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Letter to the Editor

Effects of Physical Activity and Sedentary Behavior on Metabolic Syndrome in Postmenopausal Korean Women

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Dear Editor-in-Chief

Metabolic syndrome (MetS) is not a distinct disease but rather a combination of factors that increase the risk of cardiovascular disease. These factors primarily include obesity, hyperglycemia, hypertension, high serum triglycerides (TG), reduced serum high-density lipoprotein cholesterol (HDL-C) (1). MetS exhibits significant gender disparities, typically being more prevalent in men than in women of similar age during the premenopausal stage. However, this pattern undergoes a reversal during menopause, leading to a higher incidence of MetS in women compared to men (2).

Physical activity (PA) is considered an effective means of prevention and intervention for MetS, while prolonged sedentary behavior (SB) increases the associated risks of MetS. Exercise not only serves as an effective preventive and therapeutic measure for a spectrum of metabolism-related chronic diseases but also disrupts the intricate associations among various chronic conditions, thereby reducing the occurrence of multiple chronic diseases (3). Therefore, reducing SB may play a crucial role in preventing MetS(4). Based on the current research findings, although there are numerous studies on the improvement of metabolic disorders through PA, especially in general populations, research specifically focused on menopausal women is relatively scarce.

We aimed to thoroughly analyze the impact of exercise and sedentary lifestyle on the incidence of MetS in postmenopausal women, providing a theoretical foundation for the prevention and management of MetS in this specific population.

The data used in this study were sourced from the Korea National Health and Nutrition Examination Survey conducted by the Korea Disease Control and Prevention Agency between 2016 and 2018 (IRB Approval No: 2018-01-03-P-A). After excluding outliers, we ultimately selected data from 4,257 postmenopausal female participants for the analysis.

Among 4257 menopausal women studied, there were 1791 cases of MetS, accounting for a prevalence rate of 42.1%. Significantly, age strongly influenced MetS prevalence. In the age group of 55 yr and below, 16.6% had MetS, escalating to 51.5% in the 66-75 yr age group and 55.6% in those aged 76 yr and above (P<0.01). Living alone (49.7%) correlated with a higher MetS prevalence compared to families with three or more members (37.9%) (P<0.01). Education disparities were notable, with a MetS prevalence of 25.3% among those with university education and above, contrasting sharply with the 52.7% prevalence among individuals with only primary school education (P<0.01). Household income significantly influenced MetS, with 50.9% preva-

lence in lower-income families versus 29.9% in higher-income families (P<0.01). In addition, WC emerges (58.1%) as the primary factor contributing to the development of MetS in menopausal women.

Despite lower overall obesity levels and body weight compared to premenopausal women, menopausal women exhibit higher central obesity rates (5).

In our regression model, after adjusting for age, family size, education level, household income, housing type, and place of residence as demonstrated in the adjusted model (Model 2) presented in Table 1, the analysis reveals a significant correlation between the implementation of AT in menopausal women and a reduction in the incidence rates of abnormalities in WC, TG, HDL-C, FBG, and BP. Moreover, the adjusted data also indicates a significant correlation between ST performed at least twice a week and reduced rates of abnormalities in WC, TG, HDL, and BP. Conversely, SB shows a significant correlation with increased rates of abnormalities in WC, TG, HDL-C, and FBG. The implementation of AT was significantly associated with a 31% decrease in the incidence of MetS [OR (95% CI), 0.69 (0.60-0.79)], while ST is associated with a 25% decrease [OR (95% CI), 0.75 (0.62-0.91)], and SB correlates with a 35% increase in the incidence of MetS [OR (95% CI), 1.35 (1.19-1.53)].

Table 1: Effects of Physical Activity on Metabolic Syndrome and Its Criteria

Variables	***AT***		***ST***		***SB***	
	Model 1 OR (95 % CI)	Model 2 OR (95 % CI)	Model 1 OR (95 % CI)	Model 2 OR (95 % CI)	Model 1 OR (95 % CI)	Model 2 OR (95 % CI)
MetS	0.58(0.50-0.66)	0.69(0.60-0.79)	0.59(0.49-0.71)	0.75(0.62-0.91)	1.43(1.26-1.61)	1.35(1.19-1.53)
W C	0.62(0.54-0.70)	0.73(0.64-0.84)	0.62(0.52-0.74)	0.79(0.66-0.95)	1.46(1.29-1.65)	1.40(1.23-1.59)
T G	0.74(0.64-0.85)	0.79(0.68-0.91)	0.72(0.59-0.88)	0.79(0.64-0.98)	1.28(1.12-1.47)	1.27(1.11-1.46)
HDL-C	0.73(0.64-0.83)	0.84(0.74-0.96)	0.66(0.55-0.78)	0.78(0.65-0.93)	1.20(1.06-1.35)	1.14(1.01-1.29)
FBG	0.65(0.57-0.75)	0.74(0.65-0.85)	0.74(0.62-0.89)	0.88(0.73-1.06)	1.21(1.07-1.37)	1.15(1.02-1.31)
B P	0.74(0.65-0.84)	0.90(0.78-1.03)	0.59(0.49-0.71)	0.74(0.61-0.89)	1.12(0.99-1.27)	1.03(0.90-1.17)

Model 1: Unadjusted Model 2: Adjusted by age, family size, education level, household income, housing type, and place of residence.

In conclusion, the prevalence of MetS among postmenopausal women in South Korea is high, with abnormal waist circumference being a major contributing factor. Controlling sedentary behavior is considered a key strategy to improve MetS in postmenopausal women. Both aerobic and anaerobic exercises are effective lifestyle changes for improving MetS.

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Conflict of interest

The authors declare that there is no conflict of interest.

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