Correlations between Physical and Cognitive Functions and Depression Symptoms in the Dysmobility Syndrome Group

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Abstract. The objective of this study was to examine the relationship between physical and cognitive functions and depression in elderly women with dysmobility syndrome. For this study, data on 6,070 elderly women were used and 43 of these women had dysmobility syndrome. Depression symptoms were significantly negatively correlated with sub-categories of physical function (r = -0.616 to -0.307) but were not significantly correlated with cognitive function (r = -0.032, P = 0.838) in the dysmobility syndrome group.

Keywords: Depressive symptoms, Disability, Physical activity

1 Introduction

Dysmobility syndrome was recently proposed as an approach to evaluate the musculoskeletal health of older persons [1]. Dysmobility was defined as having at least three of the following six conditions: high body fat, osteoporosis, low muscle mass, low muscle strength, slow gait speed, and risk of falling [2]. According to a study that examined the relationship between dysmobility and mortality among adults over the age of 50 according to age, sex, and race or ethnicity using 1999–2002 data of the National Health and Nutrition Examination Survey (NHANES) [1], higher mortality was associated with dysmobility syndrome, age over 70 years, female gender, and deficiency in physical activities according to age and gender.

According to a prospective cohort study with the residents of an area in Italy [3], the subjects with depression symptoms showed significantly worse results in all of the physical function tests (physical performance, muscle strength, and functional status). In the survey on depression and cognitive function in community-dwelling living-alone elderly women, the depression level was higher when cognitive functions were...
poor [4]. Depression in older persons represents a major issue because of its relative prevalence and the associated higher risk of adverse health-related events [3].

So far, the factors found to have an influence on depression include age, gender, activity of daily living, and many others. Thus, with regard to dysmobility syndrome, which is emerging recently as a new concept, this study attempted to examine the relationship between physical and cognitive functions and depression in elderly women with the syndrome. The reason for limiting the subjects of this study to elderly women is that, according to the results of Looker [1] who analyzed based on the data of the National Health and Nutrition Survey on American people, the prevalence of the syndrome was higher in elderly women than in elderly men among those over the age of 70. Assessing these relationships may help to evaluate the utility of this new proposed syndrome and may provide insight on ways to further refine it.

2 Methods

2.1 Data collection and participants

The data were obtained from the Korean Elderly Adults Survey conducted by the Korea Institute for Health and Social Affairs (KIHASA). Written approval was obtained from KIHASA for the use of the survey data. Original data were stratified by the seven metropolitan cities and nine provinces of Korea. The data were collected from 2011 to 2012. Thus, after excluding those with missing data from a total of 10,674 community dwelling elders, we identified 6,070 elderly women and 43 of these were dysmobility syndrome subjects who met all of the inclusion criteria (i.e. high body fat, fall experience in the previous two years, osteoporosis).

2.2 Measurements

Physical function. Physical function was assessed using the Physical Functioning Scale (PF) [5], which consists of a total of five questions (two for upper limb functioning and three for lower limb functioning). Upper limb functioning was determined by measuring the flexibility (PF 4) and muscular power of shoulder joints (PF 5), and lower limb functioning was determined by assessing endurance (PF 1), balance and walking ability (PF 2), as well as flexibility of lower limbs (PF 3). The items were scored from 0 to 3. The total score was divided by the number of questions and by the highest score, 3 points. Then, the upper limb score was multiplied by 40 and the lower limb score was multiplied by 60 to make the total possible scores on upper limb and lower limb questions equal to 100 points. Higher scores indicated better functioning. The internal consistency (Cronbach's $\alpha$) was 0.87 in the study of Lee et al. [5] and was 0.87 in the present study.

Cognitive function. To measure cognitive function, we used the Mini-Mental State Examination (MMSE) developed by Folstein et al. [6] and translated and modified by
Kang et al. [7]. The tool assigned 1 point when the instructions of each item were followed correctly and 0 otherwise. The score ranged from 0 (lowest) to 30 (highest). A high score indicated high cognitive capability. The internal consistency (Cronbach’s \( \alpha \)) was 0.85 in the study of Kang et al. [7] and 0.81 in this study.

**Depressive symptoms.** Depression was measured with the short-form of the Center for Epidemiological Studies Depression Scale (CES-D), which simplified Radloff’s [8] CES-D into 10 questions for the KIHASA. The tool involved questions regarding the subjects’ feelings for the last week and the total score ranged from 0 to 10, with a score \( \geq 4 \) considered an indication of “depression” (Irwin et al. [9]). The internal consistency (Cronbach’s \( \alpha \)) was 0.92 in the study of Irwin et al. [9] and 0.90 in this study.

### 2.3 Data analysis

Data were analyzed using SPSS for Windows version 18.0 (SPSS, Chicago, IL, USA). A T-test and chi-square test were used to verify the homogeneity of the sociodemographic characteristics of the subjects. Correlations between these variables were calculated using Pearson’s correlation coefficient.

### 3 Results

#### 3.1 Correlations between depression symptoms and other variables in the dysmobility syndrome group

The correlations between depression symptoms and other variables in elderly women with dysmobility syndrome are shown in Table 1. Depression symptoms were significantly negatively correlated with sub-categories of physical function (\( r = -0.616 \) to -0.307) but were not significantly correlated with cognitive function (\( r = -0.032, P = 0.838 \)) in the dysmobility syndrome group.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Depression symptoms</th>
<th>Physical function</th>
<th>Cognitive function</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>PF 1</td>
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<td></td>
<td>Depression symptoms</td>
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<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.001)</td>
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</tbody>
</table>

Values are expressed as \( r (P\text{-value}) \). PF, physical function.
4 Limitations

The criteria for diagnosing dysmobility syndrome used in this study were developed for Western people, and particularly with regard to body fat percentage, criteria for Asians should be considered. Moreover, as the findings of this study are relevant only to those with dysmobility syndrome, it may be unreasonable to generalize the findings to all elders over the age of 65.

References