PRISM
PROMOTING RESEARCH INTO SUPPLEMENTATION WITH MICRONUTRIENTS

2/2004

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Experts agree on micronutrient deficiency risk in Europe

Editorial

Do Europeans get all the nutrients they need from their diet (as many European nutrition scientists contend) or do some need to take a dietary supplement to avoid a deficiency? To find an answer to this question, eight specialists from Germany, Austria, Denmark, Poland, Northern Ireland, the Netherlands and the UK met in Germany at the end of May 2002. In their consensus report [1]

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ERNA
European Responsible Nutrition Alliance
Rue de l'Association 50, B-1000 Brussels, Belgium
Tel: +32 2 209 11 50, Fax: +32 2 223 30 64
E-mail: secretariat@erna.be Internet: www.erna.org

they agreed that, although it is possible for most Europeans to eat a healthy balanced diet, there is a real risk for certain populations to become deficient unless they change their eating habits or take a supplement. Groups at the greatest risk include: pregnant women, vegans, dieters, some athletes, elderly (especialy those in hospital or institutions), people with chronic inflammatory disorders, and those who take certain drugs.

These experts also draw attention to the fact that some groups within the general population have intakes of certain micronutrients that are below the recommended amounts. People with inadequate sunlight exposure, for example (house-bound individuals, people living in northern Europe and those who cover themselves when outdoors) have a high risk for vitamin D deficiency. In some countries almost half of the female population has inadequate iron intakes. Women's folate intakes are also at a critically low level in relation to the amount needed for a healthy pregnancy. A considerable number of women (especially elderly women), children and vegans have calcium intakes below the average requirements, putting them at an increased risk for bone fractures in later years. Vegans, vegetarians and the elderly also tend to have inadequate intakes of vitamin B12. Other critical nutrients include iodine, selenium, vitamin K and n-3 fatty acids.

Evidence from epidemiological studies shows that an optimal micronutrient status is important to help prevent coronary heart disease, cancer, mental degeneration, diabetes, age-related macular degeneration and other diseases. Some micronutrients have shown favourable effects on the common cold (vitamin C), premenstrual syndrome (vitamin B6) and preeclampsia (calcium), but only when taken in high doses as a supplement and not through the diet. Micronutrient supplements can be taken for long periods without risk provided the dosage is not excessive and proper nutrition is not neglected. Adequate regulations are needed to avoid uncontrolled overdosing. In this respect, the Codex Alimentarius Commission (the UN body responsible for the establishment of international standards in the area of food) is developing guidelines that recommend basing maximum intake levels of nutrients on upper safe levels rather than on the RDA [Codex Alimentarius Commission, 27th Session, Geneva, June 28–July 3, 2004] The current draft is now undergoing further consideration by the Nutrition Committee.

A. Bowley

1. Biesalski HK, Brummer RJ, König J, et al. Micronutrient deficiencies. Hohenheim Consensus Conference. Eur J Nutr 2003; 42: 353–363.

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Supplementation offers great health benefits

Review

Suboptimal levels of B12, B6, folic acid, C, E, iron or zinc are common in the US population. Minimal deficiencies in micronutrient status may cause subtle damage to DNA, nerve cells and mitochondria, accelerating aging and leading to an increase in cancer, cognitive dysfunction and degenerative disorders. Numerous human genetic disorders are due to defective enzymes, and could be remedied by high doses of the appropriate B vitamins. Evidence is growing that regular intake of a multinutrient supplement is a good insurance for better health.

Conclusion

Ensuring an optimum intake of micronutrients would have major health benefits, especially for those who currently have inadequate diets (many young, elderly, obese and poor people). Scientists, clinicians and educators need to explore more meaningful ways to prevent chronic disease and promote health through optimal nutrition.

Source

Ames BN. A role for supplements in optimizing health: the metabolic tune-up. Arch Biochem Biophys 2004; 423: 227–234.

Public needs guidance on supplement use

Survey

To investigate patterns of supplement use in northern England, Harrison et al. sent a questionnaire to a sample of the general population (21 923 adults). Among the 15 465 people (70.5%) who completed the questionnaire, more than one third said they took a dietary supplement.

Use of supplements was greater among healthy, physically active people who consumed the recommended amounts of fruit and vegetables, and did not smoke. People with cardiovascular problems or a high cardiovascular risk (who could expect to benefit from appropriate supplementation) were less likely to use them.

Conclusion

Healthcare providers should inform the public about the appropriate use of dietary supplements. In particular, they should point out which groups of people are most likely to benefit from taking a specific type of supplement.

Source

Harrison RA, Holt D, Pattison DJ, Elton PJ. Are those in need taking dietary supplements? A survey of 21923 adults. Br J Nutr 2004; 91: 617–623.

High intake of B vitamins lowers orofacial cleft risk

Survey

To investigate if the risk of an infant developing an orofacial cleft (OFC: cleft lip and cleft palate) is associated with its mother's periconceptional intake of B vitamins other than folic acid, Krapels et al. compared the diets of 182 women who had given birth to a child with OFC with those of 173 controls.

Women with an affected child had significantly lower intakes of thiamin, niacin and pyridoxine than control mothers. The protective effect of high B-vitamin intake was only found in users of folic acid supplements, however.

Conclusion

Babies are less likely to be born with an orofacial cleft when their mothers consume adequate amounts of thiamin, niacin, pyridoxine and folic acid before conception and during pregnancy.

Source

Krapels IPC, van Rooij IALM, Ocké MC, et al. Maternal dietary B vitamin intake, other than folate, and the association with orofacial cleft in the offspring. Eur J Nutr 2004; 43: 7–14.

More women should take folic acid supplements (1)

Review

The investigators reviewed 52 studies published between 1990 and 2003 that evaluated the rate of folic acid supplement use before conception and in early pregnancy.

Rates varied between 0.5% and 52%. While mass media campaigns to promote folic acid use were reasonably effective, they never achieved a rate higher than 50%. Supplement use was influenced by age, education, immigrant status, lack of a partner and an unplanned pregnancy.

Conclusion

More efforts are needed to promote periconceptional use of folic acid supplements to protect the offspring against birth defects. Food fortification with folic acid is a worthwhile alternative approach.

Source

Ray JG, Singh G, Burrows RF. Evidence for suboptimal use of periconceptional folic acid supplements globally. Br J Obstet Gynecol. 2004; 111: 399–408.

More women should take folic acid supplements (2)

Review

The US Centers for Disease Control (CDC) recently analysed data from 23 population-based surveillance systems to estimate the decline in neural tube defects (NTD: spina bifida and anencephaly) following the introduction of mandatory food fortification with folic acid in 1998. The total average decline was around 26%.

Conclusion

The estimated decrease in NTD-affected pregnancies in the USA following the introduction of mandatory food fortification with folic acid is encouraging. However, more effort is needed to increase women's folic acid intakes if the desired reduction in NTD-affected pregnancies of 50% is to be reached. Health-care providers should be encouraged to recommend the use of a folic acid supplement.

Source

Mersereau P, Kilker K, Carter H, et al. Spina bifida and anencephaly before and after folic acid mandate – United States, 1995–1996 and 1999–2000. MMWR 2004; 53: 362–365.

NUTRITION AND EYE HEALTH

Lutein supplements improve visual function

Intervention

To examine the effect of nutritional supplementation on visual function and symptoms of age-related macular degeneration (ARMD: the leading cause of vision loss in aging Western populations) Richer et al. conducted a 12-month trial in ninety patients with ARMD. Twenty-nine patients took a supplement containing 10 mg lutein; 30 took lutein together with a multivitamin/multimineral combination; 31 took a placebo.

Both groups of patients who took lutein showed significant improvements in visual acuity and macular pigment density. Those who took the placebo had no significant improvement.

Conclusion

In this study, visual function improved in ARMD patients who took a lutein supplement alone or together with other nutrients.

Source

Richer S, Stiles W, Statkute L, et al. Double-masked, placebo-controlled, randomized trial of lutein and antioxidant supplementation in the intervention of atrophic age-related macular degeneration: the Veterans LAST study (Lutein Antioxidant Supplementation Trial). Optometry 2004; 75: 216–230.

NUTRITION AND BONE HEALTH

Vitamin K supplements help prevent bone loss

Intervention

To investigate the complementary effect of vitamin K1 on postmenopausal bone loss, Braam et al. treated 155 healthy women aged 50–60 years for three years with a mineral/vitamin-D supplement (with or without vitamin K1) or a placebo, and measured changes in bone mineral density in the thigh and spine.

The women who received vitamin K had significantly less bone loss in the thigh than those on minerals/vitamin D alone or on placebo. Supplementation had no apparent effect on bone density in the spine.

Conclusion

Supplementation with minerals, vitamin D and vitamin K may help to maintain bone mineral density in the thigh after the menopause.

Source

Braam LAJLM, Knapen MHJ, Geusens P, et al. Vitamin K1 supplementation retards bone loss in postmenopausal women between 50 and 60 years of age. Calcif Tissue Int 2003; 73: 21–26.

NUTRITION AND MENTAL HEALTH

Early vitamin-D supplementation lowers schizophrenia risk

Survey

A poor staus of vitamin D has been suggested as a possible factor involved in the development of schizophrenia. To explore this association, McGrath et al. collected data on vitamin-D supplementation in the first year of life and subsequent development of schizophrenia (as well as of other psychotic and nonpsychotic disorders) over the next 30 years in a Finnish birth cohort.

Significantly fewer cases of schizophrenia occurred in males given a supplement containing at least 2000 IU vitamin D in the first year of life than in those on lower doses. No association was seen between vitamin D and schizophrenia in females nor between vitamin D and the other conditions reviewed.

Conclusion

It might be possible to prevent development of schizophrenia in males by giving them vitamin D supplementation in the first year of life.

Source

McGrath J, Saari K, Hakko H, et al. Vitamin D supplementation during the first year of life and risk of schizophrenia: a Finnish birth cohort study. Schizophr Res 2004; 67: 237–245.

NUTRITION AND IMMUNITY

Vitamin-D supplementation lowers multiple sclerosis risk

Survey

To test the hypothesis that a high intake of vitamin D protects against the development of multiple sclerosis, Munger et al. examined vitamin D intakes in 187 563 women who participated in the Nurses Health Study (1980–2000) or the Nurses Health Study II (1991–2001). In this period, 173 of the women developed multiple sclerosis.

Women who consumed at least 400 IU vitamin D daily (usually in a multivitamin supplement) had a 40% lower risk of developing multiple sclerosis than women who did not take a supplement. Vitamin D from dietary sources did not have a protective effect.

Conclusion

By taking a vitamin-D supplement, women may reduce the risk of developing multiple sclerosis.

Source

Munger KL, Zhang SM, O'Reilly E, et al. Vitamin D intake and incidence of multiple sclerosis. Neurology 2004; 62: 60–65.

THERAPEUTIC APPLICATIONS

Nutrition for preventing complications of heart disease

Review

Patients with coronary heart diease who have undergone surgery to relieve arterial narrowing resulting from atherosclerosis run a high risk of developing severe complications. Safe and cost-effective measures to reduce this risk are therefore highly desirable. Available evidence suggests that folic acid can prevent restenosis by reducing homocysteine levels, and improve endothelial function by promoting formation of nitric oxide. Other studies have shown that n-3 fatty acids (as found in fish oils) are also beneficial in some people. Effectiveness might depend on the individual's genes.

Conclusion

Patients with coronary heart diease should be given n-3 fatty acids to prevent sudden cardiac death, and B-vitamins, in particular folic acid, to reduce the risk of restenosis following heart surgery. Unlike the drugs that are currently used, this is a low-cost, low-risk measure.

Source

De Lorgeril M, Salen P. Dietary prevention of post-angioplasty restenosis. From illusion and disillusion to pragmatism. Nutr Metab Cardiovasc Dis 2003; 13: 345–348.

Folic acid prevents adverse effects of methotrexate

Review

Methotrexate is widely used to treat patients with rheumatoid arthritis and other inflammatory conditions. Treatment often has to be discontinued, however, because of adverse effects thought to be the result of folate antagonism. A review of relevant studies shows that folic acid supplementation can reduce liver damage and gastrointestinal intolerance in patients on methotrexate without impairing the drug's effectiveness. It also lowers high plasma homocysteine levels (an independent risk factor for cardiovascular disease) associated with the use of methotrexate.

Conclusion

A folic acid supplement (5 mg) should be given routinely to patients with rheumatoid arthritis on the morning following treatment with methotrexate.

Source

Whittle SL, Hughes RA. Folate supplementation and methotrexate treatment in rheumatoid arthritis: a review. Rheumatology 2004; 43: 267–271.

Vitamin B6 might help carpal tunnel sufferers

Review

Aufiero et al. examined the available evidence for and against the use of vitamin B6 supplementation in patients with carpal tunnel syndrom (CTS). They found that most studies were poorly designed, and the methods used to diagnose CTS, vitamin B6 deficiency and improvement of symptoms varied widely, so the findings are not conclusive.

Conclusion

In spite of these shortcomings, the authors recommend vitamin B6 supplementation (up to 200 mg daily for twelve weeks) for patients with CTS, because it is potentially beneficial and relatively safe. If no response is apparent after twelve weeks, or if adverse effects occur, treatment should be stopped.

Source

Aufiero E, Stitik TP, Foye PM, Chen B. Pyridoxine hydrochloride treatment of carpal tunnel syndrome: a review. Nutr Rev 2004; 62: 96–104.