

At Various Times of the Day and Cardiovascular Disease the Relationship between Calcium Consumption

Researchers investigated whether the quantity of calcium consumed at breakfast and dinner was associated with [cardiovascular disease](#) (CVD) in the general population.



Introduction

Cardiovascular disease is the primary cause of [mortality](#) globally and the most prevalent chronic illness among individuals living in the United States.

Calcium, a crucial dietary element, helps prevent and manage CVD by regulating blood vessels, muscular contraction, nerve transmission, hormone production, fat mass, blood pressure, and blood lipids. Circadian clocks in animals govern [circadian rhythms](#), which are biological rhythmic patterns that last 24 hours.

Diet is a significant external element that influences the synchronization of circadian clocks. Recent research indicates that calcium intake can influence physiological variations in circadian pacemaker-type [neuronal cells](#) and alter the expression of the biological clock genes.

However, the relationship between [calcium](#) consumption at various times of the day and cardiovascular disease is unclear.

Study

The present study examined the relationship between dietary calcium consumption at dinner and [breakfast](#) and CVD.

The study comprised 36,164 United States individuals (17,456 males, 18,708 females, and 4,040 cardiovascular disease patients) from the 2013–2018 [National Health and Nutrition Examination Surveys](#). They stratified the participants into five groups based on their calcium intakes from night and early morning meals.

The study focused on the fraction of calcium consumption in night and [morning meals](#) (Δ =calcium intake from dinner /calcium intake from breakfast).

The study's endpoint was cardiovascular disease, based on a self-reported history of angina, heart failure, stroke, coronary artery disease, or [heart attack](#).

Potential confounders included age, sex, educational attainment, smoking status, physical activity, marital status, annual income, alcohol consumption, body mass index (BMI), high-density lipoprotein (HDL), uric acid (UA), [total cholesterol](#) (TC), hypertension, and type 2 diabetes (T2DM).

Following confounder adjustment, the researchers used logistic regression to calculate the odds ratios (OR) for the relationship between the calcium intake percentage at night and morning and cardiovascular [disease](#).

They used dietary replacement models to investigate changes in [cardiovascular disease](#) risk by replacing 5.0% calcium from dinner with calcium consumption in the morning.

The team conducted home interviews with individuals and collected data at a mobile testing facility. They excluded individuals under 20 years, [pregnant women](#), those with incomplete data, those consuming more than 4,500 kcal per day, and those using calcium supplements.

They assessed dietary consumption using a 24-hour diet recall completed on two non-consecutive days. They assessed nutrient intake using the Food and Nutrient Database for [Dietary Studies](#) recommendations by the United States Department of Agriculture. They performed sensitivity studies to investigate the validity of the study findings.

Findings and Discussion

Individuals in the uppermost quartile showed a higher likelihood of having cardiovascular disease than those in the lowermost quintile, with adjusted [OR values](#) of cardiovascular disease of 1.2.

While keeping total calcium consumption constant, substituting a 5.0% calcium consumption from [dinner meals](#) with calcium consumption at breakfast reduced CVD risk by 6.0%.

[Breakfast meals](#) with morning snacks or dinner meals with evening snacks reduced CVD risk by 6% (OR, 0.9). Compared to the lowermost quintile, having breakfast and morning snacks as breakfast or dinner and evening snacks as dinner in the uppermost Δ quintile significantly reduced CVD risk, with adjusted ORs of 1.1 and 1.1, respectively.

Consuming dinner with evening snacks and breakfast with morning snacks yielded an adjusted OR of 1.1. Among overweight and [obese](#) individuals, the adjusted odds ratio of cardiovascular disease in the uppermost Δ quintile was 1.2 after adjusting for various confounding variables.

The circadian clock governs several cardiovascular processes, including endothelial function, thrombus development, blood pressure, and heart rate. Basic helix-loop-helix ARNT-like protein 1 (Bmal1), a primary clock gene, regulates calcium absorption and [metabolism](#).

Sleep periods improve calcium retention capability. Circadian rhythm influences the inflammatory nuclear factor kappa B (NFkB) pathway, metabolism, and [immune system](#) adaptability.

The study found that those in the [top percentile](#) of calcium consumption at dinner and breakfast are more likely to develop cardiovascular disease. The findings imply that allocating calcium intake to both meals is critical.

The study demonstrated a positive correlation between the Δ value and cardiovascular disease risk. Replacing 5.0% of calcium consumption from dinner meals with the same amount at breakfast reduced CVD risk by 6.0%. However, further research is required to corroborate these findings across races and [nations](#).

Source:

<https://www.news-medical.net/news/20240423/Replacing-dinner-calcium-with-breakfast-intake-could-reduce-heart-disease-risk-study-finds.aspx>