Association between health behavior patterns and cognitive function in older adults

ABSTRACT

Introduction: Population aging, an increasingly significant issue worldwide, is associated with an increased prevalence of cognitive decline. Cognitive decline is a unique syndrome in elderly populations that results in progressive cognitive impairment and dementia and in lower quality of life for both patients and their families. Moreover, those with incident dementia face a significantly higher risk of becoming disabled, which further increases long-term care demand. Most previous studies of cognitive decline have employed a variable-based analysis approach. Using person-centered latent class analysis (LCA) and latent trajectory analysis to identify differences in characteristics within study groups may offer new insight into the effect of different health behaviors on cognitive decline risk.

Objectives: This study was designed to explore the relationship between health behavior patterns and cognitive function.

Methods: Data from the 3rd to 7th National Institute for Longevity Sciences - Longitudinal Study of Aging (NILS-LSA) surveys (2002-2012; National Center for Geriatrics and Gerontology, Japan) were used in this two-stage study. In the first stage, a cross-sectional study of data from the 3th survey (2002-2004) was conducted. Data from 1,202 adults aged 60 and older were analyzed using LCA method, and the results were used to identify seven health behavior clusters and to categorize their related patterns of health behaviors. In the second stage, a longitudinal study was conducted using data from the 3rd to 7th surveys. Data from 626 adults aged 60 and older were analyzed using latent trajectory analysis to explore their respective cognitive function trajectories. Next, chi-square tests and logistic regression were used to explore the

relationships between different health behavior patterns and cognitive function. In addition, the Generalized Estimating Equations (GEE) model was used to explore the impact of health behavior patterns on cognitive function changes. Cognitive function was assessed using the Mini-Mental State Examination (MMSE), with cognitive decline defined as earning an MMSE score below 26.

Results: The LCA method identified four classes, including: Class 1 - smoke and alcohol use with less exercise; Class 2 - socially inactive lifestyle with shorter / longer sleep; Class 3 - sound-health status; Class 4 - socially active lifestyle. Using multivariable logistic regression analysis, a 36% lower risk of cognitive decline (odds ratio, 0.64; 95% confidence interval, 1.38–41.38) was found in the "smoke and alcohol use with less exercise" group than in the reference (socially inactive lifestyle with shorter / longer sleep) group after adjusting for confounders such as sex, age, education level, marital status, living arrangement, and work status. Latent trajectory analysis identified three trajectory groups, including: Trajectory 1 - cognitive decline; Trajectory 2 - cognitive mild decline; Trajectory 3 - cognitive maintenance. Using multinomial logistic regression analysis, there was no significant association between cognitive trajectory groups and health behavior patterns. However, using the GEE, a 0.44 positive effect on changes in cognitive function was found in the "smoke and alcohol use with less exercise" group compared to the reference (socially inactive lifestyle with shorter / longer sleep) group after adjusting for sex, age, and education level.

Conclusion: The lifestyle pattern that combines smoke and alcohol use with less exercise was found to be significantly associated with a lower risk of cognitive decline.

Key words: older adults, lifestyle patterns, cognitive function, latent class analysis, latent trajectory analysis