



ORIGINAL ARTICLE

Relationship between dietary calcium intake and adiposity in female adolescents[☆]



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KEYWORDS

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Abstract

Background and objective: The prevalence and magnitude of obesity in children and adolescents increase rapidly. Besides genetic and environmental factors, calcium intake has recently been identified as a dietary factor that is inversely related with body mass index and development of overweight and obesity.

The purpose of this study was to assess the correlation between dietary calcium intake and body mass index and fat distribution in female adolescents.

Materials and methods: This was a cross-sectional study where anthropometric variables (weight, height, body mass index, waist and hip circumference) were collected in 244 female adolescents to establish total body adiposity and fat distribution. A 24-h recall and a food frequency questionnaire were used to assess total calorie, calcium, and dairy products intake.

Results: Calcium intake was inversely related to body mass index ($p < .05$), waist circumference ($p < .05$), hip circumference ($p > .05$), and waist to hip ratio ($p < .05$). Overweight (8.3%) and obese (0.7%) adolescents had a lower mean calcium intake than adolescents of normal weight ($p = .06$).

Conclusions: Dietary calcium intake and, to a lesser extent, consumption of dairy products are inversely related to total and abdominal adiposity, and also to the prevalence of overweight in this group of adolescents.

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PALABRAS CLAVE

Adolescentes;
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Sobrepeso

Relación entre ingesta dietética de calcio y adiposidad corporal en adolescentes mujeres**Resumen**

Antecedentes y objetivo: La prevalencia y magnitud de la obesidad en niños y adolescentes se incrementa aceleradamente. Aparte de los factores genéticos y ambientales, se ha identificado recientemente la ingesta de calcio dietético como uno de los factores que se correlaciona inversamente con el índice de masa corporal y con el desarrollo de sobrepeso y obesidad.

El objetivo del presente estudio es determinar la correlación entre la ingesta dietética de calcio con el índice de masa corporal y la distribución de la grasa en adolescentes mujeres.

Materiales y métodos: Es un estudio de corte transversal en el cual se realizó la evaluación antropométrica (peso, talla, índice de masa corporal, circunferencia de cintura, circunferencia de cadera) en 244 adolescentes mujeres, para establecer la adiposidad corporal total y la distribución de la grasa. Se utilizó el recordatorio de 24 h y un cuestionario de frecuencia de consumo para determinar la ingesta calórica total, ingesta de calcio y consumo de lácteos.

Resultados: La ingesta de calcio se correlacionó inversamente con el índice de masa corporal ($p < 0,05$), circunferencia de cintura ($p < 0,05$), circunferencia de cadera ($p > 0,05$) e índice cintura cadera ($p < 0,05$).

Las adolescentes con sobrepeso (8,3%) y obesidad (0,7%) tuvieron una ingesta promedio de calcio inferior al de las adolescentes de peso normal ($p = 0,06$).

Conclusiones: La ingesta dietética de calcio y en menor grado el consumo de productos lácteos se relaciona inversamente con la adiposidad total y abdominal así como con la prevalencia de sobrepeso en las adolescentes estudiadas.

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Introduction

Non-communicable chronic diseases represent a worldwide health problem.¹ They have a substantial impact on health and have serious adverse effects on the quality of life, favor early mortality, and cause high costs to society. Cardiovascular disease, cancer, chronic respiratory tract disease, and diabetes account for 60% of deaths worldwide. It is estimated that 41 million people will die from non-communicable chronic diseases in 2015.²

Obesity is considered by the World Health Organization to be the "epidemic of the 21st century", and its prevalence has increased and continues to increase in developed countries, as well as in countries with economies in transition, and has acquired epidemic proportions. Overweight and obesity account for approximately 2.6 million deaths annually. Considering its multifactorial etiology, genetic factors appear to have played only a secondary role in the increased prevalence of obesity, while environmental factors such as diet and physical inactivity emerge as the most significant determinants of increased adiposity in the past 30 years.²

The prevalence and magnitude of obesity are also rapidly increasing in children and adolescents.³ Childhood obesity is the most common cause of insulin resistance in children and adolescents and is associated with dyslipidemia, type 2 diabetes mellitus, long-term vascular complications, and usually with increased morbidity and mortality in adulthood.^{3,4}

Research has often focused on the identification of combinations of macronutrients able to regulate body weight, but the effects of micronutrients need to be further

explored. Some minerals are involved in energy metabolism and in insulin secretion and action, and may interfere with obesity control.⁵

Studies searching for epidemiological explanations of increased adiposity have identified dietary calcium intake as one of the factors inversely correlated to the body mass index (BMI). Thus, consistent evidence concerning the role of calcium and dairy product consumption in obesity prevention has started to appear in recent years. The first report by McCarron, two decades ago, of the finding of lower body weights in US people who reported higher calcium intake in the National Health Survey opened a line of basic, clinical, and molecular research aimed at first confirming, and then explaining the mechanisms by which a mineral apparently unrelated to the energy equation could contribute to weight loss.⁶ Short-term studies have reported negative associations between calcium consumption and the BMI, percent fat, and waist circumference.⁷ Experimental studies in rats to determine the effect of subchronic dietary calcium intake on body weight and lipid metabolism showed that the administration of calcium added to a high-fat diet decreased body weight and abdominal fat contents during treatment, from which a potential decrease in fat absorption and a potential increase in fatty tissue apoptosis was inferred.⁸⁻¹⁰

A reanalysis of several prospective studies designed to assess the effect of dairy products on the prevention of osteoporosis showed that groups treated with calcium or with a greater intake of dairy products consistently had less risk of overweight.¹¹ A greater relative risk of high body adiposity was found in people with the lowest calcium intake, and the risk gradually decreased as calcium intake increased; relative risk was 0.75 for the second quartile,

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