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The Vital Role of Nutrition in Brain Health

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Introduction

Nutrition is well established as a critical component of health throughout the life cycle, from early development through old age, for both optimizing wellness and preventing disease.[1] Beyond preventing disorders related to malnutrition, healthful nutrition helps prevent a wide range of health conditions, including diabetes, cardiovascular disease, hypertension, obesity, and many other chronic diseases as well as age-related syndromes such as sarcopenia and frailty. A growing body of evidence indicates that nutrition also plays an important role in brain health. Notably, up to 40% of dementia cases can be attributed to modifiable behaviors.[2]

Strategies that manage health and wellness overall (e.g., exercise, social stimulation, management of vascular risk factors) are also meaningful for primary prevention of multiple neurologic conditions. Based on available evidence for the impact of behavior on dementia, the UsAgainstAlzheimer's risk reduction workgroup (RRWG) has published 11 consensus-based recommendations to reduce the risk of cognitive decline that can be implemented in clinical practice.[2]

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contents

1 Introduction
4 Brain Health and Cognitive Changes Associated With Aging
5 Dietary Patterns for Brain Health
10 Conversations With Older Adults Regarding Diet and Brain Health
12 Clinical Insight: Addressing Nutrition as Part of a Brain Health Discussion
13 Conclusion
14 Resources for the Health Care Professionals
14 Dietary Information for Patients

The RRWG recommendations address neurovascular risk management, physical activity, sleep, nutrition, social activity, and cognitive stimulation (Table 1).[2] The nutrition-focused recommendations for primary care from the RRWG focus on assessing dietary eating patterns and recommending dietary interventions that impact brain health.

Recommendations for assessing individuals' nutritional intake include asking questions such as:[2]

- Are you concerned about your diet?
- Do you think you get enough fruits and vegetables in your diet? How many servings do you have per day?
- How many times per week do you eat butter, cheese, red meat, or fried foods? In what quantities?
- How many meals per day (or per week) include highly processed foods?

Information gathered from these questions can be used to determine whether any interventions are necessary and guide the selection of strategies that may help support healthful dietary patterns, including educational resources about dietary recommendations. Additionally, individuals who report dietary patterns that do not align with recommendations may be appropriate for referral to a registered dietitian nutritionist (see eatright.org). More details about dietary patterns that support brain health are discussed in this issue of *Insights & Implications in Gerontology*.

Table 1. Behavioral Recommendations for Reducing Risk of Cognitive Decline

Domain	Recommendation
Neurovascular risk management	1. For adults 45 years of age and older with established hypertension or type 2 diabetes, clinicians should manage the conditions according to guidelines with appropriate medications to help reduce the risk of cognitive decline, and clinicians should encourage optimal brain health in the same way they encourage cardiovascular health through other modifiable risk factors (or lifestyle interventions) such as physical activity, diet, and sleep to reduce the risk of cognitive decline.
Physical activity	2. Clinicians should conduct a physical activity assessment, at least annually, using practical and validated tools to identify adults 45 years of age and older who are sedentary or not meeting recommended levels of physical activity (150 minutes per week of moderate intensity) and who can decrease their risk of cognitive decline or worsening health. 3. For individuals not meeting recommended levels of physical activity, develop a plan using a safe, gradual approach that starts with moderate-intensity physical activity that fits within a person's lifestyle (e.g., walking, gardening, dancing, calisthenics) and is culturally acceptable.
Sleep	4. Clinicians should routinely (if possible, at each visit) assess sleep quantity and quality in patients 45 years of age and older using a validated tool and ascertaining whether they take any medications to sleep. 5. For individuals getting insufficient or poor-quality sleep, clinicians should encourage getting 7 to 8 hours of sleep in a 24-hour period, including naps. Those with severe sleep complaints, which may indicate sleep apnea (e.g., snoring with stops of breathing, excessive daytime sleepiness), should be referred to a sleep clinic for diagnosis and treatment.
Nutrition	6. Clinicians should assess dietary eating patterns and habits, at least annually, with patients 45 years of age and older. 7. For individuals who indicate a less than optimal diet, clinicians should counsel patients about the value of a healthy diet and should broach the topic of culturally acceptable dietary interventions that directly and indirectly impact brain health at each annual encounter to suggest beneficial nutritional modifications.
Social activity	8. Clinicians should annually or after patients' major life events (e.g., death of loved one, change in living arrangements) perform an assessment using one or more validated tools (e.g., UCLA Loneliness Scale for assessing loneliness, Berkman-Syme Social Network Index for assessing social isolation) to identify adults 45 years of age and older experiencing loneliness or social isolation. 9. For those identified with elevated risk of social isolation or loneliness, clinicians should suggest strategies for enhancing social connection and activity and check in with them via phone or virtual meeting every few months to offer guidance or additional resources, as needed, to help prevent further declines in social activity.
Cognitive stimulation	10. During each scheduled visit, but at least annually, clinicians should ask patients 45 years of age and older about their level of cognitive stimulation or activity, which may include learning new skills or other stimulating activities they practice. 11. For individuals who indicate low levels of cognitive stimulation or activity, suggestions for cognitive stimulation should be made.

Source: Reference 2.

Brain Health and Cognitive Changes Associated With Aging

Brain health may be defined as "a state of complete physical, mental, and social well-being through the continuous development and exercise of the brain."[3] This definition combines neurologic, psychiatric, and social concepts to take a broader view of well-being.[3] Addressing all these elements in a unified approach is intended to support overall brain health.

Some brain health changes, such as taking longer to learn something or becoming more forgetful, are aspects of normal cognitive aging.[4] Normal cognitive aging is distinct from more serious changes that impact activities of daily living such as driving, using the phone, and navigating transportation. Behaviors that may indicate the presence of cognitive impairment include:[4]

- Asking the same questions repeatedly.
- Getting lost in places a person knows well.
- Having trouble following recipes or directions.
- Becoming more confused about time, people, and places.
- Not taking care of oneself (e.g., eating poorly, not bathing, behaving unsafely).

In some cases, these changes in cognition may be classified as mild cognitive impairment (MCI). People with MCI have more cognitive problems than other people their age but can usually perform activities of daily living and live independently. Although MCI may be an early sign of dementia, not all individuals who develop MCI progress to dementia.

Signs of MCI include:[4]

- Losing things often.
- Forgetting to go to important events or appointments.
- Having more trouble coming up with desired words than other people of the same age.

Dementia is a loss of cognitive functioning that interferes with a person's ability to function and is not considered a normal part of aging. Dementia may include impairments in thinking, remembering, learning, and reasoning as well as changes in behavior or personality that interfere with a person's quality of life and activities.[4]

Dietary Patterns for Brain Health

The amounts, variety, and combination of foods and beverages an individual consumes over time are considered a dietary pattern. A well-balanced dietary pattern includes all necessary macronutrients (fats, protein, and carbohydrates) and micronutrients (vitamins and minerals) while limiting excess fat, sugar, salt, and highly processed food.[1] Selected key micronutrients and their functions and dietary sources are shown in Table 2.[5-10] Certain dietary patterns have been shown to be associated with improved cognition and may alter the trajectory of neurodegenerative conditions, including Parkinson's disease, Alzheimer's disease, and other types of dementia.[1] The microbiome and obesity are also nutrition-related factors that may influence brain health.[1]

Brain-healthy dietary patterns include the Mediterranean diet, the Dietary Approaches to Stop Hypertension diet (DASH diet), and the Mediterranean and DASH Intervention for Neurodegenerative Delay diet (MIND diet). Dietary selections included in these dietary patterns are shown in Table 3.[11-13] In general, individuals should be encouraged to reduce the intakes of high-fat dairy products, red meat (especially processed red meat), fried foods, and highly processed foods, including sugar-sweetened beverages and sweets, while increasing intakes of leafy green and cruciferous vegetables, berries, beans, nuts, whole grains, and protein-rich foods such as fish, seafood, and chicken.[1,14] Eating patterns associated with a negative impact on cognition include those with lower vegetable intake and higher intake of saturated fat, processed meat, sugar, ultra-processed foods, and alcohol.[1]

These three dietary patterns are associated with improved cognition and decreased risk of dementia in older populations; they are also associated with other health benefits, including reduced depression and improved cardiovascular health, blood pressure, and blood glucose control.[2] Adherence to the MIND diet in particular has been associated with being equivalent to 7.5 years younger in terms of cognitive abilities; benefits were seen across all assessed cognitive domains.[12] Conversely, "Western" diets are associated with cognitive decline and depression.[2]

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Table 2. Main Micronutrient Functions and Dietary Sources

Micronutrient	Functions	Recommended Dietary Sources	Recommended Dietary Allowance for Women/Men*
VITAMINS			
A	Antioxidant that plays a role in vision, bone growth, reproduction, cell functions, and the immune system	• Plant sources include colorful fruits and vegetables; animal sources include liver and whole milk • May also be added to foods (e.g., cereals)	700/900 mcg retinol activity equivalents
B_1 (thiamin)	Helps convert food into energy; important for cellular growth, development, and function	• Whole grains and fortified bread, cereal, pasta, and rice • Meat (especially pork) and fish • Legumes, seeds, and nuts	1.1/1.2 mg
B_2 (riboflavin)	Helps convert food into energy; important for cellular growth, development, and function	• Eggs, organ meats (e.g., kidneys, liver), lean meats, and low-fat milk • Some vegetables (e.g., mushrooms, spinach) • Fortified cereals, bread, and grain products	1.1/1.3 mg
B_3 (niacin)	Helps convert food into energy; important for cellular development and function	• Animal foods (e.g., poultry, beef, pork, fish) • Some types of nuts, legumes, and grains • Enriched and fortified foods (e.g., many breads and cereals)	14/16 mg
B_5 (pantothenic acid)	Helps convert food into energy; important for many physiological processes, including making and breaking down fats	• Beef, poultry, seafood, and organ meats • Eggs and milk • Vegetables (e.g., mushrooms [especially shiitakes], avocados, potatoes, broccoli) • Whole grains (e.g., whole wheat, brown rice, oats) • Peanuts, sunflower seeds, and chickpeas	†
B_6	Affects more than 100 enzyme reactions involved with metabolism, brain development, and immune function; helps prevent anemia	• Poultry, fish, and organ meats • Potatoes and other starchy vegetables • Fruit (other than citrus)	1.5/1.7 mg
B_7 (biotin)	Involved in metabolizing food; may improve health of hair, skin, and nails	• Fortified cereal, egg yolks, meat, and legumes (e.g., lentils, chickpeas, beans)	†
B_9 (folate/folic acid)	Helps the body make new cells	• Green leafy vegetables, fruits, dried beans, peas, and nuts • Fortified products (e.g., breads, cereals)	400/400 mcg dietary folate equivalent
B_{12}	Keeps blood and nerve cells healthy; helps make DNA; helps prevent megaloblastic anemia	• Fish/shellfish (especially clams), meat (especially liver), poultry, eggs, milk, and other dairy products • Fortified products (e.g., cereals, yeasts)	2.4/2.4 mcg
C	Antioxidant that is important for skin, bones, and connective tissue; promotes healing; helps the body absorb iron	• Fruits and vegetables, including citrus, red and green peppers, tomatoes, broccoli, and leafy greens • Fortified products (e.g., juices, cereals)	75/90 mg
D	Helps promote bone health; promotes calcium uptake; helps control chronic conditions, including diabetes, hypertension, cardiovascular disease, and muscle pain and weakness	• Synthesized by the body in response to sunlight exposure • Dietary sources include primarily fatty fish and mushrooms exposed to ultraviolet light • Fortified foods, including some milk, yogurt, and orange juice	600/600 IU‡

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Micronutrient	Functions	Recommended Dietary Sources	Recommended Dietary Allowance for Women/Men*
VITAMINS			
E	Antioxidant that plays a role in the immune system and metabolic processes	• Vegetable oils, margarine, nuts and seeds, and leafy greens	15/15 mg alpha-tocopherol
K	Supports protein synthesis for bones, tissues, and blood clotting	• Green leafy vegetables (e.g., spinach, kale, broccoli, lettuce) • Vegetable oils • Some fruits (e.g., blueberries, figs) • Meat, cheese, eggs, and soybeans	90/120 mcg
MACROMINERALS			
Calcium	Bone and teeth formation; nerve conduction; muscle contraction; blood clotting; production of energy; immune function	• Dairy products and green leafy vegetables	1,200/1,000 mg
Chloride	Maintaining fluid and electrolyte balances; digestive fluids	• Table salt	†
Magnesium	Involved in the use of glucose; synthesis of nucleic acids and protein; cellular energy	• Green leafy vegetables, fish, nuts, beans, and whole grains	320/420 mg
Phosphorus	Bone strength; cellular functions and cell membranes	• Dairy products, fish, meats, poultry, vegetables, and eggs	700/700 mg
Potassium	Muscle contraction; nerve impulses; synthesis of nucleic acids and protein; energy production	• Fresh vegetables and fresh fruits	2,600/3,400 mg
Sodium	Fluid balance	• Salt added during food processing or at the table for taste	2,300/2,300 mg
Sulfur	Certain amino acids	• Onions, garlic, eggs, meat, and dairy	†
TRACE MINERALS			
Chromium	Use of glucose in the body	• Whole grains, spices, meats, and brewer's yeast	†
Copper	Hemoglobin synthesis and function; production of collagen, elastin, and neurotransmitters; melanin formation	• Organ meats, shellfish, nuts, and fruits	†
Fluorine	Binding calcium in bones and teeth	• Fluoridated water	†
Iodine	Production of energy as part of thyroid hormones	• Seafood and iodized salt	Levels established only for individuals who are pregnant or lactating
Iron	Hemoglobin synthesis and function; enzyme actions in energy production; production of collagen, elastin, and neurotransmitters	• Organ meats, meat, poultry, and fish	8/8 mg

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Micronutrient	Functions	Recommended Dietary Sources	Recommended Dietary Allowance for Women/Men*
TRACE MINERALS			
Manganese	Functions not entirely understood but needed for optimal health	• Whole grains and nuts	†
Molybdenum	Functions not entirely understood but needed for optimal health; detoxification of hazardous substances	• Organ meats, whole grains, green leafy vegetables, beans, and milk	†
Selenium	Functions not entirely understood but needed for optimal health	• Broccoli, cabbage, celery, onions, garlic, whole grains, brewer's yeast, and organ meats	†
Zinc	Immunity and healing; vision; hundreds of enzyme activities	• Whole grains, brewer's yeast, fish, and meats	8/11 mg

*Ages 51 years and older at the 1,600 calories/day level for women and 2,000 calories/day level for men.

†Not established.

‡Increases to 800 IU for women and men ages 71 years and older.

IU = International Units.

Source: References 5–10.

Table 3. Brain-Healthy Diets

Diet	Details
Mediterranean diet	• Focus on eating fruits, vegetables, bread and other grains, potatoes, beans, nuts, and seeds • Olive oil as a primary fat source • Dairy products, eggs, fish, and poultry in low to moderate amounts • Fish and poultry are more common than red meat in this diet • Minimally processed, plant-based foods • Wine may be consumed in low to moderate amounts • Fruit is a common dessert • Limited intake of sweets
DASH diet	• Focus on eating vegetables, fruits, and whole grains • Include fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils • Limit foods high in saturated fat, full-fat dairy products, and tropical oils such as coconut, palm kernel, and palm oils • Limit sugar-sweetened beverages and sweets
MIND diet	• Focus on consuming vegetables, especially green leafy vegetables, nuts, berries, beans, whole grains, fish, poultry, and extra virgin olive oil • Limit consumption of red meat, processed meats, butter and margarine, regular cheese, pastries and sweets, and fried foods, especially fast food

DASH = Dietary Approaches to Stop Hypertension; MIND = Mediterranean and DASH Intervention for Neurodegenerative Delay.

Source: References 11–13.

Role of Micronutrients and Nutritional Supplementation

Available evidence indicates that a varied and healthful dietary pattern that includes a range of nutrients provides maximal health benefits.[1] Current recommendations for the intake of micronutrients can be found in the *Dietary Guidelines for Americans 2020–2025* developed by the U.S. Department of Agriculture (Table 4).[6] However, many adults in the United States do not obtain adequate amounts of micronutrients from their regular dietary pattern.[15] The 2015 Dietary Guidelines Advisory Committee reported that several micronutrients are often underconsumed, including vitamins A, C, D, and E; calcium; magnesium; and potassium. This report indicated that supplementation may be appropriate to prevent or reverse deficiencies in some populations.[16]

The risk of inadequate nutritional intake increases with age because aging is associated with decreased absorption of some micronutrients.[15] Health conditions that increase in prevalence with aging and their treatment regimens may also impact nutritional requirements or status. For example, certain medications may interact with nutrients contributing to altered nutritional status. Therefore, encouragement of higher intakes of some micronutrients through consumption of fortified foods and/or dietary supplements may be needed to maintain and/or improve nutritional status in older adults.[15] Approximately one-third of adults in the United States consume multivitamins at least sporadically, and older adults are more likely than younger adults to consume dietary supplements.[15] An analysis of data from the National Health and Nutrition Examination Survey found that middle-aged and older individuals who regularly use a multivitamin have been shown to have higher levels of biomarkers for vitamins and minerals.[15] Those who did not use multivitamins were more likely to have micronutrient deficiencies.[15]

Because vitamins and minerals are required for multiple biologic pathways that support brain function, deficiencies in older adults may increase the risk for developing cognitive decline and dementia.[17] Several studies have shown that intake levels or deficiencies of micronutrients can have effects on cognitive function.[1] For example, a systematic review and meta-analysis of adults with Alzheimer's disease found that these individuals had significantly lower plasma levels of several micronutrients—including vitamins A, B_{12}, C, and E—compared with a control population.[18] Another study found that higher brain

Table 4. USDA Recommended Healthy U.S.-Style Dietary Pattern Composition

Food Group or Subgroup	Daily Amount of Food From Each Group*
Vegetables (cup eq/day)	2½
	Vegetable Subgroups in Weekly Amounts
Dark-green vegetables (cup eq/wk)	1½
Red and orange vegetables (cup eq/wk)	5½
Beans, peas, lentils (cup eq/wk)	1½
Starchy vegetables (cup eq/wk)	5
Other vegetables (cup eq/wk)	4
Fruits (cup eq/day)	2
Grains (ounce eq/day)	6
Whole grains (ounce eq/day)	≥3
Refined grains (ounce eq/day)	<3
Dairy (cup eq/day)	3
Protein foods (ounce eq/day)	5½
	Protein Foods Subgroup in Weekly Amounts
Meats, poultry, eggs (ounce eq/wk)	26
Seafood (ounce eq/wk)	8
Nuts, seeds, soy products (ounce eq/wk)	5
Oils (grams/day)	27
Limit on calories for other uses (kcal/day)	240
Limit on calories for other uses (%/day)	12%

*Food group amounts shown in grams, cup, or ounce equivalents (eq) for a 2,000 calories per day diet with daily or weekly amounts.

USDA = U.S. Department of Agriculture.

Source: Reference 6.

vitamin D concentrations were associated with better cognitive function.[19]

Whether micronutrient supplementation can impact cognitive function has also been studied. In one study, individuals with Alzheimer's disease who were given 800 IU of vitamin D daily performed better on cognitive assessments after 6 and 12 months compared with those who were given placebo.[20] Other studies have found a decrease in the risk for dementia with increased intake of other nutrients.[1] For example, adults aged 50 to 70 years who received supplementation with folate 800 mcg daily for 3 years scored significantly better on measures of cognitive function than those who received placebo.[21] However, there are conflicting results for some micronutrients; variability in study results may have been influenced by the specific micronutrients tested (alone or in combination), the specific cognitive tests administered, the outcome measures (single test versus composite score), and participant demographics and nutritional status.[1,17]

The COcoa Supplement and Multivitamin Outcomes Study (COSMOS) was a large randomized controlled trial that assessed the effects of cocoa flavanols (containing 500 mg flavanols) and multivitamin/mineral (MVM) supplementation for cardiovascular disease and cancer prevention in 21,442 adults 60 years and older.[22] This study had 3 substudies: COSMOS-Mind, COSMOS-Web, and COSMOS-Clinic. [22] COSMOS-Mind assessed the cognitive benefits of cocoa extract versus a daily MVM supplement for 3 years in 2,262 participants with a mean age of 73.5 years.[17] Daily MVM supplementation, but not cocoa extract, was found to improve global cognition, episodic memory, and executive function. These benefits were found to be greatest in adults with pre-existing cardiovascular disease.[17] Based on these data, the authors concluded that MVM use may be a safe, affordable, and accessible intervention to protect against cognitive decline in older adults.[17] COSMOS-Web compared a daily MVM supplement with a placebo in 3,562 adults (mean age 71.0 years).[23] This study found MVM use improved memory after 1 year and this improvement was maintained over 3 years of follow-up.[23] The COSMOS-Clinic study compared MVM supplementation with placebo in 573 adults and found MVM use improved global cognition over 2 years.[22] A meta-analysis of the 3 COSMOS substudies found MVM use benefited global cognition and episodic memory. The magnitude of the effect on global cognition was considered equivalent to 2 years of aging.[22]

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Conversations With Older Adults Regarding Diet and Brain Health

To achieve greater awareness of cognition and brain health in older adults, the Gerontological Society of America Workgroup on Cognitive Impairment Detection and Earlier Diagnosis created the KAER framework. This framework encourages individuals to be more aware of brain health–related changes and creates an environment where patients may feel more comfortable sharing their concerns.

The KAER framework has four steps—Kickstart, Assess, Evaluate, and Refer—that are intended to improve health-related outcomes and well-being. These steps may increase detection of cognitive impairment, initiate earlier diagnostic evaluation, and generate referrals for educational and supportive community services related to brain health.[24] This framework can be used by clinicians to guide nutrition interventions as part of overall efforts to promote brain health. Clinicians can kickstart the conversation by addressing nutrition as part of overall efforts to address brain health, assess the dietary patterns and nutritional status of their patients, evaluate the adequacy of these individuals' nutrition, and refer them as needed to registered dietitian nutritionists or other specialists to support healthful nutrition.

Recommendations from UsAgainstAlzheimer's RRWG for clinicians to implement nutritional recommendations include:[2]

- Assess the quality of individuals' diets with prompting questions:
  - Are you concerned about your diet?
  - Do you think you get enough fruits and vegetables in your diet? How many servings do you have per day?
  - How many times per week do you eat butter, cheese, red meat, or fried foods? In what quantities?
  - How many meals per day (or per week) include highly processed foods?

- Encourage healthful dietary modifications:
  - Decrease intake of high-fat dairy products (e.g., butter, cheese), red meat, fried foods, and highly processed foods or sweets.
  - Increase relative intake of leafy green and cruciferous vegetables, berries, beans, high-fiber nuts and whole grains, and non–red meats such as fish or chicken.
- Educate patients about how to incorporate dietary modifications:
  - Share resources for brain-healthy diets.
  - Determine underlying motivations as well as potential barriers to dietary modifications.

Additionally, it is beneficial to educate individuals who use dietary supplements about product selection. While the U.S. Food and Drug Administration (FDA) regulates dietary supplements, it places the burden on the manufacturer to ensure product safety and use appropriate scientific data to support claims. Dietary supplement manufacturers must follow the FDA's Current Good Manufacturing Practices; however, some dietary supplements may undergo independent verification through third-party testing and display this information on their label.[25] Finally, people who want to use supplements should be educated to know that vitamins and minerals can be toxic with excessive supplementation. Adults should be instructed to follow recommendations for micronutrient intake and not to exceed recommended upper limits. However, it is important to note that some vitamin and/or mineral supplements can interact with certain medications or disease states. For example, vitamin K can interact with warfarin and affect its efficacy. Recommendations for any dietary supplements should always consider any other health conditions, medications, or other dietary supplements that the person is using.

Clinical Insight: Addressing Nutrition as Part of a Brain Health Discussion

Kathryn Porter Starr, PhD, RDN, Associate Professor at Duke University School of Medicine and Research Health Scientist at the Durham VA Medical Center helps patients adopt healthful diets in her clinical practice. According to Dr. Starr, using a patient-centered approach that ties conversations about nutrition to patient goals is an effective strategy for starting conversations about diet and health. "Broaching the topic of diet and nutrition can be challenging. I start by asking patients what their goals are." These goals could include physical goals such as maintaining muscle mass, cognitive goals such as preserving memory, as well as functional goals such as being able to travel or play with grandchildren. Linking information about nutrition to helping adults achieve their goals is an effective strategy for stimulating motivation to implement healthy changes, explains Dr. Starr. Adopting this framework for conversations is also helpful for building rapport and trust so that patients do not feel judged about dietary choices.

Patient recall is one of the primary strategies for assessing current dietary patterns. However, this process can be challenging because patients sometimes are not comfortable providing an accurate report. "It is really important for me to establish that there is no judgment so that my patients know they are in a safe place where they can be honest about their food choices," shares Dr. Starr. Involving caregivers in gathering information about patients' diets is

essential when patients have MCI or signs of dementia and are not able to accurately report or record what they eat. Conducting a cognitive assessment can be helpful for determining whether it is necessary to connect with knowledgeable informants to get more information.

In addition to gathering data from dietary recall, a nutrition-focused physician exam that includes a complete laboratory panel as well as an assessment of weight change, loss of subcutaneous fat, muscle wasting, and functional status can help identify whether a patient is malnourished. Assessment of micronutrient levels that could impact cognitive status—including vitamins B_{12}, D, and folate—is key for determining whether there are specific nutritional deficiencies that could be affecting brain health. Information about what foods individuals are currently consuming can then be used to identify changes that can be made to the diet with a focus on achieving healthier dietary patterns. "I encourage individuals to eat fruits and vegetables and healthy fats, including omega-3 fatty acids from fish," says Dr. Starr. "The conversation is really about the whole diet and how it will impact progress toward patient goals and find practical ways to implement recommendations."

Discussions of brain health are often a component of broader discussions about nutrition's impact on health and wellness, reports Dr. Starr. "I explain to patients that it's all synergistic. Cardiovascular disease is tied to dementia, so if you have atherosclerosis, that could have an impact on your brain health." Therefore, patients should be educated that dietary strategies to improve cardiovascular health also have benefits for brain health. "I tell people that a healthy diet is not just about losing weight or improving muscle, it's about helping the body function well overall," explains Dr. Starr.

When deficiencies of specific nutrients are identified, supplementation may be needed to ensure that patients obtain an adequate intake if dietary changes alone are not sufficient. According to Dr. Starr, "I would love for everybody to get all of their micronutrients from food. Unfortunately, for most older adults, it's really challenging to do that due to physiological changes that occur with aging and certain disease states that affect absorption, so we often recommend a multivitamin." In addition to recommending a broad-spectrum multivitamin, Dr. Starr reports that she also recommends supplements that address any specific deficiencies that have been identified.

Conclusion

Consumption of a healthful diet has been identified as one of the behavioral strategies that help to prevent dementia. Several dietary patterns are associated with reduced risk for the development of cognitive impairment. Additionally, adequate intake of micronutrients supports brain health, and recent evidence shows that the use of an MVM supplement is associated with improved cognitive outcomes. Ideally, individuals are able to obtain all needed nutrients from their diet. However, this is not always possible and supplementation with an MVM or specific micronutrient may be needed. The consumption of an MVM supplement also helps individuals to perhaps better meet nutrient recommendations; given that some vitamin deficiencies increase the risk of impaired cognition, the inclusion of an MVM supplement may assist in reducing this risk. Patient-centered conversations about the impact of diet and nutrition should include identifying and implementing strategies that benefit brain health as well as overall health and well-being.

Resources for Health Care Professionals

Academy of Nutrition and Dietetics
Topical expertise and a database of nutrition professionals
eatright.org

Harvard School of Public Health
The Nutrition Source
hsph.harvard.edu/nutritionsource

National Heart, Lung, and Blood Institute
DASH Eating Plan
nhlbi.nih.gov/education/dash-eating-plan

National Institutes of Health
Office of Dietary Supplements
ods.od.nih.gov

U.S. Department of Agriculture
FoodData Central
fdc.nal.usda.gov/index.html

USAgainstAlzheimer's
Alzheimer's advocacy organization
usagainstalzheimers.org

Dietary Information for Patients

American Heart Association
Mediterranean diet information
heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/mediterranean-diet

KFF Health News
MIND diet handout
khn.org/wp-content/uploads/sites/2/2017/04/mind_ph_module-1_mind-diet_v2.pdf

National Heart, Lung, and Blood Institute
DASH diet information
nhlbi.nih.gov/health-topics/dash-eating-plan

Join GSA and Access Members-Only Resources and Communities

Founded in 1945, GSA is the driving force behind advancing innovation in aging. GSA membership allows you to connect with 5,500+ GSA members from more than 50 countries and collaborate in a respected interdisciplinary community to strengthen your career and share a collective purpose with others — the advancement of gerontological research, education, and practice. GSA offers many benefits to its members, including multiple opportunities for professional development, networking, leadership, and volunteering throughout the year.

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