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Letter to the Editor

Effects of Physical Activity and Body Mass Index on Hypertension in Older Females with Physical Disability

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Dear Editor-in-Chief

The rate of aging among the Korean population is increasing at a substantially high level. The National Institutes of Health in the U.S. estimated that, by 2050, the percentage of individuals aged 65 yr or above would reach 35.9% in South Korea and 40.1% in Japan. Besides, South Korea exhibits the second fastest rate of aging behind Japan (1). In line with this, the percentage of older adults with physical disability is also increasing in Korea (2). This percentage is considerably high in older adults aged 65 yr or above (84/1,000 persons) in comparison to all other age groups (129/1,000 persons).

This study conducted an analysis of an aging-related phenomenon using the raw data of the 2017 Current Status Survey of Older Adults with Physical Disability. The subjects in this study included 968 older females aged 65 yr or above, whose physical characteristics are presented in Table 1. The level of physical activity (PA) in this study was defined based on the responses to the PA questionnaire as follows: High PA for the group of individuals performing 150 min or more of PA per week; Low PA for those performing less than 150 min of PA per week. The body mass index (BMI) in this study was calculated using the standard method.

Table 1: Physical characteristics of the subjects

Variable	*Low PA (n=647)*	*High PA (n=321)*	*P-value*
Age (yr)	75.70±6.40	74.26±5.56	<0.001
Height (cm)	153.31±6.09	153.88±5.54	0.366
Weight (kg)	56.62±9.93	57.13±8.46	0.428
BMI (kg/m^2)	23.99±3.73	24.13±3.39	0.567
Disability duration (years)	17.49±14.64	15.60±12.32	0.046
Hypertension (n, %)	431/647 (66.6%)	206/321 (64.2%)	0.452

Values are Mean±SD, BMI: Body mass index, PA: Physical activity

All statistical analyses were performed using SPSS/Window (Chicago, IL, USA) 26.0. To identify the subject characteristics, the independent *t*-test was used to analyze comparatively the mean of each variable in each group with different levels of PA. In addition, the subjects were categorized into the high and low groups based on the levels of PA (150 min PA per week) and obesity (25 kg/m^2 BMI), and were further divided into four groups: 1. Low BMI & High PA; 2. Low BMI & Low PA; 3. High BMI & High PA; and 4. High BMI & Low PA. In the condition controlling the following factors: age, disability duration, smoking and alcohol drinking, the logistic regression analysis was used to analyze comparatively the odds of hypertension in each group. The level of significance was set to $P < 0.05$.

The subjects in this study were categorized into high and low groups for PA and BMI levels, then further sub divided into four groups: 1. Low BMI & High PA; 2. Low BMI & Low PA; 3. High BMI & High PA; 4. High BMI & Low PA. Results on the risk of hypertension in each group is presented in Table 2. The analysis after controlling the age, disability duration, smoking, and alcohol consumption, showed that the risk of hypertension was higher in the High BMI & High PA and High BMI & Low PA groups than in the Low BMI & High PA group [Ref Odds ratio (OR): 1], by 1.65 [OR: 1.65 (95% CI: 1.02~2.68)] and 2.27 [OR: 2.27 (95% CI: 1.50~3.45)] times, respectively.

Table 2: Odds ratio according to BMI and Physical activity levels

Variable	***BMI < 25kg/m²***		***25kg/m² ≤ BMI***	
	High PA (n=200)	Low PA (n=415)	High PA (n=121)	Low PA (n=232)
Hypertension OR (95% CI)	1	1.03(0.73~1.45)	1.64(1.01~2.66)	2.25(1.48~3.42)
*Multivariable-adjusted OR (95% CI)	1	1.04(0.73~1.47)	1.65(1.02~2.68)	2.27(1.50~3.45)

BMI: Body mass index, PA: Physical activity, *Adjusted for age, disability duration, smoking, and alcohol consumption, $P<0.05$

The results in this study supported the correlation between the risk of hypertension and the levels of PA and BMI in older females with physical disability. Reduced PA and increased BMI caused by aging and physical disability had a negative effect on the risk factors of metabolic diseases, with a consequent increase in the risk of various chronic diseases, including cardiovascular disease, hypertension, and hyperlipidemia (1, 2). These results implicated that decreased BMI and increased PA may promote healthy living among older adults with physical disability. It is worth noting that, in a meta-analysis (3) on older adults with physical disability, the increase in PA through exercise had a significant positive effect on subject mobility and physical functions. Hence, the levels of mobility and physical functions are closely associated with the level of PA, and that their increase may increase PA.

In summary, the findings in this study suggested that controlling obesity and increasing PA are effective methods to lower the risk of hypertension in older females with physical disability. It is essential that further studies be conducted on the most effective PA for older females with physical disability.

Conflict of interest

The author declares that there is no conflict of interest.

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