

Role of Nutrition in Geriatric Patients: A Review

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Abstract

Nutrition is an essential component of health. It is essential to have thorough knowledge of daily dietary requirements in geriatric patients for the maintenance of good oral and general health. Generally as the age advances teeth are lost, along with the diminished olfactory and gustatory receptors. Various factors like physical, social, functional and pharmacological factors are responsible for the malnutrition in the geriatric patients. The nutritional status should be assessed and nutritional strategies should be made to boost immunity and improve nourishment in denture wearers.

Keywords: Diet; Geriatric; Nutrition.

Introduction

A correct diet must provide for the maintenance of the body as well as energy requirements, for growth and reproduction. The average caloric requirement of the adult male is 3,000 daily.[2] There are six major classes of nutrients: carbohydrates, fats, minerals, protein, vitamins, and water. These nutrient classes can be categorized as either macronutrients (needed in relatively large amounts) or micronutrients (needed in smaller quantities). The macronutrients include carbohydrates (including fiber), fats, protein, and water. The micronutrients are minerals and vitamins.

Malnutrition is more common in elderly persons than in younger adults. Ageing itself, however, neither leads to malabsorption nor to malnutrition with the exception of a higher frequency of atrophic gastritis in older persons. Malnutrition in elderly people is therefore a consequence of somatic, psychic or social

problems. Typical causes are chewing or swallowing disorders, cardiac insufficiency, depression, social deprivation and loneliness.[1]

As the age advances and the teeth are lost, the chewing efficiency is also depleted. Recent studies suggest that the risk of malnutrition is higher among elderly patients wearing complete denture and that limited nutritional intake is more likely to be related to compromised body index (BMI) than any other factor.[3]

It has been suggested that poor oral health and decreased ability to chew have a profound influence on food selection, diet and thereby the nutritional status of the individual.[4] Maintenance or re-establishment of masticatory function is an integral part of the medical health care of these patients, with the aim of improving their nutritional status and quality of life.[5] A balanced diet with appropriate quantity of all the nutrients especially proteins, calcium and vitamin D are required for the maintenance of good health in geriatric patients.

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Quality and quantity of the constituents of food

The food can be divided into mainly two types:

1. *Primary food* (Protein, fat and carbohydrate)

- Protein, fat and carbohydrate are consumed in the ratio of 1:1:4 in India.
- 3,000 calories are provided by 1,00 grams of protein, 100 grams of fat and 400 grams of carbohydrate. 3,0000 calories are provided by 1,00 grams of proteins, 100 grams of fat and 400 grams of carbohydrate.
- Although the 1:1:4 ratio is prevalent in this country still wide variations of carbohydrate and fat may occur without harm.
- It is advisable that 10%-15% of the total calories should be obtained from protein, 20%-35% from fat and 50%-60% from carbohydrate.

2. Vitamins and Minerals

Fruits, vegetables and cereals are chief sources of mineral elements such as Calcium, Phosphorus, Iron Iodine, Magnesium, Copper, Sodium chloride, Vitamins, Water.[2] As the person becomes older the daily dietary requirement of certain vitamins and minerals also changes. Calcium, Iron, Vitamin D, A,C,K become more important in elderly people.[32] Elderly people are particularly at risk of marginal vitamin and mineral deficiencies and early recognition of malnutrition is very important in preventing diseases, maintaining a healthy immune system and increasing lifespan.[33]

Factors affecting nutrition of geriatric patients

As a person ages, he undergoes numerous changes that affect the nutritional status of a person. The factors that are responsible for malnutrition in the elderly are:

- *Physical factors:* poor dentition and ill-fitting dentures or age-associated changes in taste and smell may influence food choice and limit the type and quantity of food eaten in older people.[23]

Association between nutritional status with and without dentures

Various studies have been carried out to see whether there is any difference in the dietary patterns of an edentulous patient wearing complete denture. It was observed that despite the highly significant improvement in masticatory ability after the optimisation of the dentures, no general improvement regarding the nutritional status was observed.[10] In another study complete denture wearers were compared to implant supported denture wearers, it was found that Complete denture users can be more susceptible to malnutrition when compared with implant-supported dentures users and this may be because of the increased ability of chewing different types of food in the latter group.[11]

In another study it was seen that the prosthetic rehabilitation of the edentulous patients with complete dentures, along with the dietary counselling, improved the nutritional status of these patients. Prosthetic rehabilitation of the edentulous patients with complete dentures, along with the dietary counselling, improved the nutritional status of these patients.[12]

- *Social factors:* depression, anxiety, poverty, social isolation and loneliness can undermine the desire to prepare and eat food and lead to decreased food intake, weight loss, anorexia, morbidity and mortality in elderly people.[22-23]
- *Functional factors:* Certain functional disabilities like arthritis, stroke, vision and hearing impairment, Parkinsonism can indirectly affect the nutritional status of geriatric patients.[22]
- *Pharmacological factors:* drug induced vitamin and mineral deficiencies can lead to a host of symptoms, including anorexia, bone pain, confusion and malaise this leading to malnutrition.[24]

Continued physical activity and good nutritional status are important determinants

of physical and cognitive function. It is possible that some of the decline in cognitive function associated with aging is preventable or reversible with improved vitamin nutrition, especially vitamin B-12, vitamin B-6, and folate.

Dietary advice for geriatrics

A diet for old people should consist of 6 small meals, instead of 2 or 3 large meals. This helps digestion and reduces the levels of stomach acid. The way foods are cooked also play an important role and therefore, the elderly should mainly eat foods that are baked, grilled, roasted or boiled. In a diet for people of old age, foods that are high in fats and sugar should be limited, though not necessarily eliminated. Hence chips, sodas, sweets, cakes, chocolates, cookies pies and other such foods should be eaten only once in a while. However, not every senior person should follow a high-fiber and low fat diet. People who are prone to infections or other immunity related problems, as well as a poor appetite should choose a diet that is high in nutrients, such as vitamins, minerals, proteins and so on.

A diet rich in vegetables, fruits and other foods are helpful. The food pyramid helps in choosing the right kind of foods. The base of the pyramid comprise of cereals. About 6-11 servings of cereals are recommended. Complex carbohydrates, such as whole grains, oats and rye are preferred more, as the fibre helps in relieving constipation, which is typical of old age. Vegetables and fruits provide phytonutrients helpful in overcoming diseases. Three to five servings and 2-4 servings are recommended respectively. About 2-3 servings each of meat, poultry and fish and milk and related products prove beneficial. These supply the essential protein and other minerals essential for the various body complications.

Daily multivitamin or trace mineral supplement that includes zinc and selenium, with additional vitamin E to achieve a daily dose of 200mg/day is helpful to reduce the risk and reverse some of the immune dysfunction associated with advanced

age.[26]

Nutritional assessment of geriatric patients

- *Dietary assessment:* Twenty-four hour recall is commonly used and is based on an interview during which the patient recalls all food consumed in the previous 24 hours.[13-14]
- *Clinical assessment:* The general impression is a wasted, thin individual with dry scaly skin and poor wound healing. The hair is thin and nails are spooned and depigmented. Patients complain of bone and joint pain and edema. Specific nutritional deficiencies are associated with specific clinical signs.[13]
- *Screening tools:* The Malnutrition Universal Screening Tool (MUST) is a five-step screening tool to identify adults who are malnourished or at risk of malnutrition.[13-15] It consists of three components: BMI, history of unexplained weight loss, and acute illness effect. Studies have shown that it has a high predictive validity in the hospital environment (length of stay, mortality in older people, and discharge destination in orthopedic patients).[13-16]
- *Anthropometric assessment:* The Quetelet index relates weight (kg) to the square of the height (m²), which enables calculation of body mass index (BMI).[13-18]
- *Biochemical markers:* Serum proteins synthesized by the liver have been used as markers of nutrition albumin, transferrin, retinol-binding proteins and thyroxine-binding prealbumin.[14-17]

Treatment of geriatric patients

As the age advances the nutritional requirement also changes in the geriatric patients as they become more prone to certain diseases like cancer, cardiovascular disease, diabetes, osteoporosis, sarcopenia, cataract,

muscular degeneration and infections.[19] Certain interventions are suggested like resistance training, placebo activities, nutritional supplement and placebo supplement.[20] It is seen that depletion of certain vitamins causes or contributes to certain types of dementia, then clearly, adequate supplementation of those vitamins can be utilized as a remedial intervention and continued use of these supplements should serve to lessen the risk of relapse.[21]

The food intake can be increased by making the food more palatable. Certain flavor enhancers can be added that amplify the intensity of food odor that can be useful in the patients with hyposmia.[27] Liquid supplements are preferred over solids as gastric emptying time of liquids is quicker.[9-28] Thus the total intake in terms of quantity can be increased.

Several drugs can promote weight gain like Mirtazapine that is used to treat depression, can increase the appetite and help in weight gain.[29] Megetrol that is used to treat cachexia in patients with AIDS or cancer has produced weight gain. Lower dosage may be effective to produce weight gain in elderly people.[9-30] Cyproheptadine is an antihistaminic and antiserotonergic medication that causes a mild increase in appetite.[9-31]

Certain physical exercises should be asked to perform that can help to increase the appetite of a patient. Even though the drugs can promote weight gain they should be avoided as far as possible as the long term effect of drugs are still not known.

Conclusion

The widespread prevalence of dental problems that lead to tooth loss is often seen in the elderly people. The perceptual changes alter the taste and texture preferences as the gustatory and olfactory receptors also get diminished with age. It is important on the part of a dentist to identify the malnourished patients and provide nutritional guidance to them. A dentist should be well versed with the nutritional deficiency signs and symptoms. Provision of dentures can improve the nutritional status of geriatric patients. The nutritional status should be assessed and proper dietary advice should be given to the patients that can help in increase of weight of geriatric denture wearer patients. A healthy balanced diet is recommended for the maintenance of general over all health of patients. Dentures help in providing nutrition to the elderly who have lost teeth by improving the mastication and assimilation of food.

Nutrient	50-74 yrs		≥ 75 yrs	
	Male (73kg)	Female (63kg)	Male (69kg)	Female (69kg)
Protein (g)	63	54	57	47
Energy(J)	9623	7531	8368	7112
Vitamin A(RE)	1000	800	1000	800
Vitamin D	5	5	5	5
Vitamin E	7	6	6	5
Vitamin C	40	30	40	30
Folate (µg)	230	195	215	200
Vitamin B ₁₂ (µg)	1.0	1.0	1.0	1.0
Calcium (mg)	800	800	800	800
Phosphorus (mg)	1000	850	1000	850
Magnesium (mg)	250	210	230	210
Iron (mg)	9	8	9	8
Iodine (mg)	160	160	160	160
Zinc (mg)	12	9	12	9
Thiamine (mg)	0.9	0.8	0.8	0.8
Riboflavin (mg)	1.2	1.0	1.0	1.0
Niacin (NE)	16	14	14	14
n-3 PUFA (g)	1.3	1.1	1.1	1.1
n-6 PUFA (g)	8	7	7	7

Nutritional Deficiency signs and symptoms[8]

Symptom or Sign	Possible Nutritional Deficiency	Other Possible Causes
General Symptoms and Appearance		
Fatigue	Protein-energy, iron, magnesium, potassium, vitamins B1, B12 and other B vitamins and vitamin C	Many physical illnesses including hypothyroidism, cardiac failure, anaemia, chronic fatigue syndrome and depression
Loss of appetite	Zinc	Many chronic illnesses
Pica eating non-nutritive substances	General malnutrition and possibly iron, calcium, zinc, vitamins B1 - thiamine, B3 - niacin, C and D	Normal in infants under 2 years of age, pregnancy especially in young women, mental illness
Loss of taste	Zinc	Common cold, many nasal disorders
Cold intolerance	Iron	Hypothyroidism, anaemia and reduced cardiac output
Pale appearance due to anaemia	Iron, folate and vitamin B12	Excessive bleeding and haematological disorders
Carotenoderma - yellow discolouration of the skin noticeable on the face and trunk	Protein-energy and zinc	Dietary carotenoid excess especially in women, hypothyroidism
Diffuse hyperpigmentation	Protein-energy	Addison's disease and haemochromatosis
Muscle wasting e.g. clothes appear too big, loss of limb musculature	Protein-energy	
Loss of height and excessive curvature of the spine	Calcium and vitamin D	Increasing age and disease-related osteoporosis
Mouth		
Sore tongue	Iron, vitamin B12, B2, B3 and possibly other B vitamins	Excessively hot drinks and oral disease
Cracking and peeling of skin on the lips	Vitamin B2 - riboflavin	Excessive exposure to cold or windy weather
Cracking at the corners of the mouth	Iron, vitamin B2 - riboflavin possibly other B vitamins	Poorly fitting dentures, eczema infection with candida albicans
Recurrent mouth ulcers	Iron, vitamin B12, folate and possibly other B vitamins	Coeliac disease, Crohn's disease recurrent herpes and oral disease
Enlarged veins under the tongue with micro-haemorrhages	Vitamin C	Smoking and old age
Smooth, shiny and sore tongue: atrophic glossitis	Iron, vitamin B12 and folate	

Nutritional recommendation for the elderly

The recommended intakes are generally based on those for younger populations adjusted for age related changes, such as decline in basal metabolic rate and reduced physical activity. The recommended nutrient intakes (RNIs) have changed very little since 1983, except that for vitamin D, which has doubled. The increase from 2.5 to 5 μ /d.[6]

The effect of calcium and vitamin D dietary supplements on post extraction alveolar bone

resorption was reported. Mean alveolar bone loss for patients receiving the supplement was 36% less than that for patients receiving a placebo medication.[7]

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