

## *Prescribing for the Elderly*

# Nutritional disorders in the elderly

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*Overnutrition and undernutrition can contribute to many common diseases or disorders in the elderly. Some conditions may take years to develop, while others can occur within weeks. Protein energy malnutrition may be the direct result of poor diet, or it may develop indirectly when other illnesses increase nutritional requirements beyond usual needs. One of the most easily recognised consequences of overnutrition is obesity, which is a risk factor for other diseases such as non-insulin-dependent diabetes mellitus, cardiovascular disease and hypertension. If nutritional disorders are identified and managed appropriately, the health of many elderly people can be significantly improved. (Med J Aust 1995; 163: 376-381)*

**T**he elderly are more susceptible to nutritional disorders because of age-related changes and the increased prevalence of disease. Ageing is associated with a decline in energy expenditure, which is often accompanied by a reduction in food intake. Also, aged people are likely to be taking multiple medications and are susceptible to particular psychological and social problems, all of which can influence nutrition. Tackling the problem of nutritional disorders in the elderly requires routine assessments of elderly patients and implementing proper management procedures when indicated.

### Eating disorders

A subset of elderly people show disturbances in body image,<sup>1</sup> have distorted food beliefs and may also have eating disorders, including an inappropriate sense of need for weight change (personal unpublished data).

Distorted food beliefs may arise from confusing messages carried by the media. For instance, aged people with a history of coronary heart disease may avoid nutrient-dense foods such as meat, eggs or dairy products because of a fear of cholesterol or fat. Others may become vegans in the belief that this will protect them against cancer.

Eating disorders like anorexia nervosa may be associated with depression, which is not uncommon among the elderly. Certain drugs, such as digoxin, may depress appetite, leading to anorexia nervosa-like symptoms.

Social isolation, physical handicaps, emotional difficulties, impaired cognitive function and dementia can all give rise to inappropriate eating behaviours, so it is important to be aware of the possibility of eating disorders among the elderly, and of ways in which aspects of nutritional status can be assessed (see Box 1).

### Protein energy malnutrition

Protein energy malnutrition (PEM) is probably the least recognised, yet one of the most important, nutritional disorders among elderly people, both in the community and in institutions. It is closely related to the nutritional disorders of immunodeficiency and is associated with an increase in the incidence of infectious disease,<sup>5</sup> impaired wound healing<sup>6</sup> and osteoporosis (dietary deficiencies in calcium and protein which accelerate the rate of bone loss). PEM may be the result of abnormal eating behaviours. It is a risk factor for falls in the elderly<sup>7</sup> and it may decrease the efficacy of medication in critically ill patients. It may also affect drug metabolism and therefore dosage.

PEM frequently goes unnoticed in the elderly because being very thin is often mistakenly viewed as part of the normal ageing process. Further, some elderly people may be overweight while being protein malnourished.

Diagnosis of PEM usually requires a thorough nutritional assessment. Collecting information about usual food intake, meal patterns and appetite is most important. Methods for collecting this information will depend on the memory and the ability of the person being interviewed to accurately quantify and record food consumption.

Body composition must also be assessed by means of simple anthropometric measures (see Box 1).

Poor dietary intake may develop as a consequence of depression, social isolation, reduced mobility, medications and so on. Addressing such factors is an important step in the management of PEM. Next, it is essential to ensure that intake of energy, protein and other nutrients is adequate.

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Formula foods that are nutritionally complete and high in energy and protein may need to be given to achieve this goal. The success of nutrition support may depend on concomitant physical activity, as illustrated by the study on strength training in the elderly.<sup>8</sup> Finally, careful monitoring is needed to determine the effectiveness of the intervention.

### Drug interplay

Prescription and over-the-counter medications are taken regularly by many individuals over the age of 65 years. Not only does the frequency and number of drugs taken increase with age, but so does the likelihood of adverse effects.

Various adverse nutritional effects of drugs are shown in Box 2. It must be remembered that the condition or disease for which the drug has been given may itself be modulated by the concurrent food intake pattern (e.g., caffeine-containing foods worsen oesophageal reflux for which H<sub>2</sub>-receptor antagonists are given).

### Obesity

This nutritional disorder is probably the most easily recognised, and is perhaps the most overtreated problem for that very reason. Although obesity is a risk factor for cardiovascular disease, diabetes and hypertension (with the prevalence of such diseases increasing with age), "fatter" elderly people may in fact be more healthy than their thinner counterparts.<sup>9</sup>

Treating obesity in the elderly may be an important health consideration; however, the degree and type of obesity, as well as its management, need to be carefully examined. Low energy (kilojoule) diets can cause problems if they result in micronutrient deficiencies.

Abdominal obesity is associated with a number of metabolic disorders, such as insulin resistance, hyperinsulinaemia, glucose intolerance, dyslipoproteinaemias, as well as hypertension. It has been suggested that abdominal obesity contributes to an increased flux of free fatty acids, which may be responsible for several of these metabolic disorders.<sup>4</sup> The elderly are more inclined to develop abdominal obesity because fat deposition becomes more central with ageing. Perhaps a decline in physical activity is a principal contributor to this phenomenon. It is best managed by reducing fat intake and exercising regularly.

### Cardiovascular disease

While cholesterol remains a risk factor for coronary heart disease and cardiovascular disease, other nutritional factors are important in the development of these diseases.<sup>10</sup> Fuels like glucose favourably affect the metabolism of the heart when oxygen supplies are reduced. Diets high in carbohydrates and low in fat increase the uptake of glucose by the myocardium and reduce the uptake of fatty acids. Omega-3 polyunsaturated fatty acids (found in fish, lean meats and some plant foods) favourably change the membrane composition of the heart muscle, so reducing the risk of electrical instability and abnormal heart rhythms. Furthermore, omega-3 polyunsaturated fatty acids help to reduce platelet

## 1: Interpreting equations and formulas used in assessing nutritional status in the aged

Body mass index (weight [kg]/height* [m] <sup>2</sup> )	
Desirable	24–29 <sup>2</sup>
Grade 1 malnutrition	17.0–< 18.5 <sup>3</sup>
Grade 2 malnutrition	16.0–< 17.0 <sup>3</sup>
Grade 3 malnutrition	< 16.0 <sup>3</sup>
Unintentional weight change	
2% in one week	Requires action
5% in one month	
20% loss	
Measures of skeletal mass	
Mid arm muscle area (MAC – [3.14 x TSF/10]) <sup>2</sup> /12.56	
Possible PEM	< 44 cm <sup>2</sup> (men)
	< 30 cm <sup>2</sup> (women)
Abdominal circumference (measured midway between lower bony rib cage and iliac crest in standing position)	
Abdominal obesity	95 cm (women) <sup>4</sup>
	100 cm (men) <sup>4</sup>
Abdominal hip ratio (abdominal circumference/hip circumference at maximal gluteal protrusion)	
Abdominal obesity	> 0.85 (women)
	> 0.95 (men)
Serum albumin (in the absence of liver dysfunction, renal or gastrointestinal protein loss)	
< 35 g/L	PEM

PEM = protein energy malnutrition; MAC = mid arm circumference (cm); TSF = triceps skinfold (mm).

\* Height can be estimated by measuring arm span if necessary, as this is the same as normal height.

aggregation, which can contribute to atherosclerosis and thrombosis.

Low intakes of dietary fat (particularly saturated fat) can help to reduce or prevent elevated cholesterol levels. Additionally, eating a wide variety of plant foods offers protection in at least two ways: firstly, the variety of colours consumed can protect low density lipoprotein (LDL) cholesterol against oxidation damage (the pigments are transported with the cholesterol); and, secondly, high density lipoprotein (HDL), the protective form of cholesterol, is increased with intakes of dietary fibre.

A study of survivors of myocardial infarction showed that serum lipid lowering with clofibrate and nicotinic acid reduced mortality in patients over 60 by 28%.<sup>11</sup> Similarly, the Scandinavian Simvastatin Survival Study showed improved survival in patients with coronary heart disease treated with this drug, although in patients aged 60 or more years the reduction in the relative risk of mortality and morbidity was less than in younger patients.<sup>12</sup>

### Diabetes

The prevalence of non-insulin-dependent diabetes mellitus increases with increasing age, and its prevention is closely

## 2: Drugs and their possible adverse nutritional effects

### Alimentary system

#### Antacids

Aluminium hydroxide      Osteomalacia; phosphate deficiency.  
Sodium bicarbonate      Sodium and magnesium overload.

#### Laxatives

Mineral oil      Osteomalacia, hypocalcaemia, malabsorption or faecal loss of vitamins A, D, E, K and carotene.

Phenolphthalein      Malabsorption or faecal loss of vitamin D and calcium.

Senna      Potassium deficiency.

#### H<sub>2</sub>-receptor antagonists

Cimetidine      Megaloblastic anaemia, vitamin B<sub>12</sub> deficiency.

Ranitidine      Vitamin B<sub>12</sub> deficiency.

### Cardiovascular system

#### Antihypertensives

ACE-inhibitor (Captopril)      Altered taste, which may lead to weight loss.

Hydralazine      Vitamin B<sub>6</sub> antagonism (may result in peripheral neuropathy).

#### Diuretics

Thiazides }      Deficiencies or increased excretion of potassium, magnesium, zinc (zinc deficiencies  
Frusemide }      result in reduced appetite and hypogeusia).

#### Cardiac inotropic agents

Digoxin      Anorexia, nutrient depletion.

#### Hypocholesterolaemic agents

Cholestyramine      Anaemia, steatorrhoea, malabsorption of fat-soluble vitamins (A, D, E, K), folate, vitamin B<sub>12</sub>, carotene, iron and calcium.

### Central nervous system

#### Antidepressants

Amitriptyline }      Increased appetite, leading to obesity.  
Lithium carbonate }

Imipramine      Constipation, obesity.

Phenelzine (MAO inhibitor)      Vitamin B<sub>6</sub> deficiency, constipation.

#### Sedatives

Benzodiazepine      *Sedatives can cause confusion, drowsiness which may result in missed meals.*

Phenytoin      Altered taste, reduced appetite, constipation.

Phenytoin      Possible folate depletion.

#### Analgesics

Aspirin      Iron deficiency, anaemia, increased excretion of vitamin C, possible reduction in serum folate.

Codeine      Constipation.

### Musculoskeletal system

#### Anti-inflammatory agents

Sulfasalazine      Decreased folate absorption.

Colchicine      Malabsorption or faecal loss of fat, vitamin B<sub>12</sub>, carotene, sodium and potassium.

Prednisone      Osteoporosis, weight gain.

#### Antirheumatoid agents

Penicillamine      Zinc deficiency, vitamin B<sub>6</sub> antagonism.

### Infections/infestations

#### Antibiotics

Tetracycline      Effects on iron, vitamin C.

### Neoplastic disorders

Methotrexate      Megaloblastic anaemia, folate deficiency.

linked to nutrition and reduction of abdominal obesity (see above). A number of nutritional strategies can assist in its management. Eating a wide variety of foods, such as plant foods, fish (2–3 times per week), drinking alcohol in moderation (not more than 40 g for men or 20 g for women), and avoiding large meals, will help to control blood glucose and blood lipid levels. Foods that are low in salt and fat and have a low glycaemic index (i.e., provoke a small blood glucose response in comparison with that provoked by glucose or white bread) will help reduce complications of diabetes (e.g., baked beans on toast or lentil soup).

### Osteoporosis

The rate of bone loss is accelerated with inappropriate diet, lack of vitamin D (sunlight), impaired renal function, certain medications and immobility. The elderly are at greater risk of calcium deficiency because they have reduced ability to absorb calcium. Other nutritional factors contributing to osteoporosis include high intakes of sodium, caffeine and alcohol. Further, institutionalised or housebound elderly are at greater risk of vitamin D deficiency if they are not regularly exposed to sunlight. As cod liver oil and oily fish (salmon, tuna and sardines) are the best sources of dietary vitamin D, their use may reduce fracture risk.

It has been proposed that secondary hyperparathyroidism contributes to bone loss in the elderly, with parathyroid hormone secretion being stimulated by a negative calcium balance (resulting from a calcium or vitamin D deficiency). The risk of hip and other non-vertebral fractures was significantly reduced among a group of elderly women who were given a daily supplement of vitamin D (20 µg) and calcium (1.2 g).<sup>13</sup>

The incidence and complications arising from hip fracture may be partly attributable to malnutrition.<sup>14</sup> PEM is a risk factor for falls in the elderly,<sup>7</sup> and the accompanying nutrient deficiencies, particularly calcium and protein deficiencies, are associated with osteoporosis.<sup>15</sup> Nutritional supplementation can reduce the length of stay in hospital, and improve the clinical outcome for elderly people with a fractured neck of femur.<sup>14,16</sup>

Anticonvulsants, corticosteroids and certain kinds of laxatives (containing mineral oil or phenolphthalein) have an adverse effect on bone mineral status. It may not be possible to discontinue the use of anticonvulsants and corticosteroids, so it is important to encourage a favourable diet and lifestyle. Calcitriol and calcium were shown to prevent bone loss from the lumbar spine in patients receiving corticosteroid therapy.<sup>17</sup>

### Immunodeficiency

The extent to which ageing is responsible for the decline in immune function is still unknown, although immunological changes that occur when there are deficiencies in one or more nutrients are well documented. Those that occur with PEM include atrophied lymphoid organs that are depleted of lymphocytes and a decrease in the proportion and absolute number of T cells.<sup>18</sup>

The elderly are more prone to infection, especially respiratory infection, than younger adults. Infection places extra stress on nutritional requirements, which in turn leads to a further deterioration in nutritional status, and so the cycle continues. Good nutrition can help to reduce this risk.

### Water imbalance

Thirst responses may become inadequate with advancing years and this, combined with a diminishing ability to concentrate urine, can upset fluid and electrolyte homeostasis in elderly people.<sup>19</sup> The aged therefore need to be aware of the importance of drinking sufficient quantities of fluid daily to prevent dehydration.

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