Malnutrition in Older Adults

An evidence-based review of risk factors, assessment, and intervention.

ABSTRACT: Older adults are at risk for compromised nutritional status because of physical changes associated with aging, as well as cognitive, psychological, and social factors such as dementia, depression, isolation, and limited income. Malnutrition negatively affects quality of life, increases health care costs, and increases the risk of short-term mortality. Nurses and other members of interdisciplinary health care teams play important roles in preventing malnutrition in community-dwelling older adults and in older adults in long-term care settings. This article provides an overview of screening tools and interventions nurses can use to minimize the risk of malnutrition in older adults.

Keywords: dehydration, malnutrition, nutrition, older adults

In 2015 (the most recent year for which data are available), the number of Americans age 65 or older was 47.8 million—a figure that represented a 30% increase since 2005.[1] According to estimates from the Centers for Disease Control and Prevention, by 2050, one in five Americans will be 65 or older,[2] and the United Nations anticipates that the number of adults who were 60 and older in 2015 will double worldwide by 2050 to nearly 2.1 billion.[3]

Generally, older adults perceive themselves as healthy, with more than three-quarters of Americans ages 65 and older assessing their health as good to excellent.[4] Despite their healthy self-image, however, many older adults are at risk for malnutrition, a condition that can occur in frail, underweight older adults as well as in overweight and obese older adults whose nutritional needs are unmet. Consider for example the following two composite cases, which represent some of the factors that put older adults at risk for malnutrition.

Rachel Jackson, a 91-year-old who was recently widowed, lives alone in an apartment in an assisted-living facility. Ms. Jackson has become increasingly confused and reclusive. She no longer attends communal meals in the dining room. She has a small microwave and refrigerator in her apartment and her daughter shops for her every few weeks. Because of dental problems, she can eat only soft foods. She has difficulty opening packages and cans and has forgotten how to operate the microwave. Her aides are concerned about her limited food choices; they report that she primarily eats peanut butter and hot cereal. Over the past three months, she has lost 10 pounds and is now classified as underweight for her height.

After Harold Brinker's wife died, he moved in with his son. Mr. Brinker, age 87, no longer drives and relies on his son for transportation. Because of the remote location of his son's apartment, Mr. Brinker is no longer able to take neighborhood walks and now spends most of his time watching television. His son travels frequently for business. Mr. Brinker never learned to cook and has little interest in food. Without his wife's encouragement to eat well, Mr. Brinker rarely eats fruits or vegetables. Most of his meals are microwaveable frozen dinners his son purchases for him. Mr. Brinker also consumes a lot of desserts and snack foods. His blood pressure and blood glucose levels are

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elevated. Over the past six months, he has gained 15 pounds.

A number of studies have investigated malnutrition in older adults. A 2016 systematic review of 54 studies that used validated tools to screen community-living adults ages 65 and older for malnutrition susceptibility concluded that up to 83% are at risk for malnutrition.[5] A 2013 systematic review of 77 studies on nutritional problems in nursing home residents found that malnutrition prevalence rates varied widely, though most studies found that 20% to 39% of residents were malnourished and 47% to 62% were at risk for malnutrition.[6]

Malnutrition diminishes quality of life, is a strong predictor of short-term mortality, and is associated with higher health care costs.[7-9] This article reviews the many cognitive, psychological, social, and economic factors that can affect the nutritional status of older adults and discusses how nurses can intervene to prevent and address malnutrition in these patients.

PHYSICAL CHANGES ASSOCIATED WITH AGING

Both a loss of muscle tissue and an increase in body fat are associated with advanced age, even in people whose weight is stable.[10] A loss of muscle mass is accompanied by a decline in muscle strength and function[11] and may be followed by decreased mobility. Among community-living older adults, loss of mobility can interfere with food shopping and preparation. While a loss of muscle mass reduces calorie requirements, it does not decrease needs for vitamins, minerals, or protein, which often increase with aging, making it more challenging for older adults to meet these needs with a lower-calorie diet.[12]

Dehydration. In advanced age, adults also experience a reduction in total body water.[10] This reduction, in conjunction with reduced kidney function, diminished mobility, and a decreased perception of thirst, puts older adults at elevated risk for dehydration, especially those who are over age 85 or institutionalized.[12]

Dentition. More than 20% of adults ages 65 and older report they have no natural teeth.[4] Problems with teeth and gums, as well as poorly fitting dentures, can limit food choices, reducing consumption of fruits, vegetables, whole grains, and meats.

Sensory changes that can affect dietary intake, including altered taste, smell, and vision, frequently occur in older adults. Altered taste can occur with taste receptor cell dysfunction, medication use, difficulty

maintaining teeth and gum health, chronic illness, or diminished sense of smell.[13] Altered taste primarily affects perception of bitter and sour flavors and may trigger a dislike of citrus fruits and some vegetables or a preference for sweets.[13] In addition to affecting taste, olfactory dysfunction, which is more common in older than in younger adults,[14] may reduce enjoyment of food, though its effects on nutritional status are not clearly established.[15] Impaired sight can limit the ability to select or prepare food and create self-feeding challenges.

Metabolism and absorption of such nutrients as iron and vitamins A, D, and B_{12} are altered in advanced age, which can increase risk of deficiency or toxicity.[16] In a cross-sectional, population-based Finnish study of more than 1,000 adults ages 65 and older, Loikas and colleagues found a 12% prevalence of vitamin B_{12} deficiency and a 38% prevalence of borderline-to-low vitamin B_{12}.[17] Older adults are at increased risk for vitamin B_{12} deficiency because of their higher rates of atrophic gastritis, a condition that inhibits absorption of protein-bound vitamin B_{12} from such foods as meat and dairy products.[18] For this reason, the Food and Nutrition Board of the Institute of Medicine has recommended that adults over age 50 obtain most of their recommended dietary allowance (RDA) for vitamin B_{12} from fortified foods or vitamin B_{12}–containing supplements.[19] Compared with their younger counterparts, older adults also require more of certain nutrients.

- Adults ages 51 and older require more vitamin B_6.[19]
- Women ages 51 and older and men over age 70 require more calcium.[20]
- Adults over age 70 require more vitamin D.[20]
- Recent metabolic and epidemiologic studies suggest increasing dietary protein intake may help older adults reduce their risk of sarcopenia.[21, 22]

Chronic health conditions such as cardiovascular disease, hypertension, arthritis, and type 2 diabetes are more prevalent among older than younger adults and can affect nutritional needs, dietary choices, and food intake. Long-term medication use in conjunction with the digestive and metabolic changes that occur in advanced age may increase the potential for drug–nutrient interactions.[12]

PSYCHOLOGICAL AND COGNITIVE FACTORS

Dementia, a broad term used to describe symptoms related to memory and other cognitive deficits, affects the ability to perform daily tasks, including food selection, food preparation, and eventually, self-feeding. One study estimated that 17% of community-dwelling people with dementia needed assistance with eating and drinking.[23] And a study of 323 nursing home residents found that 86% of those with advanced dementia had eating problems.[24] In seniors with dementia who live independently, food choices may be limited because of difficulty with shopping and preparation. Eventually, people with dementia may be unable to express or recognize hunger and thirst, forget to eat or drink, or be unable to recognize food.[25, 26] These adults may also have difficulties with feeding, chewing, and swallowing. Any of these factors may precipitate inadequate nutritional intake and malnutrition.[25, 27]

Depression. The connection between nutrition and depression in older adults is complex. Depression can compromise nutritional status, and poor nutrition can put people at risk for depression.[28] Depression is not uncommon in older adults. In 2014, nearly 15% of American women and more than 10% of American men age 65 or older reported depressive symptoms.[4] Symptoms of depression can include both increases and decreases in appetite and weight. Medications used to treat depression may also affect nutritional status through such adverse effects as nausea, diarrhea, and anorexia.[28]

ECONOMIC AND SOCIAL ISSUES

The food choices of older adults may be limited by factors such as income, transportation options, and social isolation.

Income. Older adults with modest incomes often have to choose whether to spend their money on food, housing, or medications. The 2013 National Survey of Older Americans Act Participants found that 14% and 29%, respectively, of participants receiving congregate meals or home-delivered nutrition services do not always have enough money or food stamps to purchase the food they need.[29] One study found that elderly, low-income adults had a lower mean calorie consumption and ate fewer servings of whole grains, vegetables, and fruits than elderly adults who had higher incomes.[30]

Transportation options have also been associated with increased nutritional risk.[31] For example, older adults who rely on bus transportation and find it difficult to carry heavy shopping bags filled with fruits and vegetables may choose instead to purchase boxes of cereal or packaged snacks, which are lightweight and easier to carry. Older adults who rely on family or friends for grocery shopping may have limited access to such perishable foods as dairy products, fruits, and vegetables because of the infrequency of shopping trips.

Social isolation, a frequent result of inadequate transportation, is common among older adults. While a strong network of friends tends to be correlated with better diet quality, eating alone on a regular basis has been consistently associated with an elevated risk of inadequate nutrition and reduced enjoyment of meals in older adults.[32] Other causes of social isolation include recent widowhood and the resultant grief, both of which are also associated with reduced diet quality, appetite, and enjoyment of food.[33] In addition, socially isolated older adults have been found

to rely predominantly on physical feelings of hunger, ignoring such social conventions as eating three meals a day,[34] which may reduce overall food intake as hunger sensations decline in advanced age.[35]

FOOD CHOICES

In a survey of 185 homebound older adults, the three factors most often cited as influencing food choices were convenience, taste, and price.[36] Health issues, following a special diet, and being unable to shop for themselves were the barriers to food choice most frequently reported by survey respondents. Food choices made primarily for the sake of convenience were the most likely to result in a lower-quality diet.[36] Many older adults find it comforting to eat familiar foods, such as those eaten during childhood. This practice can have varying effects on dietary quality. For example, foods from childhood may be nutritionally deficient sweets and fried foods, or they may be the less processed, nutrient-dense foods that were eaten decades ago. Regardless of what influences a patient's food choices, it's important to remind older adults that their diet should include all essential nutrients (see Table 1).

Vegetarianism. Older adults may follow vegetarian diets for a variety of reasons, including religious or moral precepts, having a distaste for meat, experiencing digestive or chewing difficulty when eating meat, or to improve their health by potentially lowering their risk of cardiovascular disease, hypertension, hyperlipidemia, type 2 diabetes, overweight, and obesity.[37-41] If approached correctly, a vegetarian diet can provide the same essential nutrients as a balanced nonvegetarian diet. A vegetarian diet that emphasizes whole grains, beans, fruits, vegetables, and nuts, with optional dairy products and eggs, can meet an older adult's dietary needs.

ASSESSING RISK OF UNDERNUTRITION

Tools have been developed to help nurses assess the nutritional status of their older patients. The first step in this process is a screening performed to identify those at risk for malnutrition. The Mini Nutritional Assessment–Short Form (MNA-SF), the Malnutrition Screening Tool (MST), and the Malnutrition Universal Screening Tool (MUST) are often used in acute and ambulatory care settings, and a cross-sectional observational study by Isenring and colleagues found they can be used to triage nutritional care in the long-term care setting as well.[42] All three tools ask about unintentional weight loss because, while weight loss is not the only indicator of malnutrition risk, it can be measured objectively and signals the need for additional probing to determine potential causes. Weight should be measured regularly and accurately in older adults.

Table 1. Components of a Healthy Eating Plan for Older Adults

Component	Comments	Food Safety
Vegetables	Choose a variety of vegetables, including those that are green and deep orange. Fresh vegetables are the most perishable; frozen vegetables offer variety and reduce the risk of spoilage; canned vegetables may be higher in sodium.	Monitor spoilage, especially in fresh vegetables. If using canned vegetables, choose reduced sodium versions.
Fruits	Choose a variety of fruits rather than fruit juice. Frozen fruit is less perishable than fresh and may provide variety. If using canned fruits, avoid those packed in syrup.	Monitor spoilage, especially in fresh fruits.
Grains	Includes breads, cereal, pasta, and products such as rice and quinoa. Choose whole grains at least half the time.	Watch for expiration dates and spoilage.
Protein	Can include seafood, lean meats, and poultry, as well as beans, peas, soy products, nuts, seeds, low-fat milk, cheese, yogurt, and other dairy products.	Keep seafood, meats, and poultry refrigerated or frozen, cook properly, and use promptly. Foodsafety.gov provides a guide for storage times (go to www.foodsafety.gov/keep/charts/storagetimes.html).
Calcium sources	Can include fat-free or low-fat dairy and fortified soy beverages. Other sources of well-absorbed calcium include kale, broccoli, Chinese cabbage, and fortified juices.	Keep refrigerated and monitor expiration dates.

The MNA-SF (available at www.mna-elderly.com/forms/mini/mna_mini_english.pdf) was developed and validated specifically for adults ages 65 and older. It consists of six questions related to food intake, weight loss, mobility, recent psychological stress or acute disease, dementia or depression, and body mass index (BMI).[43] This shortened version of the original 18-question MNA can be completed by support staff. The MNA-SF can be used to evaluate adults living independently and those in institutional settings.

The MST (available at https://static.abbottnutrition.com/cms-prod/abbottnutrition-2016.com/img/Malnutrition%20Screening%20Tool_FINAL_tcm1226-57900.pdf) has been validated for use in acute and ambulatory care settings, though not specifically for use in long-term care settings.[42, 44, 45] It consists of two questions, one about recent, unintentional weight loss and one about appetite. When used in the long-term care setting, Isenring and colleagues recommend broadening the appetite question to address whether poor appetite is due to any difficulties with chewing or swallowing.[42]

The MUST (available at www.bapen.org.uk/pdfs/must/must_full.pdf) is typically used with adults living in the community, but it is designed for universal use. It includes questions about BMI, unintentional weight loss, and acute disease.[42]

The usefulness of BMI as a screening tool for malnutrition is very limited, as it provides no information about recent changes in body weight or composition. In addition, research suggests that older adults in long-term care facilities may benefit from a higher underweight cutoff (a BMI of 21 kg/m^2 or less, for example) than that currently used by the National Heart, Lung, and Blood Institute (a BMI of less than 18.5 kg/m^2).[46, 47]

If a screening tool suggests risk of malnutrition, a comprehensive assessment should be carried out by a registered dietitian nutritionist (RDN). This practitioner will determine the most appropriate tools to use for this assessment, which may consider such factors as medical history, weight loss, dietary and fluid intake, and anthropometric measurements (midarm circumference and calf circumference, for example).[42]

Assessing hydration. The dehydration that often occurs in advanced age can have serious consequences, but early identification can reduce the risk of hospitalization. Nursing assessment of hydration status includes a health history, physical assessment, laboratory tests, and evaluation of fluid intake.[48, 49]

Interdisciplinary teams are indispensable in providing quality care to older adults. In addition to nurses, physicians, social workers, and therapists, nutritional assessment of geriatric patients may include the following providers[25]:

- a dentist or dental hygienist to assess oral health
- a speech and language pathologist to assess swallowing capability
- an RDN to assess nutritional adequacy of dietary choices

COMMUNITY-LIVING OLDER ADULTS

When caring for community-living older adults, in addition to assessing patients for such nutritional risk factors as social isolation, food security, transportation, and need for assistance with food preparation and feeding, nurses can support their patients' nutritional status in the following ways:

- educate the patient, family, and support network on healthy eating patterns for older adults
- assess dietary intake and food safety (by reviewing refrigerator contents, and noting types and amounts of food as well as expiration dates, for example)
- review all medications, including over-the-counter medications, vitamins, and supplements
- provide resources to promote healthy eating in older adults and referrals to food and nutrition programs as appropriate

Food and nutrition programs. Although federally funded food and nutrition programs are not available to all, in 2013 they provided more than 2.4 million older adults with meals, including congregate and home-delivered meals, through the Older Americans Act Nutrition Program.[29] Congregate meals can improve food intake by providing opportunities for social interactions and a set mealtime for eating at least one meal a day. These programs may include simple lessons on food preparation and nutrition specifically geared toward an older audience; programs that include an educational component have been successful in improving nutritional knowledge and behavior.[16] Home-delivered meals distributed by such charitable programs as Meals on Wheels provide not only food for at-risk seniors but regular contact with the delivery personnel. These programs make it more likely that older adults will be able to remain in their homes.

Fewer than half of seniors who were eligible for food assistance through the Supplemental Nutrition Assistance Program (SNAP) participated in this program in fiscal year 2014,[50] possibly because of a reluctance to accept aid, lack of awareness, or difficulty completing forms. Additional education and encouragement could increase the number of older adults who use the SNAP program.

OLDER ADULTS IN HEALTH CARE COMMUNITIES

In 2015, 1.5 million Americans ages 65 and older lived in an institutional setting, most (1.2 million) in a nursing home.[1] Adults living in an institutional setting are more likely to be older, frailer, and in need of greater assistance than those living in the community.

Regulation of the nutritional content of meals served in long-term care settings varies with the type of facility. There are no federal regulations about the amount or type of food served in assisted-living

Resources

Nutritional Education

- ***For Professionals: Talk to Your Patients and Clients About Healthy Eating Patterns.*** For all ages. From the Office of Disease Prevention and Health Promotion.
  https://health.gov/dietaryguidelines/2015/resources/DGA_Conversation-Starters.pdf
- ***Dietary Guidelines for Americans 2015–2016.*** 8th Edition. From the U.S. Department of Health and Human Services and the U.S. Department of Agriculture (USDA).
  https://health.gov/dietaryguidelines/2015/resources/2015-2020_Dietary_Guidelines.pdf
- **MyPlate for Older Adults.** From Tufts University. Includes ideas for easily prepared foods and lower-sodium options and promotes physical activity.
  http://hnrca.tufts.edu/myplate
- **10 Tips: Choosing Healthy Meals as You Get Older.** Ten tips for healthy eating from the USDA (ChooseMyPlate.gov) for people ages 65 and older.
  www.choosemyplate.gov/ten-tips-choosing-healthy-meals-you-get-older
- **Healthy Eating After 50.**
  https://ethnomed.org/patient-education/geriatrics/Healthy%20Eating%20after%2050.pdf
  Smart Food Choices for Healthy Aging.
  www.nia.nih.gov/health/smart-food-choices-healthy-aging
  Both from the National Institute on Aging and include plans for smart food choices.
- **The Vegetarian Resource Group.** Links to meal plans and recipes for older adults.
  www.vrg.org

Federal Food and Nutrition Programs

- **The Older Americans Act Nutrition Programs.** Funds programs that deliver meals to frail, older adults who have difficulty leaving their homes and provides grants to states and territories to serve meals to older adults in senior centers, adult day care centers, and other community sites. Nutrition education may be offered at meal sites.
  www.acl.gov/programs/health-wellness/nutrition-services
- **Senior Farmers' Market Nutrition Program.** Provides low-income seniors with vouchers for fruits and vegetables.
  www.fns.usda.gov/sfmnp/sfmnp-contacts
- **Supplemental Nutrition Assistance Program.** Provides low-income people with assistance for food purchases.
  www.fns.usda.gov/snap/supplemental-nutrition-assistance-program-snap
- **Child and Adult Care Food Program.** Provides nutritionally adequate meals and snacks for adults ages 60 and older in adult care centers.
  www.fns.usda.gov/cacfp/child-and-adult-care-food-program
- **Commodity Supplemental Food Program.** In some states, provides low-income adults ages 60 and older with specific foods, such as juice, cereals, peanut butter, dried beans, canned meat and fish, and canned fruits and vegetables.
  www.fns.usda.gov/csfp/eligibility-how-apply

facilities; each state has its own regulations. Nursing facilities that receive Medicaid and Medicare funding must provide three daily meals that "meet the nutritional needs of residents in accordance with established national guidelines."[51] States may choose additional requirements as long as they do not contradict the federal standards. Although provision of nutritionally adequate meals is an important first step, this alone does not ensure that a resident's diet will be adequate; residents must select and eat nutritious foods regularly.

Staff can promote adequate food intake with the following mealtime practices[52]:

- positioning residents for safe eating
- ensuring that dentures are in place
- assisting with opening packages and cutting foods
- encouraging and reinforcing self-feeding attempts

The dining environment can also affect mealtime behavior, especially for residents with dementia. For example, practices that minimize distractions—such as limiting the entrance and exit of personnel, turning off the television, and discouraging feeding assistants from talking with other staff members—can improve food intake.[25] Playing music during meals, especially familiar music, also seems to have a positive effect.[53]

Since socialization during meals can promote intake and a sense of well-being, serving meals in a dining room and providing residents with consistent table companions can be helpful.

Aides and volunteers who feed residents should be trained and supervised, as skilled feeding encourages nutrient intake.[25] Skilled feeding begins even before food is served, with skilled assistants ensuring that the resident is comfortably positioned and that dentures, glasses, and hearing aids are in place. Specific resident needs should determine the rate of feeding and the bite size provided.[52] Residents should be closely observed for swallowing before the next bite is given. Some residents will need reminders to close their mouth, chew, and swallow. Feeding assistants should deliver foods separately, rather than mixing foods together. They should interact with the resident during the meal, engaging in light conversation, smiles, and praising effective eating behavior. If the appearance of food is unfamiliar because of altered consistency, they should identify the different foods for the resident.[25]

Preventing dehydration is best accomplished through a team approach, with responsibility shared between the nursing, dietary, and medical staffs. Fluids may need to be offered regularly, both at mealtimes and between meals. Beverage consistency may need to be adjusted for the resident's swallowing ability. Some foods with a high water content, such as soup, yogurt, and fruits, can increase fluid intake. Use of drinking straws and special cups can be helpful for some residents.[48,49] The need for referrals to specialists, such as RDNs, speech therapists, or occupational therapists, can be determined through observation and documentation of food and beverage intake.

INTERVENING TO REDUCE MALNUTRITION RISK

There are numerous ways in which nurses can intervene to reduce the risk of malnutrition in their patients. In the composite cases described earlier, a nurse's observations could help determine the basis for Ms. Jackson's increased confusion, which could be the result of dehydration. The nurse should assess her hydration status and screen her for malnutrition. Medical and social service staff should be consulted about her deteriorating mental status. A referral for dental care may increase her comfort and allow her to eat a wider variety of foods. A nutrition consultation with follow-up to develop a health care team approach to better support Ms. Jackson is indicated. Staff should encourage her to eat meals in the dining room. Leaving her room may help her eat a more varied diet.

Mr. Brinker may not appear to be at risk for malnutrition because of his recent weight gain, but his limited food choices put him at risk for inadequate nutrient intake. He may benefit from more structured meals and increased socialization at mealtimes. Nurses could provide information about community programs that provide communal or home-delivered meals, as well as senior transportation services that would help him be more independent. Use of a simple educational tool could help Mr. Brinker and his son select more nutritious foods. Increased activity may help him lose weight and lower both his blood pressure and his blood glucose. His nurse should provide suggestions for community programs that have an exercise component geared toward older adults. Mr. Brinker would also benefit from a consultation with an RDN who can assess his needs for education and other interventions.

Resources for nurses. For information about nutrition, nutrition programs, and meal plans for older adults, see *Resources*. ▼

For three additional continuing education activities on the topic of malnutrition, go to www.nursingcenter.com/ce.

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