Development of metabolic syndrome during young adulthood to middle age and the benefits of physical activity

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In this presentation, our focus is on the developmental process of metabolic syndrome during young adulthood to middle age and the effect of physical activity on its prevention and treatment. Reanalysis of the data from National Health and Nutrition Survey showed that weight gain during young adulthood to middle age is prominent in both men and women. In our analysis of worksite annual health check-up data of six consecutive years, this weight gain is associated with the deterioration of various metabolic parameters. Physical activity level, which we evaluated using questionnaires (IPAQ) in two worksite populations, is associated with body weight and disease status, and systemic review of the literatures revealed that energy expenditure is the key component of physical activity in reducing visceral fat as well as improving metabolic profiles. Our study also showed that ‘intrinsic motivation,’ which we evaluated using questionnaires to assess psychological control of exercise behavior (BREQ-2), was positively related to physical activity level. Enhancing intrinsic motivation to exercise is needed to control metabolic syndrome through maintaining high level of physical activity.

Reconsideration of visceral obesity assessment

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Accumulation of visceral adipose tissue (VAT) is associated with insulin resistance, dyslipidemia, diabetes, hypertension, and all-cause mortality. Currently, there are many approaches available for measuring VAT in humans. Although computed tomography (CT) and magnetic resonance imaging (MRI) are generally accepted modalities for assessing regional adipose tissue, waist circumference (WC) is perhaps the most widely used parameter in both epidemiological studies and general clinical practice to identify high-risk abdominally-obese people. In Japan, WC at the umbilicus is a required index for specific health checkups and counseling guidance. However, our studies, in addition to other recent evidence, have indicated that the commonly-used umbilicus measurement site may not be the best location to estimate VAT volume. There are several possible reasons for this discrepancy. First, WC may better reflect subcutaneous adipose tissue (SAT), rather than VAT, accumulation. Second, the zone located 5-9 cm above the umbilicus has a stronger association with cardiovascular disease risk factors. Finally, measurement sites 5-6 cm above the umbilicus have a greater association with VAT volume changes resulting from diet or regular exercise. More study is needed to fully determine the ideal means by which VAT can be accurately detected in the absence of sophisticated and expensive equipment within clinical healthcare settings.