What is the relationship between the intake of milk and milk products and cardiovascular disease?

Conclusion

Moderate evidence shows that intake of milk and milk products are inversely associated with cardiovascular disease.

Grade: Moderate

Overall strength of the available supporting evidence: Strong; Moderate; Limited; Expert Opinion Only; Grade not assignable For additional information regarding how to interpret grades, click here.

Evidence Summary Overview

Recent studies report that intake of milk and milk products are protective against cardiovascular disease (CVD). The conclusion reached for this question is based on review of two systematic reviews/meta-analyses (Alvarez-Leon, 2006; Elwood, 2008) and one case-control study (Kontogianni, 2006).

Alvarez-Leon et al (2006) systematically reviewed papers on the associations between consumption of dairy products and health outcomes, including CVD. The systematic review of these papers found an inverse association between the intake of dairy products and stroke.

Elwood et al (2008) performed a systematic review and meta-analysis to investigate the literature on milk and dairy consumption and risk of vascular disease. The final review included 15 prospective studies on ischemic heart disease (IHD) and stroke and four case-control studies on myocardial infarction (MI). The data showed a reduction in risk associated with the highest level of milk consumption for MI. There was also a reduction of about 10% to 15% in the incidence of IHD and a 20% reduction in stroke events in the individuals who had reported drinking the most milk, relative to those drinking the least milk within each cohort. The authors concluded that the data provides support for the beneficial effects of milk and dairy consumption on risk for CVD.

Finally, in a case-control study, Kontogianni et al (2006) examined the association between dairy consumption and the prevalence of a first, non-fatal event of an acute coronary syndrome in Greek adults. They reported an inverse relationship between dairy product consumption and the odds of having acute coronary syndrome. An increase of one portion of a dairy product per week was associated with a 12% lower likelihood of having acute coronary syndrome.

Evidence Summary Paragraphs

Systematic Reviews / Meta-Analyses:

Alvarez-Leon et al, 2006 (positive quality) systematically reviewed papers on the associations between consumption of dairy products and health outcomes, including cancer, bone health and CVD. Relevant articles were obtained through searching the MEDLINE database (from 1966 to January 2005) using the search terms: ‘dairy products,’ defined as ‘raw and processed or

manufactured milk, and milk-derived products' including butter, cheese, ice cream, margarine, and milk and cultured milk products (yoghurt). This search revealed 85,000 articles. After excluding studies, and including only meta-analysis and systematic reviews, the final sample consisted of 14 meta-analyses and systematic reviews. This final sample consisted of six papers on dairy products and cancer, six papers on dairy products and CVD [including hypertension (HTN), stroke and heart diseases] and two papers on dairy products and bone health. Evidence from these papers was summarized and evaluated. The systematic review found an inverse association between the intake of dairy products and stroke.

Elwood et al, 2008 (positive quality) performed a systematic review and meta-analysis to investigate the literature on milk and dairy consumption and risk of vascular disease and diabetes, examine the evidence related to consumption of whole vs. reduced fat milk and disease risk, and consider the likely effect of milk and dairy consumption on survival. The authors also reviewed a 2007 report by the World Cancer Research Fund to determine the impact of milk and dairy consumption on cancer risk. Using Cochrane systematic review methods, MEDLINE was searched up to June 2008 using key words milk/milk protein/dairy/dairy calcium and heart disease/coronary artery disease/myocardial infarction/ischaemic heart disease, stroke, and diabetes/metabolic syndrome. This search revealed 180 papers on milk and heart disease, 33 papers on milk and stroke, and 111 papers on milk and diabetes. Only studies that were done in human adults using population-based and prospective designs and reported baseline data on milk or dairy consumption, vascular disease outcome or incident diabetes were included in the final review. The final sample included 15 prospective studies on IHD and stroke, four prospective studies on diabetes, four case-control studies on metabolic syndrome and four case-control studies on MI. The data showed a reduction in risk associated with the highest level of milk consumption for MI (RR=0.83; 95% CI: 0.66, 0.99). There was also a reduction of about 10% to 15% in the incidence of IHD (RR=0.84; 95% CI: 0.76, 0.93) and a 20% reduction in stroke events in the subjects who had reported drinking the most milk, relative to those drinking the least milk within each cohort (RR=0.79; 95% CI: 0.75, 0.82). The authors concluded that taken together, these data provide support for the beneficial effects of milk and dairy consumption on health.

Case-Control Study:

Kontogianni et al, 2006 (neutral quality) used data from a case-control study to evaluate the association between dairy consumption and the prevalence of a first, non-fatal event of an acute coronary syndrome. Subjects were Greek adults [848 (700 male, 148 female) patients with an event of acute coronary syndrome and 1,078 (830 male, 248 female) population-based controls matched for age and sex]. Dietary intake was assessed using a semi-quantitative food-frequency questionnaire (FFQ), and multiple regression analysis estimated the odds ratio (OR) of having acute coronary syndrome by level of dairy intake, after adjusting for confounders. Levels of dairy intake were: No intake, five or less portions a week, six to eight portions a week and nine or more portions a week. Results showed an inverse relationship between dairy product consumption and odds of having acute coronary syndrome. An increase of one portion of dairy per week was associated with 12% lower likelihood of having acute coronary syndrome (0.88; 95% CI: 0.83, 0.93; P<0.0001). Cut-off analysis showed that 7.4 portions of dairy a week was the optimal consumption amount to benefit people from having acute coronary syndrome.

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Author, Year, Study Design,	Participants	Description of Study Design	Outcomes

Class, Rating			
Alvarez-León EE, Roman-Vinas B et al, 2006 Study Design: Meta-analysis or Systematic Review Class: M Rating:	N=14 meta-analyses and systematic reviews: • Six on dairy products and cancer • Six on dairy products and CVD • Two on dairy products and bone health.	Relevant articles obtained through searching MEDLINE database (from 1966 to January 2005) using search terms: 'dairy products,' defined as 'raw and processed or manufactured milk, and milk-derived products' including butter, cheese, ice cream, margarine, and milk and cultured milk products (yoghurt).	Reviews on stroke and heart diseases were considered. Systematic review found inverse association between intake of dairy products and stroke.
Elwood PC, Givens DI et al, 2008 Study Design: Systematic review and meta-analysis Class: M Rating:	Final N=15 prospective studies on ICD and stroke: • Four prospective studies on diabetes • Four case-control studies on metabolic syndrome • Four case-control studies on MI.	MEDLINE searched up to June 2008 using key words milk/milk protein/dairy/dairy calcium and heart disease/coronary artery disease/myocardial infarction/ischaemic heart disease, stroke, and diabetes/metabolic syndrome.	Data showed a ↓ in risk associated with the highest level of milk consumption for MI (RR=0.83; 95% CI: 0.66, 0.99). Also a ↓ of ~10% to 15% in the incidence of IHD (RR=0.84; 95% CI: 0.76, 0.93) and a 20% ↓ in stroke events in subjects who had reported drinking the most milk, relative to those drinking the least milk within each cohort (RR=0.79; 95% CI: 0.75, 0.82).
Kontogianni MD, Panagiotakos DB et al, 2006 Study Design: Case Control	N=848 (700 male, 148 female) patients with an event of acute coronary syndrome. N=1,078 (830 male,	Dietary intake assessed using a semi-quantitative FFQ. Multiple regression analysis estimated the OR of having acute coronary syndrome by level of dairy intake, after	An ↑ of one portion of dairy per week associated with 12% ↓ likelihood of having acute coronary syndrome (0.88; 95% CI: 0.83, 0.93; P<0.0001).

Study Class: C Rating: 	248 female) population-based controls matched for age and sex. Location: Greece.	adjusting for confounders. Levels of dairy intake were (portions per week): • No intake • ≤ Five • Six to eight • ≥ Nine.	Cut-off analysis showed that 7.4 portions of dairy a week was the optimal consumption amount to benefit people from having acute coronary syndrome.

Research Design and Implementation Rating Summary
For a summary of the Research Design and Implementation Rating results, click here.

Worksheets

Alvarez-León EE, Román-Viñas B, Serra-Majem L. Dairy products and health: A review of the epidemiological evidence. *Br J Nutr.* 2006; 96 Suppl 1: S94-S99.

Elwood PC, Givens DI, Beswick AD, Fehily AM, Pickering JE, Gallacher J. The survival advantage of milk and dairy consumption: An overview of evidence from cohort studies of vascular diseases, diabetes and cancer. *J Am Coll Nutr.* 2008; 27 (6): 723S-734S

Kontogianni MD, Panagiotakos DB, Chrysohoou C, Pitsavos C, Stefanadis C. Modelling dairy intake on the development of acute coronary syndromes: The CARDIO2000 study. *Eur J Cardiovasc Prev Rehabil.* 2006 Oct; 13 (5): 791-797.