

# Undernutrition in the community

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## SYNOPSIS

**Patients who are undernourished may benefit from dietary modifications, including eating foods with a high energy and protein content. A varied diet including all food groups should ensure adequate intakes of vitamins and minerals. Some patients may need to include nutritional supplements as part of their usual dietary intake and others may require enteral nutrition. A full dietary assessment should be conducted by a dietitian especially if the patient has long-term nutritional problems. Simple nutritional screening assessments, particularly for patients considered at risk of undernutrition, can be effective in reducing the consequences and complications of malnutrition.**

**Index words:** nutritional supplements, food, ageing.

*(Aust Prescr 2001;24:113–5)*

## Introduction

Good nutrition consists of adequate amounts of macronutrients such as protein, fat and carbohydrates, and micronutrients such as vitamins and minerals. Malnutrition is associated with a high burden of illness, poor wound healing and increased morbidity and mortality. It is a hidden financial burden to the community. Screening and early intervention are the key to the management of malnutrition.

## Patient groups most at risk of undernutrition

Poor nutritional status usually results from inadequate dietary intake or malabsorption. It may be related to neurological, psychiatric and other medical problems including polypharmacy. Social factors are also important. The patients most at risk of nutrition-related complications are the elderly (including those with Alzheimer's disease, Parkinson's disease or chronic obstructive pulmonary disease), the disabled who are house-bound, people with chewing and swallowing problems, and patients with HIV/AIDS or cancer. A significant risk factor is living alone, especially for men.

The elderly are particularly at risk of protein-energy malnutrition. The development of a suboptimal nutritional status is a major problem in frail elderly people. Another group of undernourished patients may be young women with restrictive dietary practices. Their diets may be nutritionally inadequate, particularly if they omit all animal products.<sup>1</sup>

## Statistics

Malnutrition is a critical healthcare problem among all age groups, but especially in the elderly where it is a major issue

affecting the allocation of resources in primary care. Approximately 14% of the Australian population are aged 65 years or over, representing almost two million people who may require additional health care as time progresses. Consequently, early intervention may save considerable financial resources in addition to increasing the number of healthy, as opposed to frail, aged people.

In the elderly, poor nutrition is a major health problem which contributes greatly to morbidity and mortality. Poor nutritional status has also been linked with diminished cognitive and physical performance, and a reduced overall sense of physical and mental well-being.<sup>2</sup> Studies on hospitalised elderly patients have shown that early intervention with nutrition support has a positive impact on nutritional status, length of hospital stay/re-admission rates, and clinical outcomes.<sup>3</sup>

## Screening for undernutrition

In the community a full nutritional assessment is not practical but simple screening tools can identify patients at increased risk of poor nutrition (see box). Identification and assessment of patients who are malnourished, or those who are at increased risk, should include clinical assessment and a brief dietary history.<sup>4</sup>

Several assessment tools have been designed including the Nutrition Screening Initiative, Subjective Global Assessment (SGA)<sup>5</sup>, and the Australian Nutrition Screening Initiative. The SGA is a screening tool which has been used in the community. It encompasses previous history and symptomatic and physical

### Nutritional risk screening and monitoring tool

Obvious underweight – frailty?

Unintentional weight loss?

Reduced appetite or reduced food and fluid intake?

Mouth or teeth or swallowing problem?

Follows a special diet?

Unable to shop for food?

Unable to prepare food?

Unable to feed self?

Obvious overweight affecting life quality?

YES to one or more questions indicates nutritional risk. Consider more detailed assessment.

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parameters. This helps to determine whether nutrient assimilation has been restricted as a result of decreased food intake or due to a medical condition. The SGA is one of the most well established and validated nutrition assessment tools and is an appropriate gold standard against which other nutrition screening tools may be compared. There is good correlation between the SGA and other parameters such as biochemical and anthropometric measures of nutrition.

Other screening tools with high sensitivity may not demonstrate specificity and may assess some well-nourished patients as being at risk of malnutrition (false positives) and a full nutritional assessment would be required. Hence the Australian Nutrition Screening Initiative is a checklist developed to raise awareness of the importance of nutrition and to identify independent older people who may be at risk of poor nutrition. It consists of the 12 most common factors contributing to risk of malnutrition in the older adult.<sup>2</sup> People who are identified as being at risk need an accurate nutrition assessment involving a combination of clinical examination and anthropometric and biochemical measurements.

### Assessment of nutritional status

Body Mass Index (BMI) can be calculated as weight in kilograms (kg) divided by height in metres squared (m<sup>2</sup>). BMI of 20–25 kg/m<sup>2</sup> is acceptable. BMI under 19 kg/m<sup>2</sup> is considered underweight and BMI under 18.5 indicates a significant risk of malnutrition. Although BMI is widely accepted as a measure of body fatness, its use is limited in some groups.

BMI overestimates body fat in very muscular people and can underestimate body fatness in underweight people. Moreover the cut-off points may not be appropriate for different racial groups given that they were originally developed for people of European origin. Measurement of body weight in some patients can also be confounded by changes in body water as a result of underhydration, oedema and ascites.

Changes in weight should also be taken into consideration. A 10% change in body weight in six months is a significant indicator of the risk of malnutrition.

Plasma proteins may be used as markers of malnutrition, but concentrations may be influenced by non-nutritional factors, such as liver disease, sepsis and inflammatory bowel disease. Albumin is a routine marker of undernutrition (chronic protein deficiency) in hospitalised patients. As albumin has a relatively long biological half-life (approximately 20 days), it is not considered a good indicator of short-term protein and energy deprivation.

Other factors in assessment include recent changes in food intake, persistent diarrhoea or vomiting, and a change in the way that clothes fit. Unintentional weight loss is also an important indicator of future nutritional deficiencies.

### Management

Some patients will benefit from non-nutritional interventions, such as medication review. Dental problems may also contribute

to poorer nutrition. Reports show that the majority of those who are edentate experience more eating problems than those who are dentate. Checking if the patient's dentures fit is a simple remedy.

Patients with chewing and swallowing problems should be referred to a speech pathologist for assessment and to a dietitian for advice regarding texture modification of food and drink. People who have problems preparing food should be referred to occupational therapists for advice regarding appropriate use of utensils and equipment. Home delivered meals may also help.

Patients with severe or excessively restrictive dietary practices may need psychiatric intervention.

### Nutrition intervention

The dietary guidelines for older Australians<sup>6</sup> do not recommend a reduction in total fat intake, as this may not be in the best interests of this group of patients who become frail. They tend to be underweight, and consume foods in smaller quantities than younger age groups. Although energy needs may be lower in this age group than in younger adults due to reduced energy expenditure, it is important to provide advice on foods with a high energy density to help older people meet their dietary requirements.

Nutrition intervention may include modification of the usual diet with high energy and high protein foods, as well as the use of commercial products including dietary supplements. Energy dense foods include margarine, oil, butter and cream. Foods high in protein and energy include full-fat dairy products, eggs, meat and nuts.

Poor dietary intake may also result in vitamin and mineral deficiencies, particularly folate, calcium, iron and zinc. Prolonged or poor storage of fresh foods can lead to a reduction in nutrient content but 'convenience' foods are a useful alternative since frozen, chilled, or packed fruits and vegetables can be a good source of vitamins and minerals.

The amount of iron absorbed from food depends on the source of iron and also on other constituents in the diet. Haem iron is found in food such as meat, liver, kidney, poultry and seafood. Non-haem iron is found in legumes, egg yolk, wholemeal/wholegrain breads and cereals, green leafy vegetables, nuts and seeds.

Haem iron is better absorbed than non-haem iron. Iron absorption is reduced in the presence of tannins (in tea, coffee) and phytates (in unrefined cereal foods). To increase the absorption of non-haem iron it is recommended that foods rich in vitamin C (a reducing agent) should also be consumed at the same time (for example a glass of orange juice with a wholegrain breakfast cereal would substantially increase iron absorption from the cereal).

Low intakes of thiamin (B<sub>1</sub>), riboflavin (B<sub>2</sub>) and niacin have been reported in the elderly. The ability to absorb vitamin B<sub>12</sub> and folic acid also decreases with age. Thiamin is found in cereal foods, meat, pulses, nuts and milk. Riboflavin is found in milk, cheese, eggs, pulses and green vegetables. Nicotinic

acid is found in meat, fish, wholegrain cereals, pulses and nuts. Pyridoxine (B<sub>6</sub>) intakes in the elderly have also been reported to be low although vitamin B<sub>6</sub> is widely distributed in foods such as liver, cereals, pulses, leafy vegetables, and fruits. Vitamin B<sub>12</sub> is found in only animal foods so strict vegans may require a supplement.

As breakfast cereals are now fortified with folate, increasing cereal intake would be a useful suggestion, especially a fibre-enriched variety. Other good sources of folic acid are green leafy vegetables, liver, citrus fruits such as oranges and grapefruit, and nuts.

Calcium absorption can be impaired by fibre and phytate in cereals and vegetables. As vitamin D is also required for the absorption of calcium, house-bound or institutionalised people may not be able to obtain vitamin D by the action of sunlight on the skin. They will need a good supply of vitamin D in their diet from sources such as oily fish, and fortified cereals and margarines.

Marginal intakes of calcium contribute to osteoporosis, a disease already prevalent in the elderly. Good sources of calcium include dairy products, calcium-fortified soy products, fish with edible bones and green leafy vegetables.

If the intake of zinc is marginal it can have a major impact on food intake by reducing taste sensation. As taste is already impaired in the elderly this can seriously affect food choice. Zinc is readily available in animal foods especially red meat, liver, fish and eggs. If this is not feasible, then the use of a multivitamin and minerals supplement may be a suitable alternative. However multiple medication use is prevalent in this population and another 'pill' may add to the confusion.

Fruits and vegetables are the main sources of vitamin C in the diet. Potatoes contain moderate amounts but as potatoes are eaten in relatively large quantities, they provide a major and significant amount of vitamin C. Some food products have vitamin C added to them (e.g. dehydrated potatoes, fruit drinks).

### **Nutritional supplements**

One of the simplest ways to increase the energy and nutrient content of the conventional home diet is by the use of nutritional supplements.

A range of supplements is available in the form of liquids and powders; some products can provide a single nutrient, whereas others are nutritionally complete and provide both macro- and micronutrients. Most supplements are available in a variety of flavours to aid compliance and help avoid flavour fatigue.

Some supplements are available as thickened liquids and texture-modified semi-solids in order to meet the nutritional requirements of patients who have difficulty in swallowing. Specialised supplements are also available such as those which provide semi-elemental nutrition for patients with impaired gastrointestinal function. Some oral dietary supplements can also be used as a complete tube feed.

### **Enteral nutrition**

If daily nutritional requirements cannot be met orally, then enteral feeding may be considered. Oral intake may still occur simultaneously with tube feeding and some patients may prefer overnight tube feeding with food intake during the day. Enteral feeding may be continued until oral intake is considered adequate. Standard enteral feeds provide 1 kcal/mL and more energy dense alternatives are also available.

The most commonly used methods for providing enteral nutrition are via nasogastric and gastrostomy feeding. Patients who require long-term enteral feeding can be considered for gastrostomies such as percutaneous endoscopic gastrostomy which has become a safe and well established technique.

### **Monitoring**

Multidisciplinary team management with regular review and continued monitoring are important in any nutritional intervention. As weight gain is achieved, dietary nutritional supplements may need to be gradually reduced, provided adequate nutrition can be maintained by food intake. Changes in food intake should be noted and advice from a dietitian should be sought for a complete nutritional assessment.

### **REFERENCES**

1. Donovan UM, Gibson RS. Dietary intakes of adolescent females consuming vegetarian, semi-vegetarian, and omnivorous diets. *J Adolesc Health* 1996;18:292-300.
2. Lipski PS. Australian Nutrition Screening Initiative. *Aust J Ageing* 1996;15:14-6.
3. Larsson J, Unosson M, Ek AC, Nilsson L, Thorslund S, Bjurulf P. Effect of dietary supplement on nutritional status and clinical outcome in 501 geriatric patients – a randomised study. *Clin Nutr* 1990;9:179-84.
4. Schneider SM, Hebuterne X. Use of nutritional scores to predict clinical outcomes in chronic diseases. *Nutr Rev* 2000;58:31-8.
5. Detsky AS, McLaughlin JR, Baker JP, Johnston N, Whittaker S, Mendelson RA. What is subjective global assessment of nutritional status? *J Parenter Enteral Nutr* 1987;11:8-13.
6. NHMRC. Dietary guidelines for older Australians. Canberra: AGPS;1999.

### **FURTHER READING**

Bunney C, Bartl R. Reduce the risk – a common sense guide to preventing poor nutrition in older people. Gosford, NSW: Nutrition Department, Central Coast Area Health Service; 1996.

Wahlqvist ML, Wattanapenpaiboon N. Antioxidant nutrients. *Aust Prescr* 1999;22:142-4.

### **Self-test questions**

*The following statements are either true or false (answers on page 131)*

3. Zinc deficiency can alter taste sensation.
4. A low serum albumin is not a good indication of short-term protein deprivation.