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Serum vitamin C and the prevalence of vitamin C deficiency in the United States: 2003-2004 National Health and Nutrition Examination Survey (NHANES).

Schleicher RL¹, Carroll MD, Ford ES, Lacher DA.

Author information

Abstract

BACKGROUND: Vitamin C (ascorbic acid) may be the most important water-soluble antioxidant in human plasma. In the third National Health and Nutrition Examination Survey (NHANES III, 1988-1994), approximately 13% of the US population was vitamin C deficient (serum concentrations <11.4 micromol/L).

OBJECTIVE: The aim was to determine the most current distribution of serum vitamin C concentrations in the United States and the prevalence of deficiency in selected subgroups.

DESIGN: Serum concentrations of total vitamin C were measured in 7277 noninstitutionalized civilians aged > or =6 y during the cross-sectional, nationally representative NHANES 2003-2004. The prevalence of deficiency was compared with results from NHANES III.

RESULTS: The overall age-adjusted mean from the square-root transformed (SM) concentration was 51.4 micromol/L (95% CI: 48.4, 54.6). The highest concentrations were found in children and older persons. Within each race-ethnic group, women had higher concentrations than did men ($P < 0.05$). Mean concentrations of adult smokers were one-third lower than those of nonsmokers (SM: 35.2 compared with 50.7 micromol/L and 38.6 compared with 58.0 micromol/L in men and women, respectively). The overall prevalence (+/-SE) of age-adjusted vitamin C deficiency was 7.1 +/- 0.9%. Mean vitamin C concentrations increased ($P < 0.05$) and the prevalence of vitamin C deficiency decreased ($P < 0.01$) with increasing socioeconomic status. Recent vitamin C supplement use or adequate dietary intake decreased the risk of vitamin C deficiency ($P < 0.05$).

CONCLUSIONS: In NHANES 2003-2004, vitamin C status improved, and the prevalence of

vitamin C deficiency was significantly lower than that during NHANES III, but smokers and low-income persons were among those at increased risk of deficiency.

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