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Association between subjective memory complaints and impaired higher-level functional capacity in people aged 60 years or older

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ABSTRACT

Objective: We aimed to investigate the association between subjective memory complaints and higher-level functional capacity in either people with long-term care needs or those who require help to maintain functional capacity.
Methods: We conducted a cross-sectional study among participants aged 60 years or older. We measured subjective memory complaints, higher-level functional capacity, and depressive symptoms, and then estimated odds ratios (ORs) by multiple logistic analysis. Subjective memory complaints were used as the predictor variable, higher-level functional capacity as the outcome variable, and age, depressive symptoms, medical history of diabetes and hypertension, frequency of going out, falling within a year, and body mass index as possible confounders. We assessed higher-level functional capacity using the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence score ≤5 as a cut-off (which is associated with higher one-year mortality rates).
Results: We conducted analyses using 501 people aged 60 years or older. Among women, subjective memory complaints were associated with impaired higher-level functional capacity after adjustment for age and depressive symptoms (OR = 3.36; 95% confidence interval [CI], 1.59–7.08). Among the men, subjective memory complaints were not significantly associated with impaired higher-level functional capacity after adjustment for age and depressive symptoms (OR = 1.91; 95% CI, 0.88–4.12).
Conclusions: Subjective memory complaints among women can indicate impaired higher-level functional capacity and may suggest higher one-year mortality rates.

1. Introduction

Higher-level functional capacity is an essential competence that helps elderly people sustain healthy and socially independent living, including the use of public transportation, handling money, reading books or newspapers, and visiting the homes of friends (Fujiwara et al., 2003; Koyano, Shibata, Nakazato, Haga, & Suyama, 1991; Okamoto, Morita, Saeki, Matsuda, & Kurumatani, 2006). Decline of higher-level functional capacity have been reported to be associated with mortality (Koyano et al., 1991) and cognitive impairment (Fujiwara et al., 2002). For example, the one-year mortality rate has been reported with the total score of the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence which is a tool to measure higher-level functional capacity and which range from 0 (the worst) to 13 (the best) (Koyano et al., 1991). People with the total score ≤5 have been reported to have higher one-year mortality rates (10–20%) than people with total score >5 (<5%) (Koyano et al., 1991).

Subjective memory complaints (SMCs) are defined as the subjective awareness of memory loss and can be assessed by a simple yes or no question (Abdulrab & Heun, 2008). SMCs has been reported to predict cognitive decline, including mild cognitive impairment (MCI) (Jacinto, Brucki, Porto, de Martins, & Nitrini, 2014) and dementia (Abdulrab & Heun, 2008; Jonker, Geerlings, & Schmand, 2000). In addition, previous studies have reported associations between SMCs and functional capacity. This includes functional capacity measured by basic activities of daily living (BADLs) (Clarnette, Almeida, Forstl, Paton, & Martins, 2001; Montejo, Montenegro, Fernández, & Maestú, 2011), such as

Abbreviations: TMIG, Tokyo Metropolitan Institute of Gerontology; GDS, geriatric depression scale; SMCs, subjective memory complaints; BADLs, basic activities of daily living; IADLs, instrumental activities of daily living.

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dressing, ambulation, or eating, and that measured by instrumental ADLs (IADLs) (Montejo et al., 2011), such as shopping, food preparation, or housekeeping. Although higher-level functional capacity usually deteriorates before BADLs (Koyano et al., 1991), few studies have investigated the association between SMCs and higher-level functional capacity.

Japan is expected to have an unprecedented super-aged population. Consequently, the Japanese government has implemented the Long-Term Care Insurance Act (Act No. 123 of December 17, 1997). Among other aims, the Act seeks to provide health, medical, and public aid services to sustain independent daily living among people with long-term care needs resulting from the physical or emotional changes of aging. It also seeks to assist those who require care with their functional capacity to maintain BADLs and IADLs. We consider that identifying impaired functional capacity early can help to accomplish these aims.

We hypothesized that SMCs could represent an easily measurable indicator of decline in functional capacity. The present study therefore aimed to investigate the association between SMCs and higher-level functional capacity in people with long-term care needs or who require assistance to maintain functional capacity.

2. Methods

2.1. Participants

This cross-sectional study recruited participants that used outpatient care service for long-term preventive care in Hyogo, Japan. As a component service of the Long-Term Care Insurance Act, outpatient services for long-term preventive care are often used by people with long-term care needs or those who require assistance to maintain functional capacity. The eligibility criteria for the present study were men and women aged 60 years or older and without dementia, Parkinson's disease, or known cerebrovascular disease because these disease can be confounding of the association between SMCs and higher-level functional capacity. In November 2012, we distributed self-report questionnaires to the volunteer participants. The Ethics Committee of the Faculty of Nursing at Senri Kinran University approved this study.

2.2. Measurements

2.2.1. Higher-level functional capacity

To measure higher-level functional capacity, we used TMIG index of competence (Koyano et al., 1991). Participants answered each question with "yes" or "no." The number of items answered "yes" indicated the total score of the TMIG-index, which ranged from 0 (the worst) to 13 (the best). The total score of the TMIG-index is known to be inversely associated with the one-year mortality rate (Koyano et al., 1991). People with total score $\leq$5 are reported to have higher one-year mortality rates (10–20%) than people with total score >5 (<5%) (Koyano et al., 1991). Thus, participants with TMIG-index scores $\leq$5 were considered to have impaired higher-level functional capacity. Higher-level functional capacity was assessed as a binary variable based on this cut-off point.

2.2.2. SMCs

To measure SMCs, we used the following question based on the previous review article which have proposed a set of criteria to increase specificity of people with SMCs for those at increased risk of dementia (Abdulrab & Heun, 2008): "Do people around you say that you have forgetfulness; for example, do you repeatedly ask the same thing?" and participants answered "yes" or "no." If participants answered yes, we considered that they had SMCs; thus, SMCs was used as a binary variable.

2.2.3. Possible confounders

We considered age (Fujiwara et al., 2003; Koyano et al., 1991), depressive symptoms (Abdulrab & Heun, 2008; Iwasa et al., 2009; Kim, Stewart, Shin, Choi, & Yoon, 2003; Wang et al., 2000) as important possible confounders. Participants were asked their sex, birthdate, depressive symptoms, height, weight, medical histories, and yes or no questions about going out at least one time a week and falling within a year in the self-reported questionnaire. To measure depressive symptoms, we used the 15-item version of the Geriatric Depression Scale (GDS) (Lesher & Berryhill, 1994; Mitchell, Bird, Rizzo, & Meader, 2010). The GDS scores ranged from 0 to 15 and higher scores indicated higher depressive symptoms. Body mass index was calculated as weight in kilograms divided by the square of the height in meters. Age, GDS score, body mass index were used as quantitative variables and the other possible confounders were assessed as binary variables.

2.3. Statistical analyses

To investigate the association between SMCs and higher-level functional capacity, we used multiple logistic analyses with SMCs as the predictor and higher-level functional capacity as the outcome. We introduced possible confounders sequentially into the analyses, first age (1-year increments), second GDS scores (1-point increments), and then the following variables one by one: medical history of diabetes, medical history of hypertension, going out at least one time a week, falling within one year, and body mass index. All analyses were stratified by sex and provided odds ratio and 95% confidence intervals (CIs). For reliable multivariate logistic regression analyses, we needed to obtain at least 10 outcome events per explanatory variable (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). Thus, at least 40 impaired higher-level functional capacity events were needed for the multivariate logistic regression analyses with the four explanatory variables in the present study. In addition, we assessed multicollinearity using the variance inflation factor (VIF). A VIF of more than 10 was taken to indicate that the model had significant multicollinearity. We used R statistical software, version 3.1.0 (R Core Team, 2014), for the statistical analyses.

To handle missing values, we used simple imputation using predictive mean matching in the MICE 2.13 package for R statistical software (Van Buuren & Groothuis-Oudshoorn, 2011; Marshall, Altman, Royston, & Holder, 2010). For sensitivity analyses, based on a missing at random assumption, we handled missing values using multiple imputation by a regression switching approach followed by predictive mean matching in the MICE 2.13 package for R statistical software (Van Buuren & Groothuis-Oudshoorn, 2011; Marshall et al., 2010). Under a missing at random assumption, multiple imputation can give preferred parameter estimates (Marshall et al., 2010). We independently analyzed 40 copies of the data (Graham, Olchowski, & Gilreath, 2007), pooled the parameter estimates and standard errors of those 40 analyses by Rubin's rules (Van Buuren & Groothuis-Oudshoorn, 2011), and obtained odds ratios and 95% CIs.

3. Results

We distributed the self-report questionnaire to 897 participants, of which 616 responded the self-report questionnaire. Of the 616 responders (response rate 68.7%), 28 were under 60 years old, 9 had dementia, 21 had Parkinson's disease, 55 had cerebrovascular disease, and 2 did not provide their sex. Thus, 501 eligible participants were available for analysis. Table 1 shows characteristics of the participants.

Tables 2 and 3 show the results of the multiple logistic analyses in men and women, respectively. SMCs were significantly associated with higher-level functional capacity in all models in