The effect of depression on cognitive decline among Korean retirees

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Background: Little information is available on the characteristics of cognitive ability among retirees. This study aimed to identify factors associated with cognitive impairment among Korean retirees. **Materials and Methods:** We used data from the Korean Longitudinal Study of Ageing survey. A total of 1755 retirees aged 45 years or older who had normal cognition were followed up for 12 years to identify cognitive impairment. Stepwise multivariate logistic models were used to assess odds ratios (ORs) and 95% confidence intervals (CIs) for cognitive decline. **Results:** Well-known risk factors, such as age (OR, 1.07; 95% CI, 1.06–1.09), female sex (OR, 1.49; 95% CI, 1.08–2.04), low education (OR, 2.45; 95% CI, 1.91–3.14), and depressive mood (OR, 1.51; 95% CI, 1.16–1.97), remained significantly associated with cognitive decline. Sex-stratified analysis revealed that depressive mood was significantly associated with cognitive decline in male retirees only (OR, 1.90; 95% CI, 1.31–2.75). **Conclusion:** Our finding indicates that screening male retirees for depressive mood is required to retard cognitive aging.

Key words: Cognitive dysfunction, longitudinal studies, retirement

INTRODUCTION

Given that cognitive abilities depend on engagement in mentally stimulating activities,[1] retirement warrants particular attention as a feasible trigger of cognitive decline.[2] Continued mental stimulation after retirement is unarguably critical; however, other factors related to cognitive decline among retirees are also a key public health concern given the unrelenting trend toward societal aging.

Some external factors such as physical activity, management of cardiovascular risk factors, healthy diet, and cognitive training are known to reduce the risk of cognitive decline,[3] but somewhat surprisingly, little information is available on the characteristics of cognitive ability among retirees.[4] Retirement and adjustment after retirement have complex effects on individuals and include numerous factors that may influence cognitive functioning. Thus, we aimed to identify factors associated with cognitive impairment among Korean retirees.

METHODS

Data from the Korean Longitudinal Study of Ageing (KLoSA) survey were used in the present longitudinal study. The KLoSA is a nationally representative public survey, which has been conducted biennially since 2006 on Koreans aged ≥45 years and utilizes a multistage, stratified, probability sampling technique. Participants in the survey were interviewed using a computer-assisted method to provide information on family, health, employment, income, wealth, subjective expectations, and life expectations. Among 8688 individuals who received the 2nd wave survey, we extracted the data of 2563 subjects who had stated they were retired. Subsequently, we excluded individuals with cognitive impairment already (n = 710) or any psychiatric disorder (n = 87) at

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baseline. Accordingly, 1755 individuals were included in the final analysis and followed biennially until 2018.

Cognitive impairment was defined as a Korean-Mini-Mental State Exam (K-MMSE) score of ≤24.[5] The K-MMSE was checked once per each wave and consists of questions designed to assess various categories of cognitive function, such as time and place, orientation, registration, attention and calculation, memory recall, language, and visual construction. For the analysis, we selected covariates associated with demographics (age, gender, educational attainment, household income, marital status, and religion), health-related habits (obesity, smoking status, alcohol use, and physical activity), and mental health (social contact and depressive mood) that might influence cognitive abilities. Level of education was categorized as "less than middle school graduate" or "high school graduate or beyond." Income level was stratified into quartiles based on annual household income rank. Marital status was grouped into "married" or "unmarried" (single, divorced, separated, or widowed). Religiosity was classified into "none" or "professing a religion" (Catholic, Christian, Buddhist, or others). Obesity was defined as a body mass index of 25 kg/m² or higher. Smoking and drinking were categorized according to their current use. Regular physical activity was defined as exercise more than once per week. Social contact was assessed using yes/no responses to the question, "Do you have a close friend, relative, or neighbor?" Depressive mood was defined as the short-form Center for Epidemiological Studies-Depression scale (CES-D) score of ≥ 10.[6] The CES-D is a brief screening instrument that checks depressive symptoms experienced during the most recent week. Its 10 items include two that are positively phrased (i.e., feel pretty good, generally satisfied) and eight that are negatively phrased (i.e., loss of interest, trouble concentrating, feeling depressed, feeling tired or low in energy, feeling afraid, trouble falling asleep, feeling alone, and hard to get going).

Descriptive statistics were presented as weighted proportion ± standard error or weighted proportion (95% confidence interval) (%). Newly developed cognitive impairment was detected from the 2nd to 7th wave in retirees without cognitive impairment at baseline. Stepwise multivariate logistic models were used to identify factors associated with cognitive impairment. The analysis was conducted using STATA ver. 14.2 (STATA Corporation, TX, USA) statistical software, and statistical significance was accepted for P < 0.05.

RESULTS

Table 1 shows baseline characteristics of participants. To clarify the association between variables and cognitive

Table 1: Baseline characteristics of participants

	Male (*n*=980)	Female (*n*=775)
Demographics		
Age (years)		
<65	52.9±1.8	78.8±1.4
≥65	47.1±1.8	21.2±1.4
Educational attainment		
High school graduate or higher	54.3±1.8	41.4±2.1
Middle school graduate or less	45.7±1.8	58.6±2.1
Income level		
Quartiles 1 (lowest) and 2	69.5±1.7	58.4±2.1
Quartiles 3 and 4	30.5±1.7	41.6±2.1
Marital status		
Unmarried	12.0±1.3	24.9±1.7
Married	88.0±1.3	75.1±1.7
Having a religion		
Yes	45.5±1.8	70.7±1.8
No	54.5±1.8	29.3±1.8
Health-related habits		
Obesity		
No	78.1±1.5	72.7±1.8
Yes	21.9±1.5	27.3±1.8
Smoking status		
None or ex	62.7±1.9	96.4±0.9
Current	37.3±1.9	3.6±0.9
Alcohol use		
None or ex	38.1±1.8	75.2±1.8
Current	61.9±1.8	24.8±1.8
Regular exercise		
No	45.9±1.9	47.9±2.0
Yes	54.1±1.9	52.1±2.0
Mental health		
Social contact		
Yes	84.0±1.5	89.2±1.3
No	16.0±1.5	10.8±1.3
Depressive[a]		
No	73.5±1.7	66.2±2.0
Yes	26.5±1.7	33.8±2.0

[a]By Center for Epidemiological Studies-Depression scores. Data are presented as weighted proportion±SE (%). SE=Standard error

declines, we provided Supplementary Tables 1 and 2 for characteristics by cognitive decline and incident cognitive declines by baseline depressive state. The factors found to be associated with cognitive decline are presented in Table 2. Among all the study subjects, well-documented risk factors, such as age, female sex, low education, and depressive mood, remained significantly associated with cognitive decline. Sex-stratified analysis revealed that depressive mood was significantly associated with cognitive decline in male retirees only.

DISCUSSION

This study is meaningful because associations between a range of features after retirement and cognitive impairment were longitudinally analyzed in a large sample of nationally

Table 2: Factors associated with cognitive decline among retirees

	OR[c] (95% CI)		
	Total (*n*=1727)	Male (*n*=967)	Female (*n*=760)
Increased age (/1-year)	1.07 (1.06-1.09)***	1.07 (1.05-1.09)***	1.08 (1.05-1.11)***
Female	1.49 (1.08-2.04)*	–	–
Low educational attainment[a]	2.45 (1.91-3.14)***	2.18 (1.59-3.00)***	2.84 (1.88-4.29)***
Depressive mood[b]	1.51 (1.16-1.97)**	1.90 (1.31-2.75)**	1.17 (0.79-1.74)

*P<0.05; **P<0.01; ***P<0.001; [a]Middle school graduate or less; [b]Based on Center for Epidemiological Studies-Depression scores; [c]Determined using stepwise multivariate logistic regression models adjusted for demographics (age, sex, educational attainment, income levels, marital status and religion), health-related habits (obesity, smoking and alcohol use, and regular physical activity), and mental health (social contact and depressive mood). CI=Confidence interval; OR=Odds ratio

representative data. Our results focus attention on the effect of depression on cognitive impairment among male retirees. Despite a lower prevalence of depression among male retirees (weighted proportion ± standard error: 26.5 ± 1.7% for men and 33.8 ± 2.0% for women), cognitive abilities were significantly influenced by depressive mood only among male retirees. These findings indicate that screening male retirees for depressive mood is required to retard cognitive aging.

Patriarchal Confucianism persists in Korean society, although it has been diluted over recent decades. Women continue to take care of the family at home, and men are considered the family breadwinners, and this responsibility often forces male retirees back into the labor force. We hypothesized that psychological distress induced by retirement would enhance the impact of depressive mood on cognitive impairment.[7]

The most critical limitation in this study is that it lacks a comprehensive assessment of preretirement work characteristics, which would be expected to affect cognitive decline.[8] In addition, the use of a simple self-report questionnaire to assess depression could lead to misclassification bias. Second, the study does not address the bidirectional nature of the relationship between depression and cognitive abilities. Further longitudinal study is needed that details the characteristics of individuals prior to, during retirement transition, and postretirement.

Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Characteristics of participants by cognitive decline

	No cognitive decline (*n*=912)	Cognitive decline (*n*=843)
Demographics		
Age ≥65 years	23.3 (20.8-26.1)	50.1 (46.2-53.9)
Female sex	47.8 (44.1-51.6)	47.4 (43.6-51.2)
Middle school graduate or less	39.1 (35.6-42.7)	68.8 (65.0-72.3)
Low income (Q1 and Q2)	58.3 (54.5-62.0)	72.2 (68.5-75.6)
Unmarried	15.1 (12.6-18.0)	22.3 (19.3-25.7)
No religion	41.1 (37.4-44.8)	44.4 (40.6-48.2)
Health-related habits		
Obese	24.0 (21.0-27.3)	25.1 (21.9-28.5)
Current smoking	20.9 (17.8-24.3)	21.7 (18.6-25.1)
Current drinking	46.1 (42.4-49.9)	41.7 (37.9-45.5)
Regular exercise	57.1 (53.3-60.7)	48.0 (44.2-51.8)
Mental health		
No social contact	12.8 (10.3-15.8)	14.5 (11.9-17.5)
Depressive	24.2 (21.0-27.6)	37.7 (34.0-41.5)

Data are presented as weighted proportion (95% CI) (%). CI=Confidence interval

Supplementary Table 2: Incident cognitive declines by baseline depressive state

	No depressive (*n*=1227)	Depressive (*n*=523)	*P*
No cognitive decline	61.6 (58.6-64.6)	45.8 (40.8-50.8)	<0.001
Cognitive decline	38.4 (35.4-41.4)	54.2 (49.2-59.2)	

Data are presented as weighted proportion (95% CI) (%). CI=Confidence interval