

NUTRITIONAL REQUIREMENTS

These are based on the physiological changes that take place during old age. The nutritional requirements change after the age of 30 years.

✓ Energy

After the age of 35 the basal metabolic rate decreases due to reduced muscle mass and other metabolically active tissue mass. Also there is reduction in physical activity which affects the energy needs.

The Fig. 9.1 shows that the percentage of muscle tissue decreases and fat tissue increases as the age increases. Resting metabolic rate decreases approximately 15–20 per cent over the life span, primarily due to changes in body composition and reduction in physical activity.

Sarcopenia, an age related loss in skeletal muscle is the result of a decline in muscle strength. Sarcopenia contributes to changes in gait and balance and loss of physical function. Lean body mass declines approximately 2 to 3 per cent per decade. Body protein level in the healthy elderly is 30–40 per cent less than that in young adults. The average body fat percentage in males increases from about 15 per cent when young to 25 per cent.

The average body fat percentage in males increases from about 15 per cent when young to 25 per cent at the age of 60 years. This change in body fat is attributable to less intense physical activity and to an alteration in testosterone and growth hormone production that affects anabolism and lean tissue growth. Figure 9.1 shows percentage changes in body composition with age.

St. Louis.

The calorie intake should be adjusted to maintain the body weight constant. In the case of obese the calorie intake should be adjusted to reduce the body weight gradually to about normal level.

Energy requirement decreases with age beyond 30 years. The adjustment factor given earlier by FAO/WHO/UNU is adopted for Indians are used for computing the energy requirements of different age periods. ICMR energy requirements of adults of different ages are given in Table 9.2.

Adjustment at different ages of adult males and females with different body

Protein

As people age there is a decrease in skeletal tissue mass. This results in decrease in store of protein provided by skeletal muscle and may be inadequate to meet the needs for protein synthesis. Hence the dietary protein intake is more important to meet essential needs.

A protein intake of 1.0 g per kilogram, the normal adult requirement, is safe during old age. Since caloric requirements are decreased without the corresponding decrease in protein, the food should be protein rich compared to normal adult food. To meet this adequate quantities of protein foods such as milk and curd can be included.

Due to decreased appetite and poor digestion, old people are likely to consume less protein. The serum albumin level is the most reliable indicator of protein nutriture. Deficiency of protein results in oedema, anaemia and lowered resistance to infection. Infection, altered gastrointestinal function and metabolic changes caused by chronic disease can reduce the efficiency of dietary nitrogen utilisation and increase nitrogen excretion.

(Of the total caloric intake 11-12 per cent should be from protein.)

Carbohydrate

An impaired glucose tolerance in the elderly can lead to hypoglycaemia, hyperglycaemia and type II diabetes mellitus. Insulin sensitivity can be enhanced by balanced energy intake, weight management and regular physical activity. Emphasis is placed on complex carbohydrates and controlling the intake of simple sugars. Whole grain cereals and pulses should be included in the diet.

It is necessary that at least 50 per cent of calories are derived from carbohydrates.

Since caloric requirements are reduced, carbohydrates intake is also reduced.

Lipids

Emphasis should be placed on reducing the intake of saturated fat and choosing monounsaturated or polyunsaturated fat sources. Elders who takes sufficient ω -3 fatty acids, have better visual acuity ω -3 fatty acids may help in conditions such as hair loss, impairment of vision, improper digestion and gas, poor kidney function, tissue inflammation, osteo-arthritis, painful joints and muscles and mental depression.

Minerals

Calcium needs during old age increases. Women over 50 years of age who are not receiving estrogens require more calcium as there is increased losses resulting in demineralisation of bone and osteoporosis. For women over fifty, 1000 mg/day is recommended for the following reasons:

- (a) Calcium is available only from a limited number of foods.
- (b) To compensate age-related bone loss and to improve calcium balance.
- (c) To decrease the prevalence of fractures and dental decay.

The physiology of calcium homeostasis in ageing men over 65 is similar to that of women with respect to the rate of bone loss. Calcium absorption efficiency decreases, vitamin D levels decline and hence men also require more calcium.

Milk is an important source of calcium for elderly as it is in the diet of the young. Wise provisions for calcium throughout life may go far in assuring an above average measure of health, an increase in vitality and perhaps in the lengthened prime of life. As caloric requirement decreases, total food consumption decreases, hence calcium supplements are essential.

The iron deficiency seen in the elderly is due to inadequate iron intake, blood loss due to chronic disease and/or reduced non-heme iron absorption secondary to achlorhydria of atrophic gastritis. Iron absorption per se does not appear to decline significantly with age. Vitamin C deficiency may also impair iron absorption.

Mild anaemia affects the health of old people due to less efficient circulation of blood. Iron intake should be adequate to prevent anaemia. Iron requirement can be same as adult man, 30 mg. If there is anaemia, supplemental iron can be given. Consumption of liver once or twice a week is effective in combating such a tendency. Particular emphasis may be placed upon the inclusion of those green leafy vegetables which are good source of iron like mayalu, cauliflower greens and agathi and whole grain or enriched breads and to certain iron rich dry fruits, and use of iron fortified salt.

There is no evidence that moderate sodium restriction will delay or prevent the onset of cardiovascular disease. It is believed that great restriction of sodium should not be attempted except under the advice of a physician in the treatment of specific disease condition. Infact, moderate amounts of salt help to improve the palatability and thus the acceptability to the diet.

Some features of old age such as delayed wound healing, decreased taste sensitivity and anorexia are also findings associated with zinc deficiency. However, healthy elderly subjects have been shown to be in zinc balance despite an apparent low dietary intake. Older people who avoid flesh foods may be at increased risk of poor zinc status.

Vitamins

- Elderly people are at risk for vitamin D deficiency due to decreased exposure to sunlight or decrease in renal mass. Prudent dietary supplementation with calcium and vitamin D improves bone density and may prevent fractures in a healthy elderly population. Recent studies have indicated that people with Parkinson's disease are likely to have low vitamin D levels.

Stress, smoking and some medications can increase vitamin C requirement. The antioxidant vitamins, such as vitamin E, carotenoids and vitamin C have been promoted as agents that enhance the health of the elderly. Vitamin C may be protective against cataract at an intake level of between 150 and 250 mg per day which is possible to achieve from dietary sources alone. Vitamin E has also been found to be a potent nutrient for reducing the decline in cellular immunity that occur in the elderly. Changes in immune system can be overcome by taking 200 mg of vitamin E. Protection from DNA damage enhances the body's self defence mechanisms.

- Requirements for the vitamin B₆ are increased in many elderly persons owing to atrophic gastritis which interferes with absorption. Alcoholic and liver dysfunction are additional risk factors for a deficiency of vitamin B₆. It has a significant role in immune function. Alcoholism is a risk factor for folate deficiency. Severe deficiency of folic acid in the elderly may result in anaemias and elevated serum homocysteine levels a risk factor for cardiac disease. Diets are often lacking in folate, so consumption of folate rich foods should be encouraged.

The usual causes of vitamin B₁₂ deficiency are atrophic gastritis and bacterial overgrowth, which decrease absorption and can lead to pernicious anaemia.

Recent research has shown that increased serum levels of vitamins B₆, B₁₂ and folate confer protection against elevated serum homocysteine, an independent risk factor for cardiovascular disease, depression and certain neurologic deficits.

Supplementation with vitamins, carotenoids and polyunsaturated fatty acids provides protection against ultraviolet light. An increase in delayed type hypersensitivity skin responses after



✓ Fibre

Fibre stimulates peristalsis. There is great enthusiasm to encourage the consumption of fibre containing food but any increase should be gradual otherwise bowel discomfort, distension and flatulence will result. While rough fibre, bran and mature vegetables are not advised for the aged, the fibre of tender vegetables, fruits will make easier the passage of the food mass down the intestinal tract.

Fibre also helps in reducing cholesterol which may reduce the incidence of atherosclerosis. Excess of fibre may reduce the absorption of iron and certain trace elements.

Diseases like diabetes, atherosclerosis, hypertension, cataract formation, Parkinson's disease and cancer and disability disorders like bone fractures, arthritis and strokes may affect nutrient requirements, intake, digestion, absorption, metabolism and excretion.