

Prevalence of Vitamin and Mineral Supplement Use in the Elderly

Carol L. Schneider, RD, MEd, and Daniel J. Nordlund, MA
Toledo, Ohio

This study examines the belief of many health professionals that the elderly are vulnerable to misconceptions of what constitutes good nutrition, especially as it relates to the use of vitamin and mineral supplements. A canvass of several census tracts in Toledo and several townships in Defiance County, Ohio, identified 309 individuals 60 years of age or older who agreed to participate in this study.

Forty-nine percent of those interviewed used some vitamin or mineral supplement. Of these, 77 percent were taking a multiple vitamin. Women were more likely to use supplements than men (53 percent vs 38 percent), and supplement use increased across the three age categories: 60 to 69 years (42 percent), 70 to 79 years (48 percent), 80 years and older (60 percent). More than 85 percent of those using supplements spent less than 2 percent of their income on supplements. Health benefits were perceived by 94 percent of those using supplements.

Nearly one half to one third of the US population use vitamin and mineral supplements daily.^{1,2} Aside from producing a lucrative \$2 billion industry, this situation also provokes fundamental questions concerning necessity, cost, and jeopardy to health. To this extent, the use of vitamin and mineral supplements becomes the concern of the family physician.

The population subgroup of elderly people is of particular interest. Although the Food and Drug Administration study done in 1975 found less than 1 percent of the elderly using supplements, it is suspected that this percentage may have greatly increased in the past six years. Many health professionals believe that the elderly population is particularly vulnerable to misconceptions regarding dietary supplements. The elderly commonly

complain of fatigue, weakness, poor dentition, and lack of energy, which are often interpreted by the lay public as being caused by vitamin deficiencies. Fixed and reduced incomes put further restraints on purchasing power. With these factors taken together, the necessity of vitamin and mineral supplements for elderly patients becomes an important issue. The present study was undertaken to determine the prevalence and rationale of vitamin and mineral supplement usage among noninstitutionalized elderly persons in northwestern Ohio.

The purpose of this study was to determine the prevalence of vitamin and mineral use in the elderly population, the percentages of income being spent on these products, the identity of the nutrition information resource recommending the supplements, and the individuals' perceived health benefits from the use of the products.

Methods

Data for the present study were collected in association with the Elderly Assessment Project

Presented at the Michigan State University Michigan Family Practice Research Day V, East Lansing, Michigan, November 5, 1981. From the Department of Family Medicine, Medical College of Ohio, Toledo, Ohio. Requests for reprints should be addressed to Carol L. Schneider, Department of Family Medicine, Medical College of Ohio, CS No. 10008, Toledo, OH 43699.

Table 1. Characteristics of Individuals Participating in the Elderly Assessment Project			
	Number Using Vitamin/Mineral Supplements		Total Sample n = 309
	Yes (n = 151)	No (n = 158)	
Sex			
Female	118	103	221
Male	33	55	88
Age			
60 to 69 years	43	60	103
70 to 79 years	61	67	128
80+ years	47	31	78
Location			
Rural	74	85	159
Urban	77	73	150
Educational Level			
0 to 8 years	54	57	111
Some high school	39	27	66
High school graduate	36	47	83
Post high school	18	18	36
College graduate	4	9	13
Median Monthly Income	\$440	\$639	\$600

conducted by the Medical College of Ohio. Individuals aged 60 years or older who lived in a rural area (Defiance County, Ohio, excluding the city of Defiance) and an urban area (Toledo, Ohio) formed the population of this project. The goal of the Elderly Assessment Project was to obtain interviews with at least 150 elderly persons in each of the urban and rural areas.

Census tracts in Toledo and townships in Defiance County that had a high percentage of elderly residents were selected so that interviewer time could be used efficiently. Interviewers went door-to-door within the first selected census tract or township and interviewed all persons aged 60 years or older who were at home. The interviewers returned no more than two times to those residences where no one was home at the first visit. When all homes in a census tract or township had been visited, the interviewers moved to the next tract or township. This procedure resulted in 309 interviews.

Each interviewer received two days of training that included interviewing skills, videotape feedback, and practice interviewing each other. Each interviewer then conducted an interview at a local

nutrition center. Another half-day session followed during which the nutrition center practice interview was critiqued.

The questionnaire concerning vitamin and mineral supplement use was included in the OARS Multidimensional Functional Assessment Questionnaire³ following question No. 43.

The questionnaire was designed to assess (1) individual use of multiple or individual vitamin or mineral supplements, (2) reasons for supplement use, (3) amount of money spent per month on supplements, and (4) perceived benefits of supplement use.

Results

A summary of the sample characteristics is presented in Table 1. That there were substantially more women (72 percent) than men (28 percent) in the sample may be due to women's living longer or the possibility that women are more likely to be home during the day.

The largest age group was the 70- to 79-year-old group (41 percent), with the 60- to 69-year-old and

80-years-and-older groups making up 33 percent and 26 percent of the sample, respectively. By design, the sample was divided almost equally between rural (51 percent) and urban (49 percent) residents. Forty-three percent of the sample had completed at least high school. The median monthly income of the sample was nearly \$600 and ranged from \$84 per month to more than \$3,334 per month.

Analysis of the study sample indicates that individuals using vitamin and mineral supplements did not differ significantly in terms of location of residence (urban vs rural) or educational level from those who did not use supplements. However, sex, age, and monthly income were significantly related to supplement use. Women were more likely to use supplements than were men, 53 percent and 38 percent respectively ($\chi^2 = 6.36$, $df = 1$, $P < .025$). The percentage of those using supplements increased with age across the three groups from 42 percent to 48 percent to 60 percent ($\chi^2 = 6.21$, $df = 2$, $P < .05$). Those using vitamin and mineral supplements were spending approximately 1 to 3 percent (range 0 to 8 percent) of their monthly income on these products. The median monthly income for users was \$440 compared with \$639 for nonusers. More nonusers and fewer users than would be expected were found in the \$835 to \$1,249 monthly income category ($\chi^2 = 28.7$, $df = 11$, $P < .05$).

Forty-nine percent of the elderly group interviewed used vitamin or mineral supplements or both (Table 2). Of those using supplements, 77 percent used multiple vitamins. In addition, 28 percent used vitamin C, 21 percent used vitamin B complex, 19 percent used vitamin E, and 13 percent used calcium.

Of the elderly persons using vitamin and mineral supplements, 40 percent reported they were doing so on the recommendations of their physicians, while 4 percent reported using the recommendations of other health professionals. Ninety-two percent reported deriving physical benefits from supplement usage.

Discussion

Three variables were significantly related to supplement use: sex, age, and income. Women were much more likely to use vitamin and mineral

Table 2. Results of Vitamin and Mineral Dietary Assessment of Those Using Supplements (n = 151)

	No. (%)
Use of multiple vitamins or minerals	116 (77)
Use of single vitamin supplements	
Vitamin A	7 (5)
Vitamin B complex	32 (21)
Vitamin C	42 (28)
Vitamin D	6 (4)
Vitamin E	29 (19)
Vitamin K	6 (4)
Iron	12 (8)
Calcium	19 (13)
Zinc	7 (5)
Magnesium	10 (7)
Reason for taking supplements	
Prescription by physician	60 (40)
Advice of friend	15 (10)
Newspaper or magazine article	9 (6)
Radio or television advertisement	7 (5)
Advice of pharmacist	5 (3)
Advice of nutritionist	2 (1)
Advice of nurse	0 (0)
Advice of health food store clerk	2 (1)
Other (family member, etc)	44 (29)
No answer (if do not know)	17 (11)
Approximate amount spent per month on vitamins and minerals (Five individuals did not respond)	
0	4 (3)
\$1-\$5	105 (70)
\$6-\$10	9 (6)
\$11-\$15	9 (6)
\$16-\$20	2 (1)
More than \$20	6 (4)
Belief in efficacy of the vitamins and minerals taken	139 (92)
Specific benefits expected	
Improvement in health	82 (59)
Prolonged youth	19 (14)
Prevention of illness	69 (50)
Other (increased energy, increased appetite)	20 (14)

supplements than were men. Some possible reasons for this behavior could be that (1) women are more likely to seek medical care, (2) women are more likely to try products that promise youth and

beauty in a youth-oriented society, (3) women are more concerned with nutrition, and (4) women may be more aware of the potential of skeletal disorders. With respect to age, one could speculate that as physical discomfort and incapacities increase, the elderly person is progressively more receptive to information on products promising relief of these symptoms. In this study, the mean monthly income for supplement users was considerably less (\$440) than that of nonusers (\$639). Perhaps the supplement users were reacting to a decrease in "buying power" and compensating by purchasing "nutritional insurance." This would certainly explain why 92 percent of the supplement users perceived added health benefits from these products.

Forty-nine percent of those surveyed used vitamin and mineral supplements. The majority (77 percent) chose a multiple vitamin supplement, a most benign choice assuming that the supplement was necessary and that dosages simulated those of the recommended dietary allowance (RDA) (Table 3).⁴ However, therapeutic dosages would be a cause for concern in terms of toxicity and cost. Of greater concern are those individuals using single vitamins and minerals, ie, vitamin C (28 percent), E (19 percent), B complex (21 percent), and calcium (13 percent). Unfortunately two common misbeliefs guiding consumers' choices are (1) the higher the cost, the better the quality, and (2) the greater the amount, the greater the physiological benefit.¹

Forty percent of the elderly using the vitamin and mineral supplements were doing so based on recommendations from their physicians and 4 percent from other bona fide medical resources. It is of concern, however, that 56 percent were utilizing information sources such as family members, friends, newspapers, and the media. This situation is potentially alarming in that the majority of those making such recommendations are presumably uneducated in the field of nutrition and are unaware of the health problems of the person for whom they are making recommendations.

In a country where food is more copious and varied than in most parts of the world, it is a great paradox to find approximately 50 percent of the elderly citizens supplementing their diets with vitamins and minerals. Likewise, it is ironic that in a country where health care is so highly valued, the issue of dietary supplements has been largely

Table 3. Recommended Dietary Allowances for Adults 51 to 75 Years of Age*

	Men (70 kg)	Women (55 kg)
Energy (kcal)	2,000-2,800	1,400-2,220
Protein (g)	56	44
Vitamin A (μ g retinol equivalent)	1,000	800
Vitamin B (IU) μ g	5	5
Vitamin E (μ g, or tocopherol equivalent)	10	8
Ascorbic acid (mg)	60	60
Folic acid (μ g)	400	400
Niacin (mg, or niacinamide equivalent)	16	13
Riboflavin (mg)	1.4	1.2
Thiamine (mg)	1.2	1.0
Vitamin B ₆ (mg)	2.2	2.0
Vitamin B ₁₂ (μ g)	3.0	3.0
Calcium (mg)	800	800
Phosphorus (mg)	800	800
Iodine (μ g)	150	150
Iron (mg)	10	10
Magnesium (mg)	350	300
Zinc (mg)	15	15

*Revised in 1980 by National Academy of Science-National Research Council

relegated to the media and the lay public as a form of "folk medicine."

The role of the physician requires clarification with respect to prescribing and guiding the use of dietary supplements. Those writing prescriptions based on need require skill in assessing the adequacy of the patient's diet. Questionnaires, trained staff, or some well-phrased questions from the physician regarding a normal intake pattern can give insight into the dietary needs of the elderly patient. A study by English and Carl⁵ revealed that 62 percent of patients interviewed by family physicians never discussed the consumption of dietary supplements or any other nutrition topics. Perhaps the time has come for the physician to incorporate some nutrition questions into routine interviews with patients.

The topic of dietary supplements is a difficult one for the physician and patient to discuss given the morass of unscientific misinformation on the

topic as well as overenthusiasm and unchangeable beliefs and behaviors of some patients. In this study, 92 percent of the elderly taking supplements reported added health benefits from them, a percentage considerably higher than the usual 30 percent normally observed in placebo effect.

Dietary supplements certainly have their place in nutrition disorders when first-line therapy (ie, nutrient intake via food) is compromised. Patients should be guided away from a hit-or-miss approach in choosing supplements. Dosage levels should be monitored and in accordance with RDA levels. Apathy or overzealousness can be greatly influenced by patient education. Patients need to know that vitamin and mineral supplements are not safe at all levels. Evidence is fast accumulating that excessive use of even water-soluble vitamins, once thought benign, can produce clinical symptoms and interfere with diagnostic tests. The most demonstrative of these, and ironically the most consumed single vitamin in this study (28 percent), is vitamin C. Megadoses of vitamin C (200 to 1,000 mg) advocated as a means to prevent and treat colds have produced toxic symptoms including renal calculi,^{6,7} false-positive results of urine glucose tests in diabetics,⁸ gastrointestinal and electrolyte disturbances,^{8,9} and interference with the absorption of vitamin B₁₂¹⁰ and iron.¹¹ Anderson et al^{12,13} found that while large doses of vitamin C produce a mild antihistaminic-like effect, vitamin C does not prevent colds. Megadoses of vitamin E (100 mg and over) have been found to interfere with blood coagulation.¹⁴⁻¹⁶

Although exercise, age, sex, and hormonal factors must also be considered, much research is focusing on calcium and vitamin D intake. Upwards of 1 g of calcium per day in conjunction with vitamin D may prevent or arrest osteoporosis.¹⁷⁻²⁰ This amount can be obtained in 3 to 4 glasses of milk or 3 to 4 oz of cheese daily. If an elderly person is unable or unwilling to ingest calcium in food form, supplementation may be indicated.

Counseling elderly patients on nutritious food should be the first-line approach, followed by appropriate dietary supplements based on need. Several national nutrient intake studies found that vitamin A, calcium, and iron were the nutrients most likely to be lacking in an elderly person's diet,^{21,22} indicating a need for more dairy, meat, and dark green, yellow, and orange vegetable products. The nutrient requirements for the elder-

ly patient remain the same as for persons under 50 years, with the exception of reduced calories to accommodate the decrease in basal metabolic rate.

References

1. Herbert V: The health hustlers. In Barrett S (ed): *The Health Robbers*. Philadelphia, F. Strickley, 1980, pp 49-68
2. Consumer Nutrition Knowledge Study: A Nationwide Study of Foodshoppers Knowledge, Beliefs, Attitudes, and Reported Behavior Regarding Food and Nutrition. Food and Drug Administration (Rockville, Md): Report II: 1975. DHEW publication No. (FDA) 76-2059. Government Printing Office, 1976
3. Multidimensional Functional Assessment: The OARS Methodology, ed 2. Durham, NC, The Duke University Center for the Study of Aging and Human Development, 1978
4. Food and Nutrition Board: Recommended Dietary Allowances, ed 9. Washington, DC, National Academy of Science, 1980
5. English EC, Carl JW: Use of nutritional supplements by family practice patients. *JAMA* 246:2719, 1981
6. Briggs MH, Garcia-Webb P, Davies P: Urinary oxalate and vitamin C supplements. *Lancet* 2:201, 1973
7. Akfin-Slater RB, Aftergood L: Food fads. In Schneider HA, Anderson CE, Coursin DB (eds): *Nutritional Support of Medical Practice*. New York, Harper & Row, 1977, pp 128-138
8. Herbert V: Facts and fiction about megavitamin therapy. *J Fla Med Assoc* 66:475, 1979
9. Lamden W: Dangers of massive vitamin C intake. *N Engl J Med* 284:336, 1971
10. Herbert V, Jacob E: Destruction of vitamin B₁₂ by ascorbic acid. *JAMA* 230:241, 1974
11. Lee PC, Fedwich JR, Smith DC: Large and small doses of ascorbic acid in the absorption of ferrous iron. *Can Med Assoc J* 97:181, 1967
12. Anderson TW, Reid DBW, Beaton GH: Vitamin C and the common cold: A double blind trial. *Can Med Assoc J* 107:503, 1972
13. Anderson TW: Large scale trials of vitamin C. *Ann NY Acad Sci* 258: 498, 1975
14. Corrigan JJ, Marcus FK: Coagulopathy associated with vitamin E ingestion. *JAMA* 230:1300, 1974
15. Farrell PM, Bierie JG: Megavitamin E supplementation in man. *Am J Clin Nutr* 28:1381, 1975
16. Horwitz MK: Therapeutic uses of vitamin E in medicine. *Nutr Rev* 38:105, 1980
17. Exton-Smith AN: Physiological aspects of aging: Relationship to nutrition. *Am J Clin Nutr* 25:853, 1972
18. Somerville PJ, Lien JWK, Kaye M: The calcium and vitamin status in an elderly female population and their response to administered supplemental vitamin D₃. *J Gerontol* 32:659, 1977
19. Bullamore JR, Gallagher JC, Wilkinson R, Nordin BEC: Effect of age on calcium absorption. *Lancet* 1:535, 1970
20. Exton-Smith AN, Hodkinson HM, Stanton BR: Nutrition and metabolic bone disease in old age. *Lancet* 2:999, 1966
21. Ten-State Nutrition Survey: 1968-1970. Center for Disease Control (Atlanta, Ga). DHEW publication No. (HSM) 72-8133. Government Printing Office, 1972
22. Preliminary Findings of the First Health and Nutrition Examination Survey, United States 1971-1972: Dietary Intake and Biochemical Findings. Health Resources Administration (Hyattsville, Md). DHEW publication No. (HRA) 74-1219-1. Government Printing Office, 1974