health problem, such as cognitive impairment in the elderly population.

The other clinical challenge is the early identification of people at high risk of cognitive impairment who might benefit from preventive interventions. Some epidemiologic studies have shown that many factors affect cognitive ability in the elderly, including age, sex, education, social activity, chronic disease, and health status. However, most of these studies were cross-sectional, marred by limited sample sizes or inappropriate sample selections, and other biases, obscuring causal relationships. Therefore, a longitudinal study with a national sample and multiple waves of follow-up would be a better study design to examine and demonstrate a causal relationship.