

Calcium Guidelines Challenged by Meta-Analyses

Laird Harrison | October 01, 2015

The bulk of the evidence does not support guidelines that recommend a minimum calcium intake, including those from the Institute of Medicine, according to the authors of two new systematic reviews and meta-analyses.

"Most people don't need to worry about their calcium at all," Mark Bolland, MBChB, PhD, an associate professor of medicine at the University of Auckland in New Zealand and an author on both papers, told *Medscape Medical News*.

Randomized controlled trials show calcium supplementation provides only a modest reduction in the risk for fractures, and the benefit may be outweighed by adverse reactions, he said. Yet fractures are the primary reason cited for minimum calcium intake.

In the two meta-analyses, both published in the September 29 issue of *BMJ*, Dr Bolland and colleagues found that neither calcium supplements nor dietary calcium significantly reduced the risk of fractures or improved bone mineral density.

The findings could have broad implications because more than 30% of older women take calcium supplements in some Western countries, including the United States, Dr Bolland told *Medscape Medical News*.

The high rates of supplementation probably result from guidelines promulgated by multiple government agencies and professional associations, Dr Bolland said. For example, the Institute of Medicine currently recommends 1200 mg per day calcium intake for women aged 51 years and older.

A spokesperson for the Institute of Medicine said it would not provide a comment for this article.

The recommendations date back to studies in the 1970s that measured calcium intake vs calcium excretion, Dr Bolland said.

Supplement use gained momentum in 1992 with the publication of a large trial showing a 43% reduction in hip fractures among elderly women randomly assigned to take calcium and vitamin D supplements compared with a matched cohort assigned to a placebo (*N Engl J Med*. 1992;327:1637-1642).

However, the women in the study were elderly, living in institutions, and had low calcium intake and low serum vitamin D at baseline, Dr Bolland pointed out. "People just assumed therefore, because there was benefit in this quite specific population group, that there would be benefits for larger populations," he said.

In the current reviews, the researchers analyzed results from 26 randomized controlled trials and found that supplements only had a modest effect. They reduced the risk for total fracture by 11% (relative risk [RR], 0.89; 95% confidence interval [CI], 0.81 - 0.96), and that for vertebral fracture by 14% (RR, 0.86; 95% CI, 0.74 - 1.00), but had no statistically significant effect on the risk for hip (RR, 0.95; 95% CI, 0.76 - 1.18) or forearm (RR, 0.96; 95% CI, 0.85 - 1.09) fracture.

At the same time, some of these trials have shown serious adverse events, including cardiovascular events, kidney stones, and hospital admissions for acute gastrointestinal symptoms, as well as milder ones such as constipation. Dr Bolland and colleagues estimate that the increased risk for cardiovascular events was "similar to or exceeded the benefits of calcium on fracture prevention."

Such findings have led some experts to recommend increasing calcium consumption through dietary sources instead of supplements, but Dr Bolland and colleagues found even weaker evidence to support this approach.

Only two good randomized controlled trials have examined dietary calcium's effects on fracture risk, and they were too small to produce statistically significant results, the researchers found. In addition, they report that most cohort studies have shown no relationship between dietary calcium and fracture risk.

In the second paper, the investigators analyzed data from 59 randomized controlled trials. They conclude that increasing calcium intake from dietary sources increased density by 0.6% to 1.0%, and supplementation increased the density by 0.7% to 1.8%. But these increases are unlikely to prevent fracture, the authors write.

The researchers call for further study to see whether there are subgroups, such as the women in the 1992 trial, who might benefit from supplementation.

Questions Persist

This is not the first recent review to find a lack of evidence for calcium supplements. The US Preventive Services Task Force reached similar conclusions in 2013.

"The question is not so much why the guidelines were formed, but why is it, since there have been all these trials accumulated since 2000, they haven't changed," Dr Bolland said.

Another analysis by his group points toward a possible answer: The smallest studies were most likely to show the most significant effects for supplementation. This is a statistical red flag for a potential bias toward publication of positive trials, Dr Bolland said.

Still, it may be too early to change the guidelines, said Xuezhi (Daniel) Jiang, MD, PhD, assistant professor of obstetrics and gynecology at the Sidney Kimmel Medical College of Thomas Jefferson University in Philadelphia, Pennsylvania.

"I'm a little bit conservative," he told *Medscape Medical News*. "I really don't want to recommend against calcium supplementation at this point."

The research so far does not prove there are no benefits to calcium supplementation, so it is better to wait for more randomized controlled trials to settle the question, he argued. "You really need to have a well-designed randomized study, just because there are so many confounding factors," he said.

Prematurely advising women to stop taking calcium could backfire if later evidence establishes a benefit, because many women would be unwilling to start taking calcium again, he said.

Isabel Maples, MEd, RDN, a spokesperson for the Academy of Nutrition and Dietetics, argued that the recommendation to eat foods high in calcium is still a helpful one because these foods generally have additional benefits.

"For instance, besides being the top source of calcium and vitamin D, dairy foods are the number one food source of potassium in the American diet — a key nutrient in better blood pressure control," she told *Medscape Medical News*.

In an editorial accompanying the two studies, Karl Michaëlsson, MD, argues for official recommendations such as those in the United Kingdom and Nordic countries of 700 to 800 mg per day of calcium. Dr Michaëlsson, a professor in the Department of Surgical Sciences at Uppsala University in Sweden, points out that this level can be achieved with "a normal varied diet."

In contrast, guidelines such as those by the National Osteoporosis Foundation would require nearly the whole population older than 50 years to take supplements, he writes.

"The weight of evidence against such mass medication of older people is now compelling, and it is surely time to reconsider these controversial recommendations," he concludes.

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