

Egg and cholesterol consumption and mortality from cardiovascular and different causes in the United States: A population-based cohort study

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Abstract

Background: Whether consumption of egg and cholesterol is detrimental to cardiovascular health and longevity is highly debated. Data from large-scale cohort studies are scarce. This study aimed to examine the associations of egg and cholesterol intakes with mortality from all causes, cardiovascular disease (CVD), and other causes in a US population.

Methods and findings: Overall, 521,120 participants (aged 50-71 years, mean age = 62.2 years, 41.2% women, and 91.8% non-Hispanic white) were recruited from 6 states and 2 additional cities in the US between 1995 and 1996 and prospectively followed up until the end of 2011. Intakes of whole eggs, egg whites/substitutes, and cholesterol were assessed by a validated food frequency questionnaire. Cause-specific hazard models considering competing risks were used, with the lowest quintile of energy-adjusted intake (per 2,000 kcal per day) as the reference. There were 129,328 deaths including 38,747 deaths from CVD during a median follow-up of 16 years. Whole egg and cholesterol intakes were both positively associated with all-cause, CVD, and cancer mortality. In multivariable-adjusted models, the hazard ratios (95% confidence intervals) associated with each intake of an additional half of a whole egg per day were 1.07 (1.06-1.08) for all-cause mortality, 1.07 (1.06-1.09) for CVD

mortality, and 1.07 (1.06-1.09) for cancer mortality. Each intake of an additional 300 mg of dietary cholesterol per day was associated with 19%, 16%, and 24% higher all-cause, CVD, and cancer mortality, respectively. Mediation models estimated that cholesterol intake contributed to 63.2% (95% CI 49.6%-75.0%), 62.3% (95% CI 39.5%-80.7%), and 49.6% (95% CI 31.9%-67.4%) of all-cause, CVD, and cancer mortality associated with whole egg consumption, respectively. Egg white/substitute consumers had lower all-cause mortality and mortality from stroke, cancer, respiratory disease, and Alzheimer disease compared with non-consumers. Hypothetically, replacing half a whole egg with equivalent amounts of egg whites/substitutes, poultry, fish, dairy products, or nuts/legumes was related to lower all-cause, CVD, cancer, and respiratory disease mortality. Study limitations include its observational nature, reliance on participant self-report, and residual confounding despite extensive adjustment for acknowledged dietary and lifestyle risk factors.

Conclusions: In this study, intakes of eggs and cholesterol were associated with higher all-cause, CVD, and cancer mortality. The increased mortality associated with egg consumption was largely influenced by cholesterol intake. Our findings suggest limiting cholesterol intake and replacing whole eggs with egg whites/substitutes or other alternative protein sources for facilitating cardiovascular health and long-term survival.

Trial registration: ClinicalTrials.gov [NCT00340015](https://clinicaltrials.gov/ct2/show/study/NCT00340015).

Conflict of interest statement

The authors have declared that no competing interests exist.

Figures

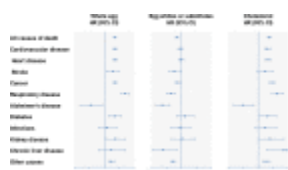


Fig 1. Multivariable-adjusted HRs of all-cause and...

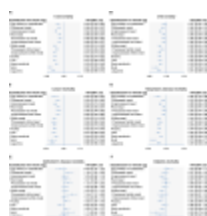


Fig 2. Multivariable-adjusted hazard ratios of all-cause...

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