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Bridging the Vitamin and Mineral Intake Gap: Role of Dietary Supplements

INTRODUCTION

Pharmacists are readily accessible health care providers in the community setting, and their counsel is often sought by consumers on a number of subjects, including the use of dietary supplements. According to the 2016 *Pharmacy Times*® Survey of Pharmacists’ OTC Recommendations, US-based pharmacists provide patients with recommendations regarding multivitamins an estimated 1.7 million times per month.¹ These interactions provide many opportunities for pharmacists to advise patients and help them meet their nutritional needs. The purpose of this article is to raise awareness of unmet needs regarding vitamin and mineral intake and describe the results of a recent study that quantifies the impact of single-nutrient supplements (SNSs) and multivitamin/multimineral supplements (MVMSs).

More than 90% of Americans fall short of obtaining the Estimated Average Requirement (EAR) or Adequate Intake (AI) of at least 1 vitamin or mineral from food alone.^{2,3} Unlike Recommended Dietary Allowances (RDAs), which represent the nutritional level sufficient for 97% to 98% of all healthy individuals, the EAR represents the quantity of a given nutrient sufficient to meet the requirements of 50% of healthy individuals within a given age- and gender-specific group.⁴ EAR levels represent a less stringent metric of dietary adequacy than RDA levels.⁴ Yet, the vast majority of Americans fail to meet this basic measure of dietary adequacy based on food alone.^{2,3}

Based on data from Americans aged 19 years and older, collected by the National Health and Nutrition Examination Survey (NHANES) from 2009 to 2012, an analysis identified important shortfalls in intake of several key vitamins and minerals (TABLE).⁵ These deficiencies are acknowledged by the 2015 US Department of Agriculture (USDA) and Department of Health and Human Services (DHHS) Dietary Guidelines for Americans, which note, “Although the majority of Americans consume sufficient amounts of most nutrients, some nutrients are consumed by many individuals in amounts below the Estimated Average Requirement or Adequate Intake levels. These include potassium, dietary fiber, choline, magnesium, calcium, and vitamins A, D, E, and C. Iron also is underconsumed by adolescent girls and women ages 19 to 50 years.”⁶

ROLE OF DIETARY SUPPLEMENTS

According to the USDA/DHHS Dietary Guidelines for Americans, although nutritional needs should be met primarily from food, “In

TABLE. PERCENTAGE OF US ADULTS WITH BELOW-EAR INTAKE OF SELECT VITAMINS AND MINERALS FROM FOOD ALONE^a

Vitamin or Mineral	Percentage of Population with Below-EAR Intake
Vitamin A	53%
Vitamin C	50%
Vitamin D	96%
Vitamin E	88%
Calcium	38%
Magnesium	58%

EAR = estimated average requirement.

some cases, fortified foods and dietary supplements may be useful in providing one or more nutrients that otherwise may be consumed in less-than-recommended amounts” or “are of particular concern for specific population groups.”⁶

THE EFFECT OF DIETARY SUPPLEMENTATION

Previous studies examining the effects of dietary supplements have identified improvements in nutrient adequacy among individuals using a MVMS.⁵ However, past analyses compared nutrient adequacy in MVMS users with nutrient adequacy in the entire NHANES sample, which is an imperfect comparison given that the full NHANES sample included both users and nonusers of MVMSs.^{2,5} Additionally, previous evaluations did not take into account the frequency of MVMS use, lumping occasional MVMS users (as infrequently as once per month) with daily users, and did not examine the effect of SNSs.⁵

To more precisely determine the effect of dietary supplementation on nutrient adequacy, researchers Blumberg et al analyzed data from 10,698 adults aged 19 years and older participating in the nationally representative NHANES survey (2009-2010 and 2011-2012).⁵ Food intake was assessed by two 24-hour dietary recall interviews. Supplement use was determined by a dietary behavior questionnaire during the interview.⁷ MVMSs were defined as supplements providing 100% or more of the RDAs or AIs for 9 or more of the 21 micronutrients with defined values. SNSs were defined as supplements providing 100% of the RDA or AI for 1 or more of the same 21 micronutrients. Consumption of MVMSs and SNSs was categorized by frequency of intake, and nutrient

intakes from food and dietary supplements were calculated. The researchers assessed the percentage of each supplement use group with nutrient intake at or above the EAR.⁵

The initial findings showed that groups with more frequent intake of MVMSs had higher rates of nutrient adequacy than groups with a lower frequency of intake. For example, 98% of individuals who reported taking a MVMS regularly (25 or more days per month) achieved intakes of vitamin D at or above EAR levels versus only 4% of individuals who reported not taking a supplement. Corresponding proportions of individuals in these 2 groups with intakes at or above EAR levels for vitamin E (100% vs 12%), vitamin A (100% vs 47%), vitamin C (99% vs 50%), magnesium (82% vs 42%), and calcium (89% vs 62%) demonstrate the value of MVMSs in preventing nutritional shortfalls (FIGURE).⁵ Similarly, a greater proportion of individuals who reported taking a SNS 8.5 or more days per month versus supplement nonusers achieved intakes at or above EAR levels for calcium (81% vs 62%), magnesium (73% vs 42%), vitamin C (91% vs 50%), vitamin D (77% vs 4%), and vitamin E (79% vs 12%).⁵

ROLE OF THE PHARMACIST

Because 90% of Americans have an inadequate intake of at least 1 nutrient, based on diet alone,^{2,3} there is an opportunity for pharmacists to provide guidance to patients regarding intakes of vitamins and minerals, as well as the use of supplements to bridge nutrient gaps. When counseling patients, pharmacists should emphasize the value of obtaining nutrients from a balanced diet. However, for patients who may be unable to obtain sufficient nutrients from diet alone, MVMSs can be a valuable adjunct to help ensure adequate intake.⁶

Use of vitamin and mineral supplements has been shown to

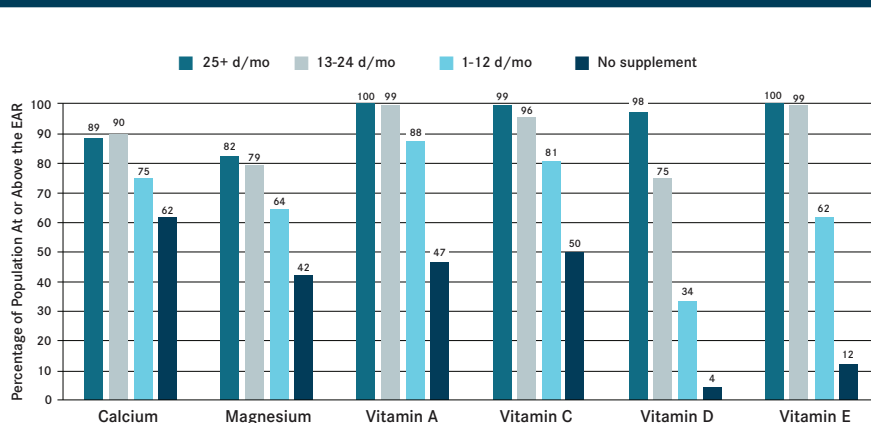
improve nutrient intakes.⁵ Because these benefits are most pronounced in those who use supplements frequently (eg, daily), pharmacists should also emphasize the importance of taking supplements on a regular basis. By providing evidence-based guidance regarding consumption of a balanced diet and regularly using a MVMS, pharmacists can help patients address common nutrient gaps.

The Campaign for Essential Nutrients is committed to educating Americans about the essential role vitamin and mineral supplements can play in helping to fill their daily nutritional gaps. The Campaign for Essential Nutrients is sponsored (funded) by Bayer HealthCare LLC, DSM Nutritional Products, Pfizer Inc, and Pharmavite, LLC. The organizations came together as part of their shared commitment to provide consumers with simple ways to supplement their diets and get key daily nutrients.

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FIGURE. NUTRIENT ADEQUACY BASED ON MULTIVITAMIN/MULTIMINERAL DIETARY SUPPLEMENT USE IN ADULTS (19+ YRS)⁵



d/mo = days per month; EAR = estimated average requirement.