NUTRITIONAL STATUS OF ELDERLY PEOPLE

What does it mean?

Ageing is often accompanied by the occurrence of illness, which may increase the risk of nutritional deficiency. There is a need to compress the period of morbidity experienced by the elderly to minimise the occurrence of nutritional deficiency and improve well-being. Altered nutritional status is associated with the pathogenesis of a number of common diseases of the elderly (Table 1). Thus, it would appear that nutritional modulation represents one possible approach to successful ageing.

Table 1. Putative role of nutrients in the pathogenesis of some diseases in the elderly [adapted from (53)].

Nutritional problem	**Disease**
Protein-energy malnutrition	Immune deficiency; anaemia; fatigue; increased infection
Hypodipsia	Dehydration; orthostatic hypotension; hypernatremia
Excessive energy intake	Obesity; hypertension; non-insulin dependent diabetes mellitus (NIDDM)
Decreased calcium and vitamin D intake and decreased sun exposure	Osteopenia; osteomalacia; hip and vertebral fracture
Low-fibre diets	Diverticulitis; constipation
High-fibre diets	Volvulus
Zinc deficiency	Immune deficiency; anorexia; poor wound healing
Folate and vitamin B_{12} deficiency	Anaemia; dementia
Iron deficiency	Anaemia
Excess sodium intake	Hypertension; cerebrovascular accident

A complete assessment of nutritional status includes determination of dietary intake, anthropometric assessments, biochemical measurements, haematological measurements, immune function measurements, various functional assessments (eg, muscle, visual) (1) and clinical assessment.

Nutritional physiology in the elderly

Food and nutrient intake in the elderly can affect and be affected by diminished physiological reserve.

Physical fitness

It becomes increasingly difficult to obtain an adequate nutrient intake once the energy intake is reduced below 1200 calories (5000 kJ) (2). Thus, it is very important for elderly people to be as physically active as possible, so that they can eat enough without being in positive energy balance and becoming overweight.

Changes in gastrointestinal function

The most common oral problem of the elderly is inadequate dentition. There may also be some atrophy of taste buds, with a loss of the sensation of taste and smell (3). These impairments of taste could be compounded by certain drugs which could also suppress appetite (penicillins, digitalis, spironolactone, and the anticonvulsants) (4).

Ageing is also accompanied by atrophy of the gastric mucosa, with decreased production of mucoprotein intrinsic factor needed for absorption of vitamin B_{12} (5). Problems of malabsorption may be caused by a colonisation of the small bowel (6). Constipation and anal sphincter incontinence can each have consequences for food intake.

Changes in endocrine function

Older human subjects can maintain either cortisol or growth hormone production in response to insulin-induced hypoglycaemia (7), but growth hormone response to vigorous exercise is less in untrained elderly individuals than in younger subjects (8). This observation may have implications for maintenance of preferred body composition and the value of exercise.

With ageing, glucose tolerance declines, especially in Western populations (9). This decline in glucose tolerance is associated with hyperinsulinaemia resulting from the higher glucose concentration and/or impaired clearance of insulin due to decreased regulation of receptors (10). Several studies have postulated that obesity and reduction in physical fitness may also be related to glucose tolerance.

Changes in neurological function

Dementia can lead to indifference to food, failure to remember to eat, failure to recognise the need to eat and behavioural abnormalities, such as holding food in the mouth and apraxia of eating (11). Changes of smell (hyposmia) and taste (hypogeusia) can also lead to anorexia in the elderly.

Weight loss is common in association with dementia. In a study of patients with Alzheimer's disease or multi-infarct dementia, energy and/or protein malnutrition was found in 50% (12). It has been demonstrated that neuropeptide Y and norepinephrine in the central nervous system, which have been shown to play a role in initiating feeding in animals, are reduced in patients with Alzheimer's disease.

Problems in assessment

Food intake assessment is a crucial part of the assessment of the nutritional status of the elderly, both in research and clinical practice. Difficulties arise in estimating the actual food intake of the elderly who have progressive decline in memory. Moreover, the knowledge of actual nutrient requirements of the aged remains uncertain. Food intake data is also essential for the planning of effective nutrition intervention and education programmes to improve the nutritional and health status of the elderly.

Quantitative dietary assessment may be made using a diet record or diary and a diet history which enquires about usual food intake across the day. It is clear enough that every method of dietary assessment has its own advantages and disadvantages.

Assessment of food intake by personal food diary (PFD) or a doctor's history of usual food intake (HUFI). Probably the most common way in which doctors presently evaluate food intake is to ask a few key clinically relevant questions (Table 2).

Table 2. Some key and clinically relevant questions to evaluate food intake in the elderly.

Objective	Question type
Setting the scene & identifying the food pattern	• How is your appetite? • How is your taste? • How is your smell? • Do you eat out? • Do you eat alone? • With whom do you eat? • Who does the cooking? • Do you have meals-on-wheels? • What about the shopping? • Do you eat between meals? If so, what? • What are your favourite foods, beverages? • Where do you see the problems with your eating, if any?
Identifying specific food	• What about fatty foods, fried foods, cooking in oil, fat spread? • Do you eat fruit? Vegetables? What sort? How much? • Do you eat fish? • Do you eat sweets, sweet biscuits, chocolate? • How many cups of coffee, tea, glass of fruit juice a day?
Identifying specific disease eg, osteoporosis, hypertension, etc.	• What do you have in the way of dairy products? Are they low fat? • Do you add salt, cook with salt, soya sauce, monosodium glutamate, bicarbonate soda?

These questions may have implications for counselling, education and monitoring. For many reasons it can be valuable to have a record of the usual food pattern across a week, because:

(1) It documents the current situation and, repeated, provides evidence for change. Improvement in food intake is a worthwhile end in itself.

(2) It often reveals problem areas not otherwise evident eg, use of sweet biscuits as an additional source of fat, purchase of fried rather than grilled fish, lack of fruit consumption.

(3) It is an instrument for behaviour change (if the patient keeps a record).

(4) It can be linked to other records for clinical analysis eg, physical activity, home blood glucose monitoring in diabetes, changes in blood pressure or plasma triglycerides with alcohol consumption.

The choice between a PFD or doctor's HUFI depends on the following:

(1) Need for an instrument of behavioural change (applies particularly with obesity).

(2) Whether information needs to be documented at first encounter with doctor (then doctor needs to take HUFI).

(3) Time. It is time-saving for the doctor to have the patient bring a PFD recorded over the week before the visit.

The way to most effectively use a PFD is to:

(1) Make a copy for your own notes of what the patient brings.

(2) Highlight (using a marker pen) the problem areas on your and the patient's copy. Make annotation about action required on patient's copy as part of a contract with the patient.

(3) Focus on the clinical problem in question when highlighting and annotating the document.

(4) Look for opportunities for preventing other nutritionally-related problems, as time and patient receptiveness allows.

(5) If in doubt about interpretation, have a book of food information at hand (13) and check it with the patient. Learning together is persuasive and reinforcing for the patient, and good for the doctor.

Nutrient requirements of the elderly

There are problems in establishing recommended dietary intakes (RDIs) for the elderly as there are for other age groups. Firstly, for the elderly, present needs may reflect cumulative problems. It is arguable to what extent this is the case, but theoretically it is a problem. Secondly, there may be effects of the ageing process itself, whatever that might be, on nutrient requirements and tolerance. It might be even more important at the upper end of nutrient intakes than at the lower end. Thirdly, there may be effects on nutrient requirements of age-related disease, as opposed to the ageing process. Fourthly, the elderly population is one of great heterogeneity for social and economic reasons, and because of differing levels of physical activity. For countries like the United States, Canada and Australia, cultural heterogeneity, which we think we address clinically, but which we actually

address very poorly, and the disparity between chronological and biological age. We need better markers of biological age before nutrition and ageing achieve any good degree of definition.

The development of RDIs for elderly people (Table 3) has largely depended on extrapolations from younger people. Furthermore, the development presumes the intake of apparently healthy elderly people, but it is only relatively recently that good population-based studies of what healthy elderly people actually eat have become available. Another aspect of the development of RDIs is that intake levels should look at functional outcomes and health problems. RDIs also can take account of when specific nutrient deficiencies arise.

Table 3. Recommended nutrient intakes for the elderly (based on current NH&MRC recommended dietary intakes for use in Australia).

	Men 64+yrs	**Women 54+yrs**
Energy (MJ/day)	7.4–11.0	6.5–9.3
Protein (g)	55	45
Vitamin A (μg retinol equivalent)	750	750
Thiamin (mg)	0.9	0.7
Riboflavin (mg)	1.3	1.0
Niacin (mg niacin equiv.)	14–17	10–12
Vitamin B_6	1.0–1.5	0.8–1.1
Total folate (μg)	200	200
Vitamin B_{12} (μg)	2.0	2.0
Vitamin C	40	30
Vitamin E (mg α-tocopherol equiv.)	10.0	7.0
Zinc (mg)	12	12
Iron (mg)	7	5–7
Iodine (μg)	150	120
Magnesium (mg)	320	270
Calcium (mg)	800	1000
Phosphorus (mg)	1000	1000
Selenium (μg)	85	85
Sodium (mmol) (mg)	40–100 920–2300	40–100 920–2300
Potassium (mmol) (mg)	50–140 1950–5460	50–140 1950–5460

Physical activity

Exercise has other benefits in later life. A recent study from Australia shows that a three-month, very modest exercise programme in elderly people improved profile of mood states (POMS). The patient's perception of effort using the Borg rating scale is recommended to determine the level of intensity (Table 4) (14).

Table 4. Borg rating scale for perceived exertion.

Score	Level of intensity
3	Extremely light
5	Very, very light
7	Very light
9	Light
11	Neither light nor heavy
13	Heavy
15	Very heavy
17	Very, very heavy
19	Extremely heavy

Anthropometry

Height. Whenever possible, the height can be measured in an upright position, with bare heels close together, legs straight, arms at the sides, and shoulder relaxed. When stature can not be measured, knee height, a sitting or recumbent measurement, can be used to estimate stature (15). Bed- or wheelchair-bound elderly whose height can not be obtained should have arm span measured. Arm span is usually the same as normal height achieved and can substitute for it (16).

Weight. Body weight is a critical measurement in assessing nutritional status (17). Weight is a gross measure of the mass of body tissues and fluids, and serial measures of weight can record changes in these body constituents. Increases in body weight may indicate developing obesity or oedema, whereas decreases in body weight can signify the presence, severity or progress of disease or a nutritional disorder. Ambulatory elderly persons can be weighed on an upright balance beam scale or microprocessor controlled digital scale. If an elderly person can only sit, a movable wheelchair balance beam scale can be used, and bed scales are available for measuring the weight of bedfast patients (15).

Midarm muscle circumference. Midarm muscle circumference has been used as an index of muscle loss in the elderly. Studies performed in New Zealand report that this measurement is a useful predictor of subsequent mortality in the elderly (18). Triceps, subscapular and other skin-fold thickness can be used to estimate adipose tissue mass.

Immune function

Immunological tests are not specific for individual nutrient deficiencies although they may reflect them; many other factors, such as emotional and physical stress (surgery, anesthesia, major burns, neoplasia and viral infections) affect immunocompetence. Correct interpretation requires information on nutritional intake, concurrent illness, exposure to infectious agents, duration of the deficit, and genetic factors. Available indices of immune function include: total lymphocyte count, T-cell subsets, and delayed type hypersensitivity (DTH).

Haematology

There is good evidence from various studies that the prevalence of nutritional anaemia is significantly increased with age (4). Three pathological nutritional anaemias are iron deficiency, folate deficiency and vitamin B_{12} deficiency anaemias. The fourth nutritional anaemia in the elderly is that due to protein-energy malnutrition (PEM). In the interpretation of the cause of anaemia in the elderly, multiple factors must be considered, both intake and loss, as well as chronic disease. The features of anaemia of chronic disease are identical to those of PEM. The tests often used to assess folate and vitamin B_{12} status are serum folate and vitamin B_{12} concentrations. Serum folate values reflect acute folate status but provide no information on the size of the folate tissue store (19). Serum folate concentrations fluctuate rapidly with recent changes in folate intakes and with temporal changes in folate metabolism.

Hypersegmentation of neutrophils in the peripheral blood is a characteristic early feature of folate and vitamin B_{12} deficiency (20), and this phenomena even precedes the development of macrocytosis (21).

The specific nutrient deficiencies which ultimately result in anaemia may have functional consequences ahead of it. For example, with iron deficiency, cognitive function might be impaired without anaemia being in evidence (22).

WHAT DO ELDERLY PEOPLE EAT?

One of the few studies of a representative sample of elderly people's eating habits is the Victorian Nutrition Survey 1987 which was conducted as a joint initiative of the Food and Nutrition Project and the CSIRO Division of Human Nutrition.

Some of the interesting findings with ageing include: reduction of meat (especially beef and veal) consumption, increased fish consumption (especially for men), reduction of certain dairy products (eg, whole milk) consumption, relative stability in potato consumption and increased consumption of certain vegetables (eg, leafy greens) especially in women.

These data are cross-sectional and when the elderly are found to eat more or less of a particular commodity, it may be the cohort effect or retention of the practice in which they engaged earlier in life. This itself could be important in anticipating what elderly people might be eating in the future and the possible impact on their health. As an example, take-away foods and take-away meat dishes are much more extensively used by present-day younger people than by older people. Alternatively, elderly people may respond to declining levels of physical activity by eating less of particular kinds of food so that their energy intake more correctly matches their energy expenditure. What they selectively reduce may have considerable importance for health. For example, if they reduce selectively nutrient-dense

items such as lean meat or eggs, they could be nutritionally disadvantaged. In the interpretation of such data, we have to consider both the absolute intake of a particular commodity (the nutrient content) and its relative intake to energy intake. In some physiological respects, the absolute intake is important (for example in achieving an adequate intake of vitamin C), in other respects, the relative intake is important (for example the contribution of saturated fat intake to overall energy intake).

There is a considerable need for Australian prospective studies of individuals, their food intake, and their associated health pattern with advancing years.

CULTURAL AND SOCIAL DETERMINANTS OF EATING BEHAVIOUR

Cultural factors

Food habits are fundamentally cultural habits; that is, the individual's cultural background and orientation, as well as his or her personal characteristics and perceptions, determine what his or her dietary patterns will be.

Social factors

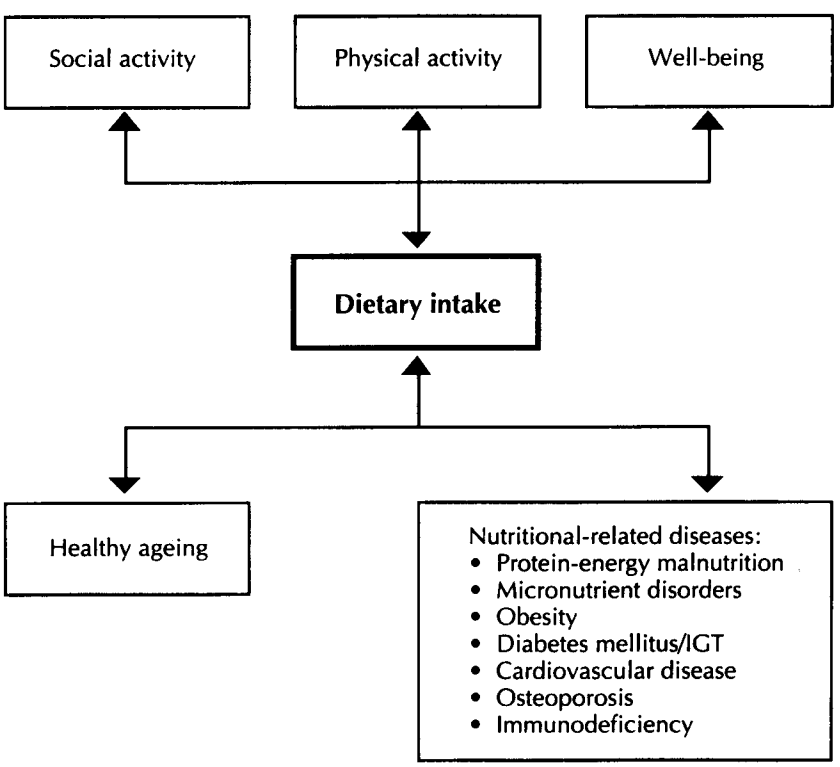

Figure. The interaction of social, psychological, physiological factors with dietary intake and possible outcomes.

The relation of social, psychological and physiological factors to dietary intake in a representative sample of 2195 people aged 65 years and over in Adelaide was studied by Horwath (23). Some interesting findings were:

a. Elderly men living alone were more likely than those living with spouses to have poor dietary habits.

b. Living alone had the greatest negative impact on the dietary habits and estimated nutrient intakes of men. Women living alone had, on the other hand, estimated nutrient intakes equal or greater than those of women living with a spouse.

c. Lifestyle, as measured in terms of participation in a variety of different social and physical activities, was the best predictor of dietary intake; a varied lifestyle being associated with a varied diet.

Wilhelmsen's group in western Sweden showed that mortality rate decreases as social activity increases (24).

The interaction of social, psychological and physiological factors with dietary intake and possible outcomes are summarised in the Figure (23,25,26).

NUTRITIONALLY-RELATED HEALTH PROBLEMS IN THE ELDERLY

Protein-energy malnutrition

The elderly are at increased risk for protein-energy malnutrition (PEM). Many factors are involved in the development of this disease (Table 5) (27). In the hospitalised elderly, the risk of the development of PEM becomes more prominent. This condition is caused by the fact that hospital patients often seem to eat less than they do when healthy despite their higher requirement for protein, energy, and perhaps other essential nutrients (28).

Clearly, early detection of this disease prior to acute illness may offer the ability to intervene in a preventive manner to avoid some of the complications seen in patients with severe PEM.

Table 5. Factors that could contribute to protein-energy malnutrition in the elderly.

Sociological factors	Socioeconomic status
	Housing
	Residency
	Marital status/children
	Erroneous belief & food faddism
	Season
Psychological factors	Ethnic/cultural factors
	Cognitive functioning
	Sense of control and health-related behaviour
	Hypochondriasis and perceived intolerance
	Food preferences
Physiological factors	Health
	Motor performance & mobility
	Senses
	Dental status
	Chronic disease
	Drugs

Vitamin problems in the elderly

There are vitamins of particular interest in later life, and some important fields for vitamin research.

Because of sunlight in Australia, vitamin D is not much of a problem, but elderly people in institutions need assessment of sunlight exposure as well as vitamin D intake. Vitamin E status (as tocopherols) has generally been presumed satisfactory, but a new literature is emerging on tocotrienols as inhibitors of HMG-CoA reductase which may remain relevant for the elderly. Again, with vitamin K, the recognition of a range of vitamin K dependent proteins, including at least two in bone, raises the need to examine vitamin K status in its own right in the elderly, rather than indirectly and exclusively through coagulation factors (29). Where we might encounter vitamin problems in the elderly is where there are two or more risk situations (Table 6).

It should be noted that adequate energy intake is required to meet recommended vitamin intake. Thus a decrease in food energy intake with advancing years is a dubious proposition; at the very least it creates the need to increase nutrient density.

Table 6. Elderly at risk of vitamin deficiency.

1. Physically inactive
2. Precarious food supply
3. Alcohol excess
4. Decreased interest in food:
   - Diminished taste and smell
   - Loneliness
   - Depression
5. Disease which alters nutrient status
6. Medication which interacts with nutrients or decreases appetite

Immunodeficiency

The impairment of the immune response by protein-energy malnutrition and deficiencies of several individual nutrients was first recognised in children (30). In the elderly, similar phenomena have taken place: a progressive decline in immunological competence as well as in lean body mass. Many studies support the evidence that individuals above the age of 65 years have obvious or subclinical deficiencies (31). While there are many aetiological factors for the immune function impairment in the elderly (Table 7) (32) including the ageing process itself, it has been suggested that malnutrition partly contributes to immunologic senescence, particularly cell-mediated immunity (33).

Table 7. Possible causes of impaired immunity in the elderly.

Causes	Underlying condition
Immunosenescence	Normal ageing
Nutritional factors	Protein deficiency Zinc deficiency Selenium deficiency Vit. A deficiency
Intercurrent illness	Virus infection Congestive cardiac failure Poor peripheral circulation Chronic renal failure Diabetes mellitus Immobility Dehydration
Iatrogenic	Corticosteroid Cytotoxic Nonsteroid antiinflammatory drugs Antibiotics (doxycycline, fusidic acid, erythromycin, cefoxitin)

If nutritional deficiencies are related to impaired immune function in older people, correcting the deficiencies should partly improve this function. The provision of protein-energy supplement and correction of deficiencies of iron, zinc, selenium, vitamin C, E and B complex are associated with improved immune responses (34,35,36,37). Moreover, nutritional support for the high-risk elderly also improves antibody response, and perhaps protection, following the administration of influenza, pneumococcal and tetanus immunisation (38).

Chronic diseases

Cardiovascular disease

(See booklet No 1 — Heart Disease, Heart Failure and Hypertension in the Elderly)

Osteoporosis

Osteoporosis is a major public health problem in Western society. In 1986 in Australia 10 000 hip fractures were recorded and patients with these fractures occupied up to 315 000 bed days in that year. It is projected that, by the year 2011 the incidence of hip fracture will increase to 18 000 per year resulting in an increase in surgical bed days to 579 000 (39). This condition will increase the burden of health services. There are various factors contributing to negative calcium balance in the elderly (Table 8).

Table 8. Factors contributing to negative calcium balance in the elderly.

Menopause
Inadequate dietary calcium intake
Calcium malabsorption
Nutrient–nutrient interaction: Protein intake Phosphorus content Caffeine intake Alcohol intake Sodium intake Fibre intake
Immobilisation
Lack of exercise
Confounding metabolic disorders
Medications

Food intake and bone density. Calcium intake is only one food factor among many to be considered in the prevention and management of osteoporosis. For example, both endogenous (Boron study) and exogenous oestrogen status (phytoestrogens) can be affected by food choice (40,41).

Prevention. There are a number of possible approaches to maximising peak bone density and minimising menopause and age-related bone loss (Table 9) (42,43).

Table 9. Some possible approaches to prevent osteoporosis.

1. Oestrogen therapy
2. Increase calcium intake to 1500 mg per day
3. Exercise, particularly weight bearing activity
4. Reducing lifestyle risk factors: • stop smoking • reduce alcohol consumption

Treatment. The objectives of treatment in established osteoporosis are to prevent further bone loss and to replace bone already lost. Some agents have been shown to increase the density of bone (Table 10) (44).

Table 10. Treatments of osteoporosis.

1. Calcium supplement
2. Sex hormone replacement:
   - Oestrogen therapy
   - Testosterone therapy
3. Anabolic steroid
4. Fluoride treatment
5. Vitamin D supplement (calcitriol)
6. Calcitonin and biphosphonates

Obesity

There are limited data on morbidity and mortality of obesity in the elderly. Many data show that it is more common for the elderly to be underweight than overweight (45). Moreover, obesity in the elderly is less worrying than in younger age groups (46).

Obesity is caused by excessive energy intake over energy output. In terms of energy output, there is a small decrease in the basal metabolic rate with advancing age, as well as a marked decrease in energy expenditure for activity. On the other hand, total energy intake is also decreased in the elderly. Thus, there should be an adjustment between energy intake and energy expenditure in the elderly, preferably with the least possible reduction in either.

Management. In the management of obese elderly, it must be kept in mind that loss of body weight can mean loss of lean mass due to the limited activity of the elderly. Therefore exercise programmes have a potential role in the management of obesity in the elderly. In most cases, a walking programme is the easiest to institute. Diet in older subjects should never be less than 1200 cal/day (5000 kJ/day) in order to avoid the development of nutrient deficiencies (13). In any case, multivitamin and trace element supplementation may be necessary. Sufficient fluid ingestion should be maintained for those with the problem of hypodipsia. Behaviour modification also plays a substantial role in the management of obese elderly. In general, drugs should be avoided in the elderly, and there seems little reason to utilise drug therapy for obesity in the elderly.

Diabetes mellitus/Impaired glucose tolerance

With ageing, glucose tolerance is reduced. A number of physiological changes of ageing have been linked to impaired glucose tolerance (IGT), notably changes in body composition with increased adiposity particularly central obesity (47) and reduction of physical activity. Clearly, nutritional factors play a role in developing adiposity, which is related to glucose intolerance and to overt diabetes.

One major component in the development of glucose intolerance is insulin resistance (9). Also contributing to the glucose intolerance of ageing is impairment in the second phase of insulin release, the complete physiologic significance of which has not been entirely understood. Furthermore, there may also be changes in the processing of insulin, resulting in increased release of relatively bioinactive products, notably proinsulin.

Recently, the role of micronutrients, such as zinc, manganese and chromium, in the pathophysiology of diabetes in the elderly has gained more interest. Diabetes compounds the risk of micronutrient deficiency (eg, zinc deficiency) by increasing glycosuria, which increases the urinary loss of zinc (48). This condition will compromise the immune system and healing process of leg ulcers which often exist in the elderly with diabetes.

Problems of management. The maintenance of ideal body weight is obviously desirable in the management of all patients with diabetes. Careful consideration should be implemented in the weight management of the elderly with noninsulin dependent diabetes and who are overweight, since some elderly are at risk for malnutrition.

Although the goal of diet management is clear, ie, reduction of plasma glucose, triglyceride and very low-density lipoprotein (VLDL) (49), controversy exists whether a high-carbohydrate and low-fat diet or high-fat (with special emphasis on mono- or poly-unsaturated fat) is more beneficial (50). Moreover, for many elderly, diminished taste and smell may complicate the effort of changing the food habits and may be difficult, and hence, will affect diet compliance.

To enhance insulin sensitivity, exercise should complement any dietary programme (51). Aerobic conditioning exercises, such as walking and swimming (or at least exercise in the water) are recommended for the elderly with diabetes or impaired glucose tolerance.

REVERSIBILITY OF IMPAIRED NUTRITIONAL STATUS BY INTERVENTION

Nutritional intervention is an essential method to reverse the impaired nutritional status of the elderly. Primary intervention could promote well-being of the elderly and anticipate future health problems. Following its anticipatory nature, morbidity might be reduced and long-term life-expectancy improved. An approach to nutritional care of the elderly in a primary intervention setting would require that risk factors be identified in the individual or community at large.

Secondary intervention aims to undertake early detection and treatment of nutritionally-related diseases. Early detection of the elderly who are suffering from intercurrent illnesses is mandatory. Intercurrent illnesses and polypharmacy in the elderly can cause the development of borderline deficiency states. For example, vigorous diuresis with frusemide in an older patient with congestive heart failure could contribute to zincuria. This condition can cause profound zinc deficiency, and will impair wound healing (52).

Tertiary intervention would restrict further disability caused by nutritionally-related diseases. Exercise therapy and aggressive nutritional therapy are the cornerstones of this intervention. The frail elderly person with established protein-energy malnutrition may require hospitalisation or admission to a skilled nursing facility. The ability of handicapped or frail elderly to eat can be improved by

the use of specialised eating utensils that have been developed to aid patients with strokes or amputations (53). It is also helpful to look at the ways in which lean mass could be maintained through the supervision of a physiotherapist or physical therapist.

NUTRITIONAL SUPPORT IN THE ELDERLY

Oral nutritional support plays an important role in elderly people with good gastrointestinal function and physical activity. Alteration of the appearance of food could raise the interest of the elderly. Changes of taste and smell of the food can be beneficial for the elderly with hyposmia and hypogeusia. Sip feeding with liquid diet with bland or ground foods should always be considered (28). The addition of a nutrient formula to a liquid diet can increase the elderly patient's mean energy intake significantly and change a negative nitrogen balance to a positive one. Improving the nutrient quality of meals delivered to homes by the meals-on-wheels programme, has been a useful approach to reduce the risk of inadequate nutrition in the elderly (54).

Enteral nutritional support

Indications and contraindications. In general, if the gastrointestinal (GI) tract is functioning, enteral nutritional support is preferred over parenteral therapy. Specific contraindications would include uncontrolled GI haemorrhage, obstruction or fistulas distal to the feeding site, peritonitis, ileus, intractable vomiting or insufficient functional small bowel to absorb the delivered nutrients. Intractable diarrhoea and high risk of aspiration are relative contraindications.

Before administering enteral nutritional support, a number of important factors must be considered in selecting a nutritional formula (Table 11) (55).

Enteral nutritional support should be formulated and designed in relation to the specific needs of the elderly patient. These needs will include physiological needs, physical comfort, safety and psychological welfare.

Table 11. Some important factors to be considered in selecting a nutritional formula.

Patient's nutrient requirements:

- consider formula's ratio of protein to total nonprotein calories.
- consider the requirements for vitamins, essential fatty acids, and minerals.

Patient's metabolic limitation:

- consider disease-specific formula for patient's with metabolic dysfunction, such as those caused by hepatic, renal, or cardiac failure.

Functional capacity of the patient's gastrointestinal tract:

- consider special formulas for patients with severe exocrine pancreatic insufficiency, biliary obstruction, short bowel syndrome, severe mucosal abnormality.

Parenteral nutritional support

Generally, elderly patients who have contraindications or cannot be managed safely and effectively with enteral feedings are potential candidates for parenteral alimentation. In some cases, parenteral alimentation can also be used in combination with enteral therapy.

The route of administration can be through a central or peripheral vein. With the introduction of high energy density lipid emulsions, peripheral alimentation is a preferred method for many elderly patients.

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UPDATE IN

GERIATRIC MEDICINE

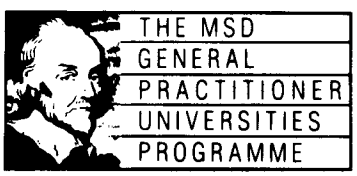
PART 1

Nutrition in the Elderly

ML Wahlqvist, W Lukito

An Overview of Current Knowledge

NUTRITION IN THE ELDERLY



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