

Vitamin Supplementation in the Elderly



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KEYWORDS

- Aged • Antioxidants • Dietary supplements • Health status
- Vitamins/administration and dosage • Nutritional requirements

KEY POINTS

- Older individuals, especially those with associated risk factors, may be at a high risk for developing certain vitamin deficiencies.
- Presentation of vitamin-related disorders may be atypical or masked by coexisting diseases or a failure to thrive.
- Use of vitamin supplements is very common in the elderly, making them vulnerable to drug–nutrient interactions.
- Current clinical trials on vitamin supplements for promotion of health and prevention of disease have failed to demonstrate the strong associations seen in observational studies.

VITAMINS AND AGING

Activity levels and energy requirements decrease with aging. Consequently, there is a reduction in total energy intake along with a decline in nutrient intake, including vitamins and minerals.^{1,2} Vitamin requirements continue to change over the life span. There is strong evidence of an increase in the requirements for vitamins D, B6, and B12 in the elderly. B12 levels decline significantly with aging, in large part due to a high prevalence of atrophic gastritis. Vitamin D requirements increase with age as well. This increase seems to result from a diminished cutaneous synthesis of vitamin D by aging skin and decreased sun exposure, particularly in the elderly in institutionalized settings.^{3,4}

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Multiple factors have been implicated in the development of undernutrition in the elderly. Polypharmacy is common, and long-term administration of some medications may adversely affect vitamin status. Also, in this population, presentation of vitamin disorders is usually atypical or masked by coexisting diseases or a failure to thrive.^{5,6}

Table 1 summarizes the risk factors contributing to micronutrient deficiencies, and **Table 2** lists medications that adversely affect the vitamin levels.

There has been an increased interest in the use of vitamins for health and disease prevention. Almost 20% to 60% of the elderly consume vitamin supplements, increasing the potential for toxicity and likelihood of drug-nutrient interactions.⁷

VITAMIN SUPPLEMENTATION AND DISEASE PREVENTION

Vitamins are organic compounds required in the diet in small amounts for the maintenance of normal metabolic integrity. However, vitamin D and niacin do not comply with this definition of vitamins. Vitamin D is synthesized in the skin from 7-dehydrocholesterol on exposure to sunlight, and niacin can be formed from the essential amino acid, tryptophan.

Vitamins have been categorized as fat soluble or water soluble. Vitamins A, D, E, and K are fat soluble and the remaining (vitamins B1, B2, B6, B12, niacin, biotin, and vitamin C) are water soluble. Vitamins A, C, E, and β -carotene are also referred to as antioxidant vitamins and have been suggested to limit oxidative damage in humans.^{7,8}

VITAMIN A AND β -CAROTENE

Vitamin A consists of preformed vitamin A (retinol) and the carotenoids such as β -carotene. Vitamin A refers to preformed retinol and the carotenoids that are converted to retinol.

Table 1 Risk factors for altered vitamin status in the elderly	
Medical factors	<ul style="list-style-type: none"> • Medications: Proton pump inhibitors, H2 antagonists, cholestyramine, INH (Isoniazid), metformin, sulfasalazine, rifampin, anticonvulsants, and colchicine • Disorders of absorption: Atrophic gastritis, bacterial overgrowth of bowel, terminal ileal resection, gluten enteropathy, lactose intolerance • Dysphagia: Neurologic disorders, esophageal strictures/webs, esophagitis, malignancy, achalasia, scleroderma • Malignancies • Neurologic disorders affecting intake: Dementia and related disorders, strokes, tremors • Altered dentition
Psychological factors	<ul style="list-style-type: none"> • Depression • Alcoholism • Late life paranoia • Dementia
Social factors	<ul style="list-style-type: none"> • Social isolation • Impaired IADLs (Instrumental Activities of Daily Living) • Financial problems
Physiologic factors	<ul style="list-style-type: none"> • Sensory impairment: Altered vision, olfaction, taste • Anorexia of aging

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