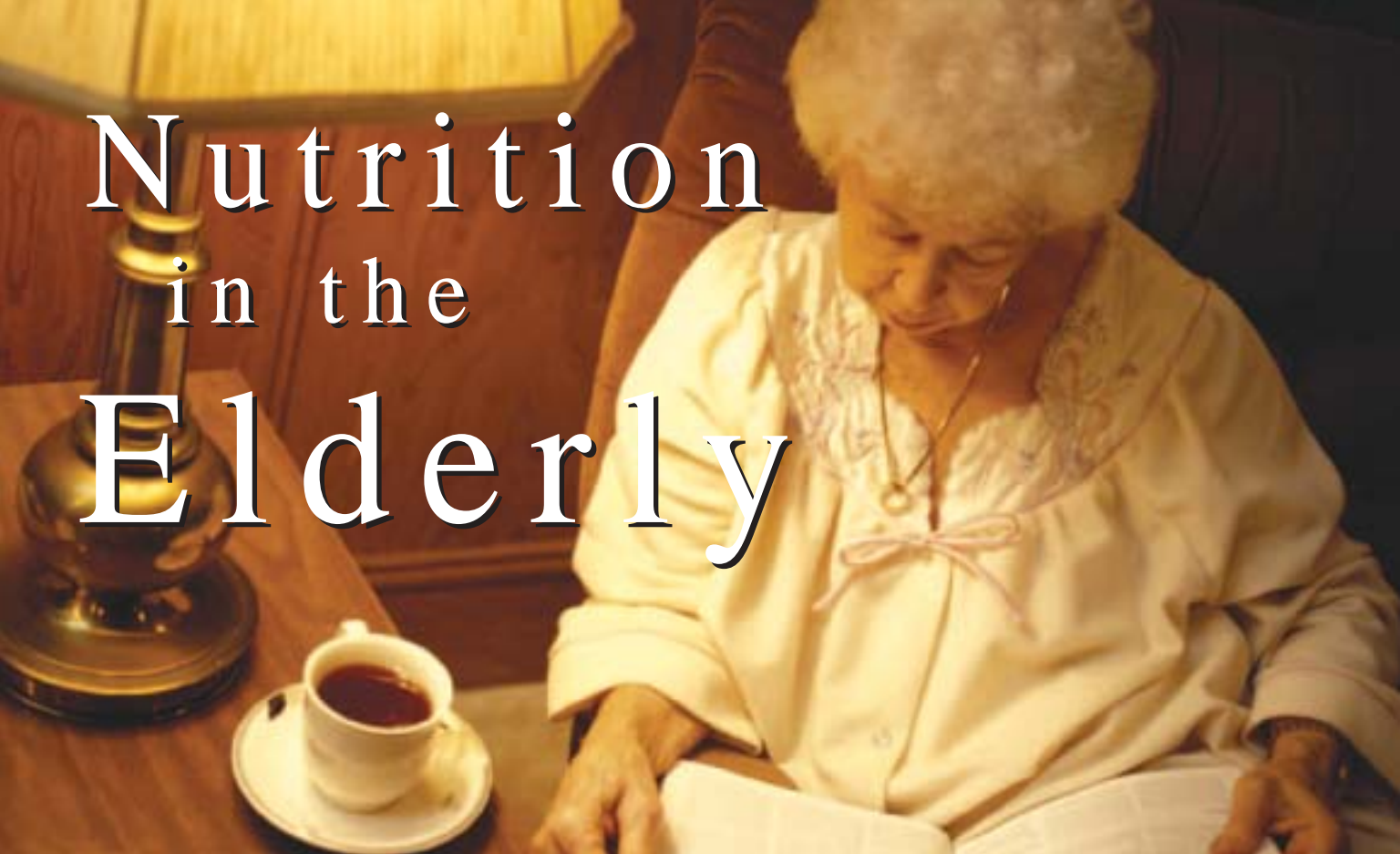


Nutrition in the Elderly



Screening and assessment for malnutrition are critical in order to institute timely and appropriate nutrition intervention in the elderly. There are a number of tools available today to conduct such screening.

By Nahid Azad, MD, FRCPC

Ageing is accompanied by a variety of physiological, psychological, economic and social changes, which may adversely affect nutritional status. Nutritional deficiency is a common and serious problem in older adults. Up to 15% of ambulatory outpatients, 35% to 65% of elderly hospitalized patients, and 25% to 60% of institutionalized older adults, have been reported as malnourished.¹⁻⁴ While some malnourishment stems from underlying illness, much is simply due to inadequate intake, which should be reversible if detected.



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Recommended nutrient intakes

Whether nutrient requirements change with old age remains a controversial issue. While clinical and dietary standards developed for younger people may be inappropriate for older persons, there are few data on nutrient requirements or

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recommended intake for older adults. In 1999, the recommended dietary allowances (RDAs) divided adults into two categories, those 25 to 50 years of age and those 55 and older.⁵

Dietary guidelines for healthy Americans are presented in Table 1 and they address the issue of dietary moderation, together with a variety and balance of nutrients. The chief focus is on limiting the consumption of fat, saturated fat, cholesterol, sugar and salt. These are to be replaced with a diet rich in whole grains, vegetables and fruits. There is some controversy as to whether these guidelines are fully applicable to persons over 70 years of age. Despite favorable results in high-risk individuals, diets very low in fat can produce adverse consequences in the elderly.⁶ A modified version of the food guide pyramid was developed at Tuff's University to reflect the specific nutrient needs of elderly adults.⁷ The base of the 70+ pyramid was narrowed to reflect reduced energy intake among older people. The pyramid also featured "nutrient-dense" foods to maximize the available nutrients per 1,000 kcal and emphasized the importance of fluid needs.

Dehydration, a major problem in older adults, is related to the following physiological changes:

- The kidney's decreased ability to concentrate urine;
- Altered thirst sensation;
- Decreased renin activity and aldosterone secretion;
- Relative renal resistance to vasopressin;
- Changes in cognitive and functional status; and
- Medication side effects.

It is recommended that women over the age of 70 consume 13 g of fiber per day and men

Summary

Nutrition in the Elderly: Where to Start

- Body weight peaks between ages 55 and 65 in women and between ages 34 and 54 in men, only to decrease thereafter. Loss of weight happens at the expense of bodily water and lean body mass.
- The decline in lean body mass and basal metabolic rate, in addition to decreased physical activity, leads to a decrease in energy requirements and, therefore, a decreased food intake.
- Malnutrition can adversely affect the well-being of older persons, causing a decline in functional status and making existing medical problems worse.
- Despite favorable results in high-risk individuals, diets very low in fat can produce adverse consequences in the elderly.
- It is recommended those over the age of 65 take in 1,500 mg of calcium per day — a full 2.5 times the current average intake.
- Nutritional screening checklists and assessment tools that assess the biological and social determinants of nutritional problems have been developed and specifically tailored for older adults.

consume 17 g per day. Several groups of recommendations support the increased consumption of fruits, vegetables and whole grain bread and cereals. This recommendation is similar to that of the National Cancer Institute.⁸

In light of information regarding shifts from macro to micro nutrient intake with age, dietary supplements may be warranted among older adults.⁹ Elements of particular concern include calcium, vitamin D and B12, folate and vitamin E. Optimizing the intake of calcium is an important goal for maintaining mobility and quality of life. Prevention of fractures is one way to maintain mobility. Calcium intake of less than 600 mg a day is common in men and women over the age of 65. It is recommended those over the age of 65 take in 1,500 mg of calcium, a full 2.5 times the current average intake. Additionally, supplementation of vitamin D intake, along with calcium, has been shown to enhance absorption. A recommendation has been made that those aged 55 to 70 years have a daily intake of 400 IU. Those over age 75 should ingest 600 IU per day.¹⁰

Both folate and vitamin B12 are needed to convert homocysteine to methionine. Deficiency of either nutrient can cause an elevation in homocysteine, resulting in an increased risk of cardiovascular disease. Levels of under 400 mcg of folate have been shown to correlate with elevated blood homocysteine levels. Vitamin E has been extensively studied recently, with somewhat mixed recommendations. Areas of particular interest include immune function, dementia and Alzheimer's disease, hip fracture and atherogenesis.¹¹ Treatment guidelines for dementia and Alzheimer's disease recommend the use of vitamin E to improve cognition and assist with slowing disease progression.¹²

Definition of malnutrition

Malnutrition is a state produced by the intake of too few macronutrients (a deficiency of proteins, vitamin and minerals), too many macronutrients (obesity), or excessive amounts of inappropriate substances, such as alcohol. Malnutrition can adversely affect the well-being of older persons, causing a

Table 1

Dietary Guidelines for Healthy Americans

- Eat a variety of foods.
- Balance the food you eat with physical activity.
- Maintain or improve your weight.
- Choose a diet with plenty of grain products, vegetables and fruit.
- Choose a diet low in fat, saturated fat and cholesterol.
- Choose a diet moderate in sugars.
- Choose a diet moderate in salt and sodium.
- If you drink alcoholic beverages, do so in moderation.

Adapted from: Russell RM, Rasussen H, Lichenstein AH: Modified Food Guide Pyramid for People Over Seventy Years of Age. *J Nutr*, Vol 1999; 129:751-3.

decline in functional status and making existing medical problems worse. A relationship has been shown between dietary quality and dependency on activities of daily living among the elderly living in community dwellings.¹³ Undernutrition increases the risk of respiratory infections and cardiac problems, deep vein thrombosis, pressure sores, perioperative mortality and multi-organ failure. In hospitalized patients, a clear correlation has been shown between the parameters reflecting poor nutrition (*i.e.*, cholesterol, albumin, and body mass index [BMI]) and the rate of in-hospital complications, re-admission and mortality ($BMI = \text{weight [kg]}/\text{height [m}^2\text{]}$).¹⁴

Screening and assessment for malnutrition

Screening and assessment for malnutrition are critical in order to institute timely and appropriate nutrition intervention, if needed. In most hospitals in the U.S., nutritional screening is now required within 24 hours of admission in acute-care hospitals, within 14 days of admission to long-term care facilities and on initial nurse visits in home-care settings. The most efficient process is routine screening of all seniors at risk of malnutrition. Patients who are at risk should be assessed comprehensively to determine the cause of the problem and the extent to which they can benefit from intervention. Detailed protocols or clinical pathways are needed for guiding nutritional therapies.

Nutritional screening checklists and assessment tools that assess the biological and social determinants of nutritional problems have been developed and specifically tailored for older adults. The Nutrition Screening Initiative (Table 2) employs the DETERMINE checklist, focusing on *D*isease, *E*ating problems, *T*ooth loss and swallowing difficulties, *E*conomic hardship, *R*educed social contact, *M*ultiple medications, *I*nvuntary



weight loss or gain, *Need for assistance in self-care*, and *Elders at a very advanced age*.¹⁵ Each of these statements represent different common risk factors for malnutrition and are scored in relation to their importance. A cumulative score of six or more, with the higher scores being the worst, suggests a high risk for malnutrition and indicates the need for further evaluation.

Table 2

Determine Your Nutritional Health

The warning signs of poor nutritional health are often overlooked. Use this checklist to find out if you or someone you know is at risk.

Read the statements below. Circle the number in the yes column for those that apply to you or someone you know. For each yes answer, score the number in the box. Total your nutritional score.

	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	2
I eat fewer than two meals per day.	3
I eat few fruits, vegetables or milk products.	2
I have three or more drinks of beer, liquor or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take three or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last six months.	2
I am not always physically able to shop, cook and/or feed myself.	2

Total:

Total Your Nutritional Score

- 0-2 Good! Recheck your nutritional score in six months.
- 3-5 You are at moderate nutritional risk. See what can be done to improve your eating habits and lifestyle. Your local health center, senior nutrition program, senior citizens counter or health department can help. Recheck your nutritional score in three months.
- ≥ 6 You are at high nutritional risk. Bring this checklist the next time you see your doctor, dietician or other qualified health or social service professional. Talk with him/her about any problem you may have. Ask for help to improve your nutritional health.

Remember that warning signs suggest risk, but do not represent diagnosis of any condition.

Adapted from: the Nutrition Screening Initiative — A project of: The American Academy of Family Physicians; The American Dietetic Association; and the National Council on the Aging.

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Table 3

The SCALES Tool for Nutritional Screening

S: Sadness
C: Cholesterol level
A: Albumin <40 g/L
L: Loss of weight
E: Eating problems (cognitive or physical)
S: Shopping problems or inability to prepare a meal

Adapted from: Morley JE: Death by Starvation. A Modern American Problem? J Am Geriatr Soc 1989; 37:184.

The Instant Nutritional Assessment (INA) is one of the simplest screening tools, is easy to use and is popular in many institutions. It depends on evaluating three parameters — lymphocyte count, albumin and weight change per unit of time. To facilitate remembering these three parameters, this tool is often referred to as LAW.¹⁶

The Mini Nutritional Assessment (MNA) is a practitioner-administered, sophisticated screening tool for evaluating the nutritional status of the elderly and is specifically intended for the frail elderly. The MNA test is composed of 18 items and can be performed in less than 15 minutes. It involves a general assessment of health (*i.e.*, questions involving lifestyle, mobility and medica-

tion), a dietary assessment (*i.e.*, questions regarding type and number of meals), anthropometric measurements and a subjective self-assessment by the patient. The results of the MNA test classify the patient as well-nourished, at risk for malnutrition, or malnourished.¹⁷

Morley has developed the malnutrition resource scale (SCALES) to be used as an outpatient screening tool.¹⁸ It has the advantage of being simple and easy to use (Table 3). The scale differs from other available screening tools by incorporating cholesterol levels and emphasizing depression as a major risk factor for malnutrition and death. It also includes an evaluation of serum albumin, weight loss, eating problems and the senior's ability to shop or prepare food. A score of three or more suggests a high risk for malnutrition.

Recently, Beck *et al* validated the Resident Assessment Instrument in a nursing home residence. It demonstrated residents most likely to have protein and energy malnutrition can be identified by the fact that they leave over 25% of their food on their plate. This is a useful warning sign of poor intake. The message from this work is that very simple observations (*i.e.*, food left on the plate) are useful indicators of nutritional risk.¹⁹

Body composition

Changes in stature, weight and body composition over the age of 60 have been well documented.²⁰ Large changes in these measurements are reportedly associated with increased morbidity and mortality in elderly subjects.²¹ In middle age, body composition changes so that muscle mass decreases and fat mass generally increases. In individuals over the age of 70, total water and muscle

mass tend to decline. Many methods are used for assessing body composition. They generally can be divided into direct and indirect techniques. Indirect techniques, such as anthropometric measurements, ultrasound and bioelectric impedance, are easier to use, but provide less specific measurements. Anthropometric measures are non-invasive techniques that provide information on, or an estimation of, body composition, muscle and fat stores. These measurements include weight, height, circumference and skinfold thickness. Anthropometric measurements can be used to monitor interventions, detect advanced malnutrition and predict outcomes.

Weight loss

Body weight declines gradually with age in both sexes. Body weight peaks between ages 55 and 65 in women and between 34 and 54 in men, only to decrease thereafter. Loss of weight happens at the expense of bodily water and lean body mass. This loss is accompanied by a decrease in the basal metabolic rate. The decline in lean body mass, basal metabolic rate, in addition to decreased physical activity, leads to a decrease in energy requirements and, therefore, a decreased food intake. Unintentional weight loss in the elderly, especially in residents of long-term care facilities, correlates with high morbidity and mortality.²² Weight is the cardinal component of any anthropometric measurements. It should be measured on a calibrated scale with attention to edema, ascites and clothing variables. If done accurately, weight (especially paired with height), provides invaluable information about a patient's nutritional status, regardless of the method.

Unfortunately, there is a lack of anthropometric standards for the elderly. Current national reference data for body weight do not extend beyond the age 75 years. Currently, the measure of mid-arm circumference (measured by flexible tape) and triceps skinfold (measured by a caliper) is thought to provide a crude assessment of fat stores and muscle mass. Skinfold thickness is highly correlated with body fat in comparison to densitometry.



Effects of nutritional intervention and outcome in the elderly

The only way to ascertain the benefit of nutritional supplementation on undernourished elderly patients is to carry out prospective randomized controlled intervention trials. Recent reviews of nutritional supplementation in the elderly concluded that, although there is evidence for effectiveness of oral protein and energy supplementation, many of the trials undertaken have been of poor quality with inadequate size, methodology and outcome assessment.

In a review of intervention trials by Corish,²³ one study looked at the effect of overnight nasogastric feeding supplements (1,000 kcal) in elderly women with a fractured neck of the femur. The study showed treatment was associated with improvements, not only in anthropometric and plasma protein measurements, but

also in clinical outcomes, mainly in shortened rehabilitation time and hospital stay. Another hospital study showed a clinical benefit of oral supplements in a randomized controlled group of elderly patients with a fractured femur, which persisted six months after injury. Clinical benefits in a group of elderly inpatients taking oral supplements, as compared to those receiving ward meals only, also demonstrated a clear benefit of nutritional supplements in terms of mortality, hospital stay, morbidity and, probably, pressure sores.

High-energy dense foods led to a 40% increase in energy intake, resulting in an increase in body weight.²³ Moreover, the cost of high-energy food was less than 50% of that same

energy given as an oral supplement. Enteral nutritional support, aggressive oral feeding with high-calorie foods (*i.e.*, sweets and chocolate), the use of tasteless calorie supplements and the discontinuation of restrictive diets have been shown to improve daily energy intake, serum albumin and transferrin levels and nitrogen balance. In a double-blind, placebo-controlled trial, supplementation with micronutrients significantly improved immunity and decreased the risk of infection.



Conclusion

Physical, mental, social and environmental changes that occur with aging may affect the nutritional status of seniors. There is evidence that undernutrition is relatively common in this group and may influence clinical outcomes in those with disease and those undergoing surgery. A major assumption underlying a nutritional screening is that patients discovered to be malnourished or at risk will benefit from being detected. Whereas treatments could normalize only those persons with reversible malnutrition, this subgroup is likely to be large enough to justify a systematic screening process of all older patients.

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