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Body composition and its association with health outcomes among elderly South Koreans

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Abstract

Sarcopenic obesity (SO) in the elderly is associated with a loss of independence and the occurrence of metabolic complications. Despite this clinical importance, the associations of SO with various health outcomes in Asian elders are unclear. This study aimed to examine the association of SO with the prevalence of chronic illness and mobility limitations among 1204 subjects (576 men and 628 women) over the age of 60 from the Fifth Korea National Health and Nutrition Examination Survey (KNHANES V-1, 2010). The patients were placed in four categories based on body composition: normal, sarcopenic non-obese, normal obese, and SO. Data regarding functional dimensions were extracted from the EQ-5D in the KNHANES data (i.e., mobility, self-care, and usual activities). Pain/discomfort data were also extracted. The prevalence of SO was higher among the women than the men (7.2% vs. 4.1%). Hypertension and arthritis were associated with increased likelihoods of SO. People with SO were more likely to report problems in mobility (OR: 3.34, 95% CI, 1.97–5.65), self-care (men: OR: 2.92, 95% CI, 1.05–8.07, women: OR: 2.33, 95% CI, 1.29–4.21), and usual activity (men: OR: 2.28, 95% CI, 1.02–5.08, women: OR: 2.13, 95% CI, 1.29–3.52). In conclusion, our results showed that SO was associated with mobility, self-care, and usual activity problems. With the rapid ageing that is occurring in Korea, more attention should be given to the prevention and management of sarcopenic obese seniors.

Keywords: Sarcopenic obese; Health outcome; Older adults

Introduction

Metabolic syndrome occurs as people age, and the associated changes in body composition result in increased prevalences of overweight and obesity combined with losses of muscle mass and strength. The loss of muscle reduces the mass of available insulin-responsive target tissue, which promotes insulin resistance, which in turn, promotes metabolic syndrome and obesity [1].

Furthermore, increasing fat mass promotes the production of interleukin-6, tumour necrosis factor alpha, and other adipokines that further promote

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insulin resistance and potentially promote a direct catabolic effect on the muscle. This cycle that is created leads to more gain in fat and more loss of muscle, until a threshold is crossed, and functional consequences, such as disability and illness occur.

Among the consequences of obesity in later life are an increased risk of cardiometabolic complications, insulin resistance, type 2 diabetes, dyslipidaemia, knee replacement, dementia and cardiovascular disease [2–5].

Similarly, the loss of muscle mass associated with the ageing process is called sarcopenia and represents an impaired state of health that involves cardiovascular risk factors including glucose intolerance and metabolic syndrome, mobility disorders, impaired abilities to perform activities of daily living, increased risks of falls and fractures, disability, loss of independence and an increased risk of death [6–8].

Given the occurrence of these two greatest epidemiological trends in ageing, it is possible that the combination of obesity and sarcopenia is associated with an even greater risk. Baumgartner et al. [9] proposed criteria for a new condition that combines sarcopenia and obesity that has been termed "sarcopenic obesity (SO)". Sarcopenic obesity is characterised by reduced skeletal muscle mass coupled with increased adiposity within the same elderly person.

Understanding the associations of sarcopenic obesity with health outcomes, such as cardiovascular risk and mobility problems, is a crucial priority for public-health policy making because these associations affect both public health promotion programs and long-term care. Villareal et al. [10] provided one of the first systematic evaluations of sarcopenic obesity relative to both nonsarcopenic obese and adults of comparable ages. These authors compared 52 obese elderly adults, 52 nonobese frail adults, and 52 nonobese, nonfrail persons who were matched for age and sex. Compared with the nonobese nonfrail group, the obese and nonobese frail groups had low in physical performance and peak aerobic power.

Previous studies have produced conflicting results. Initial evidence indicated that when obesity and muscle impairment co-exist, they act synergistically on the risks of developing multiple health-related outcomes. In the New Mexico Elder Health Survey, sarcopenic obese participants were more likely to be disabled than were participants who were only obese or sarcopenic [11].

After 8-years of follow-up in the New Mexico Aging Process Study, Baumgartner and his colleagues [9] reported that the SO elderly were 2.5 times more likely to experience declines in physical function compared to the elderly with normal body compositions. Sarcopenia or obesity alone did not increase this risk. Further, Stephen and Janssen [12] reported that sarcopenic obesity is associated with a modest increase in the risks of cardiovascular disease (CVD) and congestive heart failure (CHF). These authors reported that neither obesity nor sarcopenia alone significantly predicted CVD, but the simultaneous occurrence of these conditions (i.e., sarcopenic obesity) increased the risk of CVD by 23%.

However, two other cross-sectional studies based on the NHANES III [13] and a sample of older women [14] found no association between obesity and functional decline in the presence of low muscle mass. In the InCHIANTI study, older persons with high BMIs and low strength were found to experience steeper declines in walking speed and greater probabilities of mobility disability than were those with either poor muscle strength or obesity alone [15].

While previous studies have provided some contradictory findings, they have been limited to Western countries, and more research is needed to clarify the effects sarcopenic obesity on the health outcomes of the Asian elderly population. The Korean population is rapidly ageing, and approximately 10.3% of the Korean population over the age of 65 years in 2008. This percentage is expected to rapidly rise to 20.3% in 2027 and 34.4% in 2050 [16].

To bridge the knowledge gap between Western and Asian countries, the primary purpose of this study was to examine the associations of sarcopenic obesity with health outcomes such as chronic disease and functional outcomes among older Koreans.

Method

Study subjects

The data for this study were obtained from a cross-sectional and nationally representative survey conducted by the Korean Ministry of Health and Welfare in 2010. In the 1st-year data from the Fifth Korean National Health and Nutrition Examination Survey (KNHANES-V-1; January–December, 2010), the participants were non-institutionalised civilians who were selected with a stratified, multistage, probability-sampling design based on geographic area, sex, and age group that was conducted based on the household registries.

A total of 3840 households selected from 192 survey locations were surveyed. The overall participation rate was 82.8%. All participants provided