Effect of dairy consumption on weight and body composition in adults: a systematic review and meta-analysis of randomized controlled clinical trials

Abargouei AS, Janghorbani M, Salehi-Marzijarani M, Esmaillzadeh A

CRD summary
Increasing dairy consumption without energy restriction might not lead to a significant change in weight and body composition, whereas inclusion of dairy products in weight loss energy-restricted diets would result in more favourable results. Although the conclusions reflect the evidence, the limited size and number of trials and their limited follow-up mean that they may not be sufficiently cautious.

Authors' objectives
To summarise the evidence on the effect of dairy consumption on adult body weight and composition.

Searching
PubMed, EMBASE, Web of Science, SCOPUS and Science Direct were searched from 1960 up to October 2011 for published studies in any language. Search terms were reported. Reference lists of published studies and field experts were consulted for additional references.

Study selection
Randomised controlled trials (RCTs) that evaluated the effect of dairy products on body weight or composition in adults were eligible for inclusion. Trials with restriction of energy consumption to fixed values were excluded.

In included trials, the age of participants ranged from 18 to 85 years. Most patients were women (where reported). Interventions lasted between eight and 144 weeks. The types of dairy products and intake frequency varied. Mean calcium intake ranged from 1,037 to 2,163mg in the intervention group, and from 299 to 1,850mg in the control group.

Most trials applied energy restrictions (almost 500kcal per day less than the estimated energy requirement) to both intervention and control groups. The ratio of calcium intake between intervention and control groups, and outcome measures varied across the trials. Most trials were conducted in the USA.

The authors did not state how many reviewers selected the studies for inclusion.

Assessment of study quality
The authors did not state that they assessed the quality of the included studies.

Data extraction
Outcomes data on change in weight, fat mass, lean mass and waist circumference were extracted to calculate mean differences and standard deviations. Authors were contacted for missing data.

Data were extracted independently by two reviewers. Discrepancies were resolved via discussion.

Methods of synthesis
Pooled mean differences and standard deviations were calculated using a random-effects meta-analysis. Heterogeneity was assessed using $X^2$ and $I^2$.

Meta-regression and subgroup analyses (trials with and without energy restriction) were performed to explore potential sources of heterogeneity. Sensitivity analyses were used to explore the effect of selected trials on the pooled estimates.

Publication bias was explored using funnel plots, Egger's and Begg's tests.

Results of the review
Fourteen trials (883 participants) were included in the analyses.

Weight loss was slightly greater for participants on high dairy intake compared with those with low dairy intake.
although the difference was not statistically significant (MD -0.61kg, 95% CI -1.29 to 0.07; \(I^2=41\%\)). Increased dairy intake resulted in greater reduction in fat mass (MD -0.72kg, 95% CI -1.29 to -0.14; \(I^2=56\%\)), gain in lean body mass (MD 0.58kg, 95% CI 0.18 to 0.99; \(I^2=49\%\)), and further reduction in waist circumference compared to controls (-2.19cm, 95% CI -3.42 to -0.96; \(I^2=53\%\)).

Subgroup analyses showed statistically significant changes favouring higher dairy intake in trials with calory-restricted diets (in both intervention and control groups) on weight loss (MD -1.29kg, 95% CI -1.98 to -0.60; \(I^2=0\%\)), fat mass (MD -1.11kg, 95% CI -1.75 to -0.47; \(I^2=12\%\)), lean body mass (MD 0.72kg, 95% CI 0.12 to 1.32; \(I^2=60\%\)) and waist circumference (-2.43cm, 95% CI -3.42 to -1.44; \(I^2=0\%\)). No significant differences in the subgroup of trials without energy restrictions between intervention and control were found.

Results of sensitivity analyses and tests for publication bias were reported.

**Authors' conclusions**
The review indicated that increasing dairy consumption without energy restriction might not lead to a significant change in weight and body composition, whereas inclusion of dairy products in weight loss energy-restricted diets would result in a greater reduction of weight, fat mass and waist circumference and gain in lean body mass compared with a conventional weight loss diet.

**CRD commentary**
The review question and selection criteria were clear. Several bibliographic databases were consulted; no language restrictions were applied to the searches. Data extraction was performed in duplicate, which minimised the risk of reviewer error and bias. It was unclear whether similar steps were taken during the selection of the studies.

The absence of validity assessment makes the quality of the included trials difficult to interpret. Some trial details were presented. The authors acknowledged that follow-up duration was often short, and that the limited number of trials and small sample sizes precluded any definitive conclusions. The choice of methods of analysis appeared broadly appropriate. There was some evidence of heterogeneity for most analyses.

Although the conclusions reflected the evidence, the limited size and number of trials and limited follow-up mean that they may not be sufficiently cautious.

**Implications of the review for practice and research**
**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that the hypothesis according to which appetite-lowering effects of dairy work more efficiently along with energy-restricted diets should be further tested. They stated that further research on the effect of dairy consumption (particularly on body composition indicators) was required as findings were based on a limited number of trials.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
22249225

**DOI**
10.1038/ijo.2011.269

**Original Paper URL**
Database of Abstracts of Reviews of Effects (DARE)
Produced by the Centre for Reviews and Dissemination
Copyright © 2019 University of York
http://www.nature.com/ijo/journal/v36/n12/abs/ijo2011269a.html

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adipose Tissue /metabolism; Adult; Body Composition; Dairy Products; Diet, Reducing; Energy Intake; Female; Health Promotion; Humans; Male; Obesity /etiology /metabolism; Randomized Controlled Trials as Topic; Waist Circumference; Weight Loss

**AccessionNumber**
12013002834

**Date bibliographic record published**
25/02/2013

**Date abstract record published**
01/05/2013

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.