

VITAMIN C AND THE ELDERLY

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INTRODUCTION

Vitamin C (ascorbic acid) inadequacy, eventually leading to scurvy, is one of the oldest maladies of mankind. The decline of this dreaded disease began with the introduction of root crops in Europe during the Middle Ages. It was also learned in the past several hundred years that fruits, fruit juices, and vegetables could be used to treat scurvy, and today this has become a relatively rare disease, especially in the developed countries.

It has been over 50 years since vitamin C, the active material in fruit juice that would prevent scurvy, was first isolated.¹ Although we have learned a great deal about the biochemical effects of vitamin C deficiency during this time, there is still a wide gap in our understanding of its biochemical and physiological functions. The presence of vitamin C in all eukaryote organisms suggests that it plays an essential role in cellular function.

Although the effects of vitamin C are involved in many physiological functions (e.g., collagen synthesis, immune function, drug metabolism, folate metabolism, cholesterol catabolism, iron metabolism, carnitine biosynthesis), clear-cut evidence for a biochemical role is available only with respect to collagen biosynthesis (hydroxylation of proline and lysine). There is also controversy concerning the requirements for vitamin C in health and disease. There is some evidence in the literature suggesting increased vitamin C requirements under conditions of stress (e.g., disease status). Data are also available indicating that the vitamin C requirements of the elderly are much higher than the currently recommended dietary allowances.² While we know the minimum amount of vitamin C needed to prevent scurvy, there is no consensus on the optimum level needed to maintain good health in all age groups.

VITAMIN C STATUS IN THE ELDERLY

Some surveys of the elderly have indicated that poor vitamin status is common in this segment of the population.³⁻⁵ Other evidence leading to this conclusion includes decreased ascorbic acid levels in whole blood,^{6,7} serum,⁸⁻¹⁰ plasma,¹¹⁻¹³ and leukocytes.^{6,10,12,14-16} Low blood ascorbic acid levels have been attributed to impaired absorption or poor utilization in some cases,^{7,9,18} but inadequate dietary intake appears to be a major factor.¹⁹

A report on the elderly²⁰ indicated that while the mean intakes of nutrients generally satisfied the Recommended Daily Allowances (RDA), dietary intake of vitamin C was below the RDA level. A similar trend was noted in a survey of elderly people living in New York City;²¹ 40% of the people surveyed were deficient in vitamin C. Lyons and Trulson^{16,3} found that approximately 2.5% of low-income, elderly subjects had diets deficient in vitamin C and other nutrients. LeBovit^{14,6} found a mean vitamin C intake of 71% RDA among 283 elderly persons who lived alone in Rochester, N.Y.

According to Loh and Wilson,²² 35 mg/day of ascorbic acid may not satisfy the hematopoietic needs of the elderly. Adequate supplementation in a 5:1 ratio of ascorbic acid to iron is recommended to prevent anemia if no other deficiencies are present.

A syndrome termed "bachelor scurvy" is frequently seen in elderly men living alone.^{50,109,149,208} Burr²³ found that men who ate alone tended to have a poorer ascorbic acid status than those whose meals were cooked or shared by another person. LeBovit^{14,6} found a mean ascorbic acid intake of 71% RDA among 283 elderly persons in Rochester, N.Y. who lived alone; another New York State survey by Jordan et al.²⁴ found 40% of the subjects