The Whitehall-Robins Supplement

A Selection of Recent Findings in the Field of Nutrition

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Multivitamin and dietary supplements, body weight and appetite: results from a cross-sectional and randomized double-blind placebo-controlled study.
In addition to the well recognized roles of physical activity and macronutrients in healthy body weight, there is growing evidence that some micronutrients might play a role in energy balance. Recent studies reported that inadequate intake of calcium is inversely associated with body weight and adiposity. Furthermore, a recent report from a large cohort observed that participants who regularly used multivitamins, vitamins B6 and B12 or chromium gained less weight compared to nonusers. The mechanism of how vitamins and minerals could influence energy regulation is unclear. The researchers from Laval University, Quebec, conducted a cross-sectional and a randomized double-blind placebo-controlled study to investigate this association. The cross-sectional study compared the characteristics of consumers and non-consumers of vitamins and/or dietary supplements. The randomized study evaluated the effect of multivitamin and mineral supplementation during a weight reduction program. Compared with non-consumers, male consumers had a statistically significant lower body weight, fat mass and BMI. Similar tendencies were observed in women, although, it was not statistically significant as observed in men. In the randomized study, there was no difference in the extent of weight loss between multivitamin consumers and non-consumers. However, fasting and postprandial appetite were significantly reduced in multivitamin and mineral supplemented women. The authors conclude "Usual vitamin and/or dietary supplements consumption and multivitamin and mineral supplementation during a weight-reducing program seems to have an appetite-related effect in women. However, lower body weight and fat were more detectable in male than in female vitamin and/or dietary supplements consumers."
[Major CC, et al. Br J Nutr 2008; 99:1157-1167]

Effects of calcium and vitamin D supplementation on hip bone mineral density and calcium-related analytes in elderly ambulatory Australian women: a 5-year randomized controlled trial.
Osteoporosis and its related higher fractures risk is a significant global health burden. Postmenopausal women are at particularly high risk of skeletal structural deterioration, because of declining levels of estrogen which stimulates calcium absorption. The effect of long-term effect of calcium supplementation, with or without vitamin D on bone mineral density (BMD) and bone turnover in sunny climates have not been investigated. This study evaluated the effect of 5 year of 1200 mg of calcium carbonate supplement with or without 1,000 IU vitamin D2 (ergocalciferol), compared with placebo, on hip BMD and bone turnover in ambulant 70-80 year old elderly women residing in a sunny climate (Australia). In this study, calcium supplementation was initially beneficial in halting bone loss, however, it was not different from placebo at 3 or 5 years. In contrast to this finding, the 1,000 vitamin D plus calcium supplement group maintained hip BMD constant for 5 years, particularly in participants with low levels of 25 OHD at baseline. These data support the suggestion that it is beneficial to supplement calcium with vitamin D in elderly women, even in sunny climates. The authors conclude "Addition of vitamin D to calcium has long-term beneficial effects on bone density in elderly women living in a sunny climate, probably mediated by a long-term reduction in bone turnover rate."
[Zhu K, et al. J Clin Endocrin Metab 2008; 93:743-749]

Serum micronutrient concentrations and decline in physical function among older persons.
Several studies have suggested that poor nutrition may contribute to the decline in physical function that occurs with aging. The possible mechanisms may be due to increasing inflammatory markers and oxidative stress that lead to muscle and neuronal cell damage. These studies, however, have been limited either by their cross-sectional designs or by their non-representative samples. The authors of this longitudinal study investigated whether a low serum concentration of micronutrients (vitamins E, B12, B6, D, folic acid, and iron) is associated with subsequent decline in physical function among older community-living men and women. Participants included 698 randomly-selected men and women from Tuscany, Italy aged 65 years or older, who completed a baseline examination of physical function, after which a 3-year follow-up was conducted to assess physical function, with a decline defined as a loss of at least 1 point in the Short Physical Performance Battery. The main finding of this study showed a mean decline score of 1.1, with only low concentrations of vitamin E being associated with a decline in physical function. The possible explanation for this finding is the role of vitamin E in defense against oxidative stress through neutralization of free radicals as low concentrations increases oxidative stress leading to muscle or DNA damage. Insufficient vitamin E may also exacerbate atherosclerosis and contribute to the development of neurodegenerative disorders. The authors conclude "These results provide empirical evidence that a low concentration of vitamin E is associated with subsequent decline in physical function among community-living older adults. Clinical trials may be warranted to determine whether an optimal concentration of vitamin E reduces functional decline and the onset of disability in older persons."
[Bartali B, et al. JAMA 2008; 299:308-315]

Vitamin B-12 and the risk of neural tube defects in a folic-acid-fortified population.
Risk of neural tube defects (NTD) can be reduced by almost 50% with maternal folic acid supplementation or fortified flour during pregnancy. Recent studies have suggested that vitamin B12 deficiency might increase the risk of NTD, however, these studies had several limitations. There is an ongoing debate about the addition of vitamin B12 to supplements or fortified foods. In this population-based case-control study, the authors evaluated a sensitive indicator of B12 status, serum holotranscobalamin (holoTC), in 89 women with an NTD and 422 unaffected

pregnant controls in Ontario, at 15 to 20 weeks' gestation. The authors also examined serum folate levels and assessed whether the risk of hyperhomocysteinemia changed after folic acid fortification of Canadian flour. Results showed significantly lower holoTC levels in the NTD cases compared to controls, and that low maternal B12 status was associated with almost a tripling of NTD risk. Also, with moderate folic acid supplementation and folic acid flour fortification, the data suggest that about 34% of NTD in Canada may be attributed to low vitamin B12. The authors conclude" There is almost a tripling in the risk of NTD in the presence of low maternal B12 status measured by holoTC. The benefits of adding synthetic B12 to current recommendations for periconceptional folic acid tablet supplements or folic-acid-fortified foods need to be considered. It remains to be determined what fraction of NTD cases in a universally folate-fortified environment might be prevented by higher periconceptional intake of B12."
[Gray JG, et al. Epidemiology 2007; 18:362-366]

Suggested Readings

Vitamin D and reduced risk of breast cancer: a population-based case-control study.
[Knight JA, et al. Cancer Epidemiol Biomarkers Prev 2007; 16:422-429]

Dietary fat and plasma total homocysteine concentrations in 2 adult age groups: the Hordaland Homocysteine Study.
[Berstad P, et al. Am J Clin Nutr 2007; 85:1598-1605]

Homocysteine-lowering therapy; a role in stroke prevention.
[Spence JD. Lancet Neurol 2007; 6: 830-838]

Association of periconceptional multivitamin use and risk of preterm or small-for-gestational-age births.
[Catov JM, et al. Am J Epidemiol 2007; 166:296-303]

Effects of dietary calcium intake on body weight and prevalence of osteoporosis in early postmenopausal women.
[Varenna M, et al. Am J Clin Nutr 2007;86:639-644]

The relationship of dietary carotenoid and vitamin A, E, and C intake with age-related macular degeneration in a case-control study. AREDS Report No. 22.
[Age-Related Eye Disease Study Research Group. Arch Ophthalmol 2007; 125; 1225-1232]

High Folate intake is associated with lower breast cancer incidence in postmenopausal women in Malmo Diet and Cancer Cohort.
[Ericson U, et al. Am J Clin Nutr 2007; 86:434-443]

A randomized trial of beta-carotene supplementation and cognitive function in men. The Physicians' Health Study II.
[Grodstein F, et al. Arch Intern Med 2007; 167:2184-2190]

Sources of folate and serum folate levels in older adults.
[Mulligan JE, et al. J Am Diet Assoc 2007; 107:495-499]

In vitamin B12 deficiency, higher serum folate is associated with total homocysteine and methylmalonic acid concentrations.
[Selhub J, et al. PNAS 2007; 104: 19995-20000]

Plasma n-3 fatty acids and the risk of cognitive decline in older adults: The Atherosclerosis Risk in Communities Study.
[Beydoun MA, et al. Am J Clin Nutr 2007;85: 1103-1111]