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Association between multiple geriatric syndromes and life satisfaction in community-dwelling older adults: A nationwide study in Taiwan

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ABSTRACT

Objective: Although previous studies have investigated the association between a single geriatric syndrome and life satisfaction in the older adults, the accumulated effects of multiple geriatric syndromes on life satisfaction remain unclear.
Methods: We conducted a nationwide study by using data from the Taiwan Longitudinal Study on Aging database. A total of 2415 older adults were enrolled. Life satisfaction was evaluated according to the Life Satisfaction Index, and the geriatric syndromes included a depressive disorder, cognitive impairment, functional impairment, urine incontinence, pain, a fall, and polypharmacy. Other characteristics were age, sex, marital status, education level, self-rated health, and chronic diseases.
Results: Univariate analysis revealed that the older adults, who were illiterate, did not live with a partner, yet other issues such as stroke, malignancy, osteoarthritis, poor self-rated health, a depressive disorder, functional impairment, urine incontinence, or pain were associated with lower life satisfaction. In the multivariate regression model, the older adults who were male, illiterate, lived without a partner, had poor self-rated health, or had a depressive disorder were more likely to have lower life satisfaction. In addition, life satisfaction was unaffected in the older adults with only 1 geriatric syndrome, but among those with $\geq$2 geriatric syndromes, an increased number of geriatric syndromes were associated with lower life satisfaction.
Conclusion: In addition to socio-demographic factors, cumulative effects of multiple geriatric syndromes might affect life satisfaction in the older adults. Further study of interventions for reducing geriatric syndromes to maintain life satisfaction is required.

1. Introduction

As medicine progresses, the focus of health outcomes has shifted from morbidity and mortality to well-being and life satisfaction. Higher life satisfaction is associated with better physical health and the absence of chronic conditions (Siahpush, Spittal, & Singh, 2008), whereas lower life satisfaction is associated with poor general health, disability (Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008), and mortality (Koivumaa-Honkanen et al., 2000).

Various scales, including the Life Satisfaction Index (LSI) (Neugarten, Havighurst, & Tobin, 1961), single-item health indicators (McDowell, 2010), and the Satisfaction With Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985), are used to measure life satisfaction. The LSI measures the general feelings of life satisfaction among the older adults, and its original version comprises 20 items, including 12 positive and 8 negative items with 3-point response scales (Neugarten et al., 1961). Single-item health indicators, such as "Taking everything into consideration, how would you say you are today: excellent, very good, good, fair, or poor?" provide an overall summary of subjective life satisfaction

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(McDowell, 2010). The SWLS is used to determine the subjective expression of life satisfaction. The scale comprises 5 items, with responses rated on a 7-point Likert scale, and a score of 20 indicates neutral (Diener et al., 1985).

Life satisfaction is reportedly associated with socio-demographic characteristics, such as education level (Hsu, 2012; Meléndez, Tomás, Oliver, & Navarro, 2009; Subaşi & Hayran, 2005), marital status (Berg, Hassing, McClearn, & Johansson, 2006; Enkvist, Ekström, & Elmståhl, 2012), life course socioeconomic factors (Niedzwiedz, Katikireddi, Pell, & Mitchell, 2014), social support (Hsu, 2012) and economic status (Hsu, 2012). Previous studies have demonstrated that life satisfaction is associated with geriatric syndromes, including impaired cognition (St John & Montgomery, 2010), fall (Stenhagen, Ekström, Nordell, & Elmståhl, 2014), functional impairment (Sato, Demura, Kobayashi, & Nagasawa, 2002), depression (Berg et al., 2006; Meléndez et al., 2009), and urine incontinence (DuBeau, Levy, Mangione, & Resnick, 1998). The term "geriatric syndrome" is a commonly used but ill-defined concept. The definition of geriatric syndromes is conditions "experienced by older, particularly frail elderly, that occur intermittently rather than either continuously or as single episodes, may be triggered by acute insults, and often are linked to subsequent functional decline" (Reuben, 1991). Distinct geriatric syndromes generally share similar risk factors (Inouye, Studenski, Tinetti, & Kuchel, 2007). Chen, Peng, et al. (2010) described the cumulative effects of multiple geriatric syndromes on mortality in the older adults. However, the interaction between multiple geriatric syndromes and life satisfaction as well as the accumulated effects of multiple geriatric syndromes on life satisfaction remain unexplored. Several demographic characteristics, such as age (Inouye et al., 2007), sex (Chen, Dai, Yen, Huang, & Wang, 2010), education level (Brown, Kiely, Bharel, & Mitchell, 2013), self-rated health (Bluestein & Rutledge, 2006), and chronic diseases (Lee, Cigolle, & Blaum, 2009; Mohile et al., 2011), have been associated with geriatric syndromes, and these factors could influence the association between geriatric syndromes and life satisfaction. By using data obtained from a national representative sample, we analyzed the relationship between multiple geriatric syndromes and life satisfaction in community-dwelling older adults, and the impact of socio-demographic factors on this relationship.

2. Materials and methods

2.1. Data and participants

The data were obtained from the Survey of Health and Living Status of the Elderly in Taiwan, also called Taiwan Longitudinal Study on Aging (TLSA), a nationwide representative survey conducted since 1989 with a follow-up every 3–4 years and a response rate of 80–90%. The survey was initiated by the Taiwan Provincial Institute of Family Planning (now the Taiwan Health Promotion Administration, Ministry of Health and Welfare) as a collaborative effort with the University of Michigan. The first interview was conducted in 1989 (cohort I), and people aged 60 years and older were recruited (Chang & Hermalin, 1989). Follow-up surveys were conducted in 1993, 1996, 1999, 2003, 2007, and 2011. In 1996 (cohort II) and 2003 (cohort III), a new sample of individuals aged 50 years and older were interviewed, respectively. Death was the major cause of the decline in the sample size. The participants who were lost to attrition were more likely to involve older adults, males, and individuals who were socially inactive and had poorer physical functioning (Chiao, Botticello, & Fuh, 2014). The data were collected through face-to-face interviews and included background information, household information, work history, and health status.

The data used in this research was the survey of TLSA in 2003, containing the first, second, and third cohort enrolled in 1989, 1996, and 2003, respectively. The original samples comprised 3778 people aged 57–102 years. After the participants younger than 65 years and those with incomplete data were excluded, the sample size was 2415.

2.2. Measures

2.2.1. Life satisfaction

Life satisfaction, the major variable of interest, was measured using the LSI, and higher scores indicated higher satisfaction. The LSI is one of the earliest scales developed to access the primary components affecting satisfaction (McDowell, 2010), and the reliability and validity of this index have been previously reported (Adams, 1969; Wood, Wylie, & Sheafor, 1969). Various studies involving this index have been published (Chiao, Weng, & Botticello, 2012; Hsu, 2012; Lue, Chen, & Wu, 2010). In the current study, the LSI was a 12-item modified version of the original 20 items. Items included "Are you satisfied with your life?" and "Has your life been better than most people's lives?" A 2-point agree/disagree score system was used in which responses of 0 and 1 indicated dissatisfaction and satisfaction, respectively. Items were reverse scored when necessary, and the total score ranged from 0 to 12, with higher scores indicating higher life satisfaction. For the participants affected by cognitive impairment or illiteracy, a proxy respondent was used.

2.2.2. Geriatric syndromes

The geriatric syndromes included a depressive disorder, cognitive impairment, functional impairment, urine incontinence, pain, a fall, and polypharmacy. These geriatric syndromes were chosen because they are common in the older adults, and previous studies have demonstrated an association between these geriatric syndromes and life satisfaction (DuBeau et al., 1998; Sato et al., 2002; St John & Montgomery, 2010; Stenhagen et al., 2014). Depressive disorder was evaluated using the 10-item Center for Epidemiological Survey Depression Scale (CES-D), which is a short form of the 20-item CES-D constructed in 1977 (Radloff, 1977). The total scores ranged from 0 to 30, with a score equal to or greater than 10 indicating a depressive disorder (Andresen, Malmgren, Carter, & Patrick, 1994). Cognitive function was measured using the Short Portable Mental Status Questionnaire (Pfeiffer, 1975). Incorrect answers on more than 2 questions indicated impaired cognitive function. One more incorrect answer was allowed for the participants with a grade school education or lower, and one less incorrect answer was allowed for the participants with a high school education or higher (Pfeiffer, 1975). Functional status was determined by assessing activities of daily living (ADL) (Katz, Gotf, Moskowitz, Jackson, & Jaffe, 1963), including eating, dressing, transferring, bathing, ambulation and toileting, and functional impairment was defined as dependence in any ADL. Urine incontinence was defined by asking whether the participant had been unable to maintain urine continence in the past year. Pain was determined using pain scores, ranging from 1 to 5, 1 indicating no pain, and $\geq$2 indicating more severe pain. A fall was indicated if the participants had $\geq$2 episodes of falls in the past year. Medication history was determined by asking if the participants had regularly taken medications on schedule, and the concurrent use of medications categorized in 5 or more classes of drugs was defined as polypharmacy (Hajjar, Cafiero, & Hanlon, 2007).

2.2.3. Demographic characteristics

The demographic characteristics were age, sex, marital status, education level, self-rated health, and chronic diseases. Marital status was categorized into married or living with a partner and