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Communication

Light coffee consumption is protective against sarcopenia, but frequent coffee consumption is associated with obesity in Korean adults

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ABSTRACT

Few studies have examined the effects of coffee on body composition in the general population. In this cross-sectional study, we hypothesized that coffee consumption is protective against obesity and sarcopenia in Korean adults. The study included 6906 subjects aged ≥40 years who participated in the Korean National Health and Nutrition Examination Survey in 2009–2010. Body composition was measured using dual-energy x-ray absorptiometry, and obesity was determined according to the body mass index (BMI) and waist circumference (WC). Sarcopenia was defined as an appendicular skeletal muscle mass divided by height-squared that was below the lower quintile of the study population. Participants were classified into 4 groups according to the degree of coffee consumption (<1/d, 1/d, 2/d, and ≥3/d).The numbers of participants who were obese by BMI, obese by WC, and sarcopenic were 2390 (35.5%), 2033 (28.5%), and 1438 (20.0%), respectively. On multiple logistic regression analyses, the odds ratio (OR) of sarcopenia was lower in men who drink coffee once a day compared to those who rarely drink coffee (OR: 0.69, 95% confidence interval [CI]: 0.50–0.94). Women who consumed coffee ≥3 times/d had higher obesity ORs than those who rarely drink coffee according to both obesity indices (OR: 1.57, 95% CI, 1.18–2.10 for obesity by BMI; OR: 1.33, 95% CI: 1.01–1.75 for obesity by WC). Light coffee consumption was protective against sarcopenia in men, whereas frequent coffee consumption produced a higher risk for obesity, especially in women.

1. Introduction

Normal aging is associated with changes in body composition that are characterized by a progressive increase in fat mass; this can lead to obesity as well as a relative decline in muscle mass (sarcopenia) [1]. These body composition changes often begin at approximately 40 years of age, even in those with stable body weights [2,3]. Obesity is known to be related to several negative health outcomes, such as cardiovascular disease (CVD), obstructive sleep apneas, and musculoskeletal

Abbreviations: ASM, appendicular skeletal muscle mass; ASM/Ht^2, ASM divided by height-squared; BMI, body mass index; CI, confidence interval; CVD, cardiovascular disease; KNHANES, Korea National Health and Nutrition Examination Survey; OR, odds ratio; SE, standard error; WC, waist circumference.

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disorders [4,5]. Similarly, sarcopenia is known to be associated with adverse health outcomes such as falls, disability, long-term care requirements, poorer quality of life, and death [2,6]. Because such aging effects have a significant impact on public health, it is necessary to study the factors associated with body composition changes, including obesity and sarcopenia, in the general population.

Coffee is one of the most frequently consumed beverages worldwide, and contains several biologically active compounds potentially affect health such as caffeine, antioxidants, and various minerals [7]. Several studies have investigated the association between coffee intake and the risk of obesity or type 2 diabetes mellitus. Although the effect of coffee on obesity has remained unclear, there are several pieces of evidence that coffee consumption reduces the risk of obesity [8-14]. However, studies from other nations may not be applicable to the Korean population because Koreans have unique coffee drinking habits. Although coffee intake is on the rise in Korea owing to the influence of Western diets, one characteristic of a traditional Korean lifestyle is the low consumption of coffee compared to Western countries, as well as the use of instant coffee mixes that contain non-dairy creamer and/or sugar [15]. Furthermore, relatively little attention has been paid to the effects of coffee on skeletal muscles despite the fact that such muscles comprise the largest organ in the body; skeletal muscles constitute an endocrine organ that secretes hundreds of peptides (such as myokines) that influence the progression of age-related diseases and systemic aging [16]. In previous studies, coffee intake was suggested to have a beneficial effect on skeletal muscles [17,18]. However, too few studies have been conducted to evaluate the effect of coffee intake on body composition measures in the general population. To that end, we hypothesized that coffee consumption is protective against obesity and sarcopenia; hence, we performed this study to assess the relationship between coffee consumption and body composition measures in Korean adults 40 years of age or older.

2. Methods and materials

2.1. Study population

This study analyzed data acquired from the third year (2009) of the Korea National Health and Nutrition Examination Survey (KNHANES) IV (2007–2009) and the first year (2010) of KNHANES V (2010–2012). The KNHANES is a series of cross-sectional and national surveillance studies conducted by the Korea Centers for Disease and Control that are designed to provide representative prevalence estimates of health-related behaviors, health conditions, and the nutritional status of Koreans.

Among subjects aged ≥40 years, those who had previously been diagnosed with ischemic heart disease, stroke, liver cirrhosis, or chronic kidney disease were excluded from the study, as were those receiving cancer treatment. Individuals with incomplete anthropometric measurements or laboratory test results were also excluded. A total of 6906 subjects (2833 men and 4073 women) were included in the final statistical analysis.

2.2. Data collection and measurement

Anthropometric data were obtained according to standardized guidelines. The body weights and heights of participants were measured to the nearest 0.1 kg and 0.1 cm, respectively. Waist circumference (WC) was measured to the nearest 0.1 cm, upon expiration, at the narrowest point between the lower border of the rib cage and the iliac crest. Body mass index (BMI) was calculated by dividing the body weight by the height-squared (kg/m^2). A BMI ≥25.0 kg/m^2 denoted obesity, as did a WC ≥90 cm in men and ≥85 cm in women [19].

Body composition, including body fat percentage and appendicular skeletal muscle mass (ASM; kg), was measured with dual-energy X-ray absorptiometry. ASM was defined as the sum of the lean soft tissue masses of the arms and legs, assuming that all non-fat and non-bone tissues were skeletal muscle [20]. Sarcopenia was defined as an ASM divided by height-squared (ASM/Ht^2) that was below the lower quintile of the study population [2].

Smoking status was classified as “current smoker” or “non-smoker” (ie, the individual had never smoked or had previously smoked). Alcohol consumption was marked ‘yes’ for participants who consumed at least 2 units of alcohol every week over the previous year. The low-income group comprised those with earnings in the lowest quartile of household income. Strenuous exercise, moderate exercise, and regular walking were marked ‘yes’ when the participant engaged in the relevant activity on a regular basis: ≥20 min for ≥3 days per week for strenuous exercise, ≥30 min for ≥5 days per week for moderate exercise, and ≥30 min for ≥5 days per week for walking.

2.3. Assessment of coffee consumption and nutritional intake

Information about the frequency of coffee consumption and intake of macronutrients was investigated by using the 63-item food frequency questionnaire, which is methodologically convenient and practical for assessing dietary intakes in a large population and has already been validated in Asian populations [21,22]. Participants were asked to indicate how frequently they consumed coffee over the previous year, and the frequencies of coffee consumption were categorized into 10 groups: almost no drinking, 6–11 cups per year, 1 cup per month, 2–3 cups per month, 1 cup per week, 2–3 cups per week, 4–6 cups per week, 1 cup per day, 2 cups per day, and 3 or more cups per day. The participants were re-categorized into 4 groups as follows: participants who rarely drink coffee (<1 time/day; n = 1538), participants who drink 1 cup of coffee per day (n = 1227), participants who drink coffee 2 cups per day (n = 840), and participants who drink coffee ≥3 cups per day (n = 468). The intakes of macronutrients, such as the total caloric intake (kcal/d), carbohydrate intake (g/d), protein intake divided by weight (g/kg), and lipid intake (g/d), were calculated by multiplying the food code-specific nutrient concentration data with the corresponding weight of each reported food.

2.4. Statistical analyses

Data were presented as means ± SE for continuous variables and frequencies ± SE for categorical variables, as appropriate.

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