

Use of Dietary Supplements by Patients in a Family Practice Clinic

B. Clair Eliason, MD, Jennifer Myszkowski, Anne Marbella, MS,
and Dale N. Rasmann, MS, RD

Background: Many Americans are using alternative medical therapies as well as nutritional or dietary supplements that include vitamins, minerals, herbal products, tissue extracts, protein solutions, and other chemicals. Potential for both good and harm exists in taking many of these preparations.

Methods: We surveyed 200 consecutive patients older than 18 years attending a family practice clinic. In addition to demographic data, we asked them about their intake of dietary supplements during the past year, perceived benefits from supplements, source of information, estimated cost of products, and whether their physician knew that they were taking the product.

Results: Fifty-two percent of the patients had taken 1 or more supplements during the past year, 18 percent used 2 to 5 supplements, and 3 percent took 6 to 13 different dietary supplements. Twenty-nine percent took them for diet and energy enhancement, and 24 percent for cancer prevention and immune system enhancement. The media was the principal source of patient information. Thirty-three percent of patients had not told their physician of their supplement use. The average estimated expenditure was \$6.60 per month with a maximum of \$68.90 per month.

Eighty-two percent of the supplements taken were vitamins and minerals at recommended daily allowances (RDAs), whereas 18 percent were other supplements such as herbal products, megadose vitamins, and protein and amino acid preparations.

Demographically, only educational level correlated significantly with supplement consumption. Patients with a high school education took significantly fewer supplements than those with more advanced education.

Conclusions: Physicians should have a dialogue with their patients about dietary supplements because their use is widespread. Whereas many supplements are taken in safe doses, for others neither safety nor effectiveness has been proven, and for a few there are known toxicities. Additional research is needed to investigate both the safety and effectiveness of these products. (J Am Board Fam Pract 1996;9:249-53.)

Nutritional or dietary supplements come in a vast array of preparations, including vitamins, herbal compounds, minerals, animal glandular and tissue extracts, protein and amino acid preparations, other plant extracts, and chemicals. The supplement industry has grown from a fledgling industry into a multibillion dollar economic force.¹

The Food and Drug Administration (FDA) has

minimal regulatory control over these supplements unless a direct drug effect is claimed.²⁻⁴ Nutritional or dietary supplements are considered food products. Even when a toxic reaction occurs, the burden of proof for safety rests with the FDA, not the manufacturer. In general, the FDA can only warn the public and is limited in its ability to remove a product from the market.⁵ Manufacturers are free in this context to make unsubstantiated claims and need not take great care to establish appropriate doses or perform any scientific testing. Philen et al⁶ surveyed 12 popular health and body-building magazines; of 235 unique ingredients he found no human toxicological data on 59 percent. Hyperthyroidism has been reported from a product containing desiccated bovine thyroid with the direction of the label exceeding

Submitted, revised, 28 March 1996.

From the Department of Family and Community Medicine, Medical College of Wisconsin (BCE, AM, DNR), and the Medical College of Wisconsin (JM), Milwaukee. Address reprint requests to B. Clair Eliason, MD, Department of Family and Community Medicine, Medical College of Wisconsin, 1000 N. 92nd St, Milwaukee, WI 53226.

The Medical College of Wisconsin provided support of a student summer research project.

Table 1. Demographics of the Study Population.

Characteristics	Number	Percent
Age (years)		
Mean	42	
Range	18-91	
Sex, female		68
Exercise		
None		34
At least 30 min/d 3 d/wk		48
Ethnicity		
White		82
Black		13
Hispanic		3
Other		2
Education		
Less than high school		6
High school degree		32
College degree		48
Postgraduate work		14

normal thyroid replacement doses by 3- to 5-fold.⁷ Lead poisoning has been reported from Chinese herbal medicine that contained adulterated clamshell powder.⁸ Other toxicities have been reported by the Centers for Disease Control and Prevention (CDC).⁹⁻¹³

Nevertheless, there appears to be a marked movement among the public to take dietary supplements. Tradition, oftentimes the media, anecdote, folklore, and non-Western medicine argue for the benefits of nutritional supplements, and beneficial medications have been described and extracted from various plant products.^{14,15} Very few of these claims, however, are accompanied by scientific documentation.

More scientific data are needed about public consumption and motivation to consume nutritional supplements. To gain more information about the consumption of dietary supplements and the perceived benefits, we conducted a survey of patients in family practice center located in a suburban academic medical center.

Methods

During a 3-week period in July 1994, we interviewed 200 consecutive patients older than 18 years who visited a family practice clinic located in a suburban Milwaukee academic medical center. A research assistant recruited and interviewed the patients in the examination room immediately before or after the physician visit depending on time constraints at the clinic. Before each interview the assistant obtained consent for the inter-

view and assigned an identification number to the patient. Confidentiality was assured.

Demographic information included age, sex, race, educational level, and exercise level. We asked patients about nonprescription medications, vitamins, minerals, herbal compounds, amino acid and protein preparations, and any other compound that they were taking. We then elicited information about the ingredients of the product(s), benefits promised (ie, weight loss or gain, cancer prevention, etc), dosage, cost per month of the product(s), and how the patient learned of the product. We also asked whether the patient's physician had recommended the product and whether the physician knew the patient was taking it. If the patient could not supply the information at the clinic, a follow-up telephone call was made.

Analysis

The responses were coded and entered into a Foxpro database, Version 2.5.¹⁶ Tabulations and Pearson chi-square tests of significance were performed for correlation between demographic information and supplement consumption.

Results

Patient demographics are listed in Table 1. The patients had an average age of 42 years. They were mostly female (68 percent) and white (82 percent) and had a college education or higher (62 percent). Nearly one half (48 percent) exercised at least three times a week.

More than one half (53 percent) of the 200 patients reported taking supplements. Of these, 32 percent took 1 supplement, 18 percent used 2 to 5, and 3 percent used 6 to 13 different supplements for a total of 209 supplements (47 different preparations or brands). Vitamins and minerals accounted for 84 percent, herbal compounds 8 percent, proteins and amino acids 3 percent, and miscellaneous the other 5 percent. Only 2 percent of the vitamin supplements were taken in megadoses (defined as 10 times the daily recommended allowances [RDA]). Eight (4 percent) of the patients were taking at least one herbal product, for a total of 16 different herbal products.

Patients perceived the most common benefits from the supplements to be nutrition and energy enhancement (29 percent), followed by cancer prevention or immune enhancement (24 percent), and treatment of musculoskeletal problems

(15 percent). The perceived patient benefits are listed in Table 2.

Patient sources of information about the supplements were media (27 percent), physician (22 percent), general knowledge (21 percent), family or friends (20 percent), and other health care professionals (5 percent).

The patients reportedly did not tell their physicians about the consumption of the product 33 percent of the time. Their physicians reportedly recommended the supplement only 23 percent of the time.

The consumption of nutritional supplements did not correlate with age, ethnicity, exercise, or use of prescription or nonprescription medications. More women (56 percent) than men (44 percent) took supplements, but this difference was not statistically significant at the $P < 0.05$ level.

Those who had a high school education took significantly fewer supplements ($P = 0.03$) than those who had attended college or graduate school. Only 13 (6 percent) of the patients had an 8th grade or less education, and 10 of these patients took at least one supplement; but when compared with the other educational groups, there was no statistically significant difference in the number of supplements they took (Table 3).

The average estimated expenditure of those taking at least 1 supplement was \$6.60 per month. Eight patients who were taking five or more supplements per month spent an estimated average of \$24.10 per month. The maximum estimated expenditure per month for nutritional supplements in this study was \$68.90.

Discussion

More than one half of the adult patients in this family practice clinic with a predominately white population had taken a dietary supplement during the past year. Most of these supplements were vitamins and minerals taken at acceptable doses. About 18 percent of the products taken, however, were herbal products, protein and amino acid preparations, megadoses of vitamins, and other products. Our concern about the use of these latter products stems from the lack of scientific information on safety or effectiveness. There are scientific data to support the effectiveness of vitamins and minerals taken in standard doses in some situations, such as by the elderly whose diets might be marginal, pregnant women, and nursing babies. A

Table 2 Perceived Benefits of Dietary Supplements.

Benefits	Number	Percent
Diet and energy supplements	60	28.9
Immune system (allergy, cancer prevention)	49	23.5
Musculoskeletal	32	15.3
Women's health	14	6.7
Hematologic	12	5.8
Central nervous system	12	5.7
Aging	9	4.3
Dermatologic	8	3.8
Gastrointestinal	5	2.4
Weight loss	4	1.9
Cardiovascular	3	1.4
Pain relief	1	0.5
Total	209	100.0

1987 health survey performed by the National Institutes of Health also showed that 51.1 percent of the population had consumed vitamin and mineral product(s) during the past year.¹⁷ Eisenberg et al,¹⁸ in a study of 1500 English-speaking households across the United States, found that 3 percent of the population were taking herbal products and about 2 percent were taking megadoses of vitamins. Neither group of researchers inquired about other supplements.

Eight (4 percent) of the patients surveyed took 16 different herbal compounds. Despite a concern about safety and efficacy, herbal products have a long anecdotal history and tradition. Several important medications, such as digitalis, atropine, and taxol, have been derived from herbal (plant) products.^{14,15} It is estimated that 20,000 species of higher plants are used medicinally throughout the world, and among some indigenous populations they are often the principle source of medicine.^{14,15} In some countries, such as China, there is a long history associated with herbal products, and textbooks have been written describing their use.¹⁹ Clearly, additional consideration and research about herbal compounds are warranted.

Nevertheless, based upon the current FDA regulation, it is difficult to have medical confidence in herbal products for the following documented reasons: (1) concentrations of active ingredients in a plant will vary according to the year, individual plants, the maturation of the plant, and the portion of the plant extracted, such as leaves, stems, or seeds²⁰; (2) the extraction or preparation methods are variable and can be imprecise, uncontrolled, and result in contamina-

Table 3 Educational Level of Patients Taking Various Nutritional Supplements.

Education Level	Total Patients	Patients Taking Supplements				
		No. (%)	Vitamins	Minerals	Herbal Products	Protein and Amino Acids
Graduate school and beyond	28	15 (54)	15	14	1	1
Some college to college graduate	96	55 (57)	44	41	5	6
High school*	63	25 (40)	21	19	1	1
Eighth grade or less	13	10 (77)	10	10	1	0
Total	200	105 (52)	90	84	8	8

* $P = 0.03$ (took significantly fewer total supplements than those with more education).

tion⁸; (3) because of little regulatory oversight, unscrupulous persons or companies are perfectly free to advertise and promote these products and other products; and (4) there are few human toxicology data or studies to support either safety or effectiveness for many of these products.⁶

The 200 patients surveyed took seven different amino acid or protein products and no tissue or organ extracts. Amino acid and protein preparations have little or no scientific or convincing anecdotal evidence to support their claims. L-Tryptophan has resulted in several deaths because of a production contamination and has been removed from the market.²¹ Although none of our surveyed patients took organ or tissue extracts, there is little to support the use of organ and tissue extracts in nutritional supplements.

The findings from our study support the importance of physicians talking with their patients about nutritional supplements. Improved nutrition, prevention of diseases, and treatment of fatigue appear to motivate the majority of patients taking supplements (Table 2). As these motivations are all within the physician's domain, and as some supplements might be injurious or subject to misuse, physicians should inquire about the use of supplements.

Two thirds of the patients stated that they had informed their physicians about the use of supplements, but only 23 percent of the physicians had actually recommended the supplement to the patients. These patients learned about supplements usually from the media, general knowledge, and family or friends rather than their physicians. A physician's knowledge about many of these products might be limited and require further education. Most physicians recognize that there is little scientific information about dietary supplements. As more physicians become knowl-

edgeable, it might be possible for them to recognize more often either beneficial or toxic effects of these supplements.

The cost of the supplements did not appear to be excessive in this study with the average expenditure estimated by the patient to be \$6.60 per month. Some patients who are taking multiple supplements will spend much more than this amount, but the maximum estimated expenditure in our study was only \$68.90 per month. The only statistically significant correlation between demographic findings and supplements was between educational level and number of supplements ingested. Those with a high school education consumed fewer supplements than those with more advanced education ($P = 0.003$). It is suggested from our findings and those of another study²¹ that educated people tend to take more supplements; whether they are more able to afford them or are better informed is unclear.

Our study was limited by the population surveyed, that is, one clinic in one geographical location. Nevertheless, our clinic population is probably typical of many in the United States that are mainly white and English speaking. Other populations will differ, and additional data are required to describe their use of supplements. This study illustrates that many patients are taking dietary supplements, many of which have not been adequately tested and some of which might be toxic. Conversely, other supplements can provide benefits. Additional research is needed to determine the effectiveness and safety of nutritional (dietary) supplements. The FDA should establish some minimal standards to allow physicians and the public to have greater confidence in many of those products. Physicians and health providers should engage their patients in conversation about nutritional supplements.

References

1. Morgenthaler J, Fowkes SW. Stop the FDA—save your health freedom. Menlo Park, Calif: Health Freedom Publication, 1992.
2. FDA regulation of dietary supplements. Gaithersburg, Md: General Accounting Office, 1993.
3. Ono Y. Dose of controversy: the blurry line between drugs, dietary supplements. *Wall Street Journal* 1995 Aug 8;sect A:6(W), 6(E) (col 1).
4. Ono Y. Double vision: Twinlab finds itself a lucrative niche in health-food pills. *Wall Street Journal* 1995 Aug 8;sect A:1(W), 1(E) (col 6).
5. Porter D. Dietary Supplement Health and Education Act of 1994. Pub L 103-417. CRS Report for Congress. Washington, DC: Congressional Research Service (CRS), The Library of Congress, 1 Dec 1994. SPR no 94-965.
6. Philen RM, Ortiz DI, Auerbach SB, Falk H. Survey of advertising for nutritional supplements in health and body-building magazines. *JAMA* 1992;268:1008-11.
7. Eliason BC, Doenier JA, Nuhlicek DN. Desiccated thyroid in a nutritional supplement. *J Fam Pract* 1994;38:287-8.
8. Markowitz SB, Nunez CM, Klitzman S, Munshi AA, Kim WS, Eisinger J, et al. Lead poisoning due to hai ge fen. The porphyrin content of individual erythrocytes. *JAMA* 1994;271:932-4.
9. Jin bu juan toxicity in adults—Los Angeles, 1993. *MMWR Morb Mortal Wkly Rep* 1993;42:920-2.
10. Jin bu juan toxicity in children—Colorado, 1993. *MMWR Morb Mortal Wkly Rep* 1993;42:633-6.
11. Multistate outbreak of poisonings associated with the illicit use of gamma hydroxy butyrate. *MMWR Morb Mortal Wkly Rep* 1990;39:861-3.
12. Chaparral-induced toxic hepatitis—California and Texas, 1992. *MMWR Morb Mortal Wkly Rep* 1992;41:812-4.
13. Anticholinergic poisoning associated with an herbal tea. New York City, 1994. *MMWR Morb Mortal Wkly Rep* 1995;44:193-5.
14. Farnsworth NR, Akerele O, Bingel AS, Soejarto DD, Guo Z. Medicinal plants in therapy. 1985. *Bull World Health Organ* 1985;63:965-81.
15. Phillipson JD. Natural products as drugs. *Trans R Soc Trop Med Hyg* 1994;88(Suppl 1):S17-9.
16. Jones E. Foxpro 2.5 for DOS made easy. Berkeley, Calif: Osborne McGraw-Hill, 1993.
17. Subar AF, Block G. Use of vitamin and mineral supplements: demographics and amounts of nutrients consumed. The 1987 Health Interview Survey. *Am J Epidemiol* 1990;132:1091-101.
18. Eisenberg DM, Kessler RC, Foster C, Norlock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States. Prevalence, costs, and patterns of use. *N Engl J Med* 1993;328:246-52.
19. Huang KC. The pharmacology of Chinese herbs. Boca Raton, FL: CRC Press, 1993.
20. Jimson weed poisoning—Texas, New York, and California, 1994. *MMWR Morb Mortal Wkly Rep* 1995;44:41-5.
21. McGinnis LS. Alternative therapies, 1990. An overview. *Cancer* 1991;67(Suppl):1788-92.