Review Article

Role of Nutrition Assessment and Dietary Counselling in Geriatric Denture Population- An Overview
Manu Rathee, Shefali Singla, Mohaneesh Bhoria, Renu Kundu,
1- Senior Professor and Head, 2- Professor, 3- Demonstrator, Department of Prosthodontics, Post Graduate Institute of Dental Sciences, Pt. B.D.Sharma University of Health Sciences, Haryana, India. 4- Dentist, Haryana Civil Dental Services, Haryana, India.

Abstract
Nutrition is the science of how the body utilizes food to meet requirement for development, growth, repair and maintenance. A variety of physiologic and psychosocial changes occur with aging that detrimentally impact nutritional status and general health of geriatric denture population. An understanding of nutritional status, requirement and systemic/oral factors influencing nutrition intake will assist dental clinician in identifying the risk and further referring to dietician. This paper provides an overview on the factors affecting nutritional status, and the phases of assessment of nutritional status of geriatric denture population. Hence, it is recommended that dietary analysis and counselling should be integral part of comprehensive geriatric denture population assessment.

Keywords
Denture; Diet Counselling; Malnutrition; Nutrition

*Author for correspondence:
Manu Rathee, Senior Professor and Head, Department of Prosthodontics, Post Graduate Institute of Dental Sciences, Pt. B.D.Sharma University of Health Sciences, Haryana, India. Email; ratheemanu@gmail.com
Background

Nutritional problems of geriatric may result from the aging process, associated disease, interactions with medications, or combination of these (1). Among nutritional problems, protein energy malnutrition affects about 2% to 4% of the geriatric population. Inadequate intakes of folic acid, vitamin D, vitamin B6, calcium, vitamin B12, and zinc have all been documented in population over age 60 years (2). Most common reason is a general decline in food intake that leads to multinutritional deficiencies (3).

General factors affecting nutritional status

a. Physio-Cognitive factors:
Declines in physical and cognitive status often increase with age. Declines in gastric acidity also often occur with age, and may affect from 10% to 15% of persons over age 60 years. This hypochlorhydria results can cause malabsorption of vitamin B12. Vitamin B12 deficiency, in turn, can result in megaloblasticanemia, gastrointestinal symptoms, neuropathy, and cognitive impairment (4). Vitamin D deficiency is also common in the elderly such as insufficient sun exposure, decline in synthesis of vitamin D through impaired kidney or liver function to activate vitamin D. Impairment in the function of the intestinal track secondary to disease, medications can cause malabsorption (5) (6).

b. Psychosocial factors:
It has been found that there is increased risk of malnutrition among geriatric population living alone, and are physically handicapped with insufficient care (7).

c. Functional factors:
Functional disabilities such as arthritis, stroke, or vision or hearing impairment can affect nutritional status indirectly (8).

d. Pharmacologic Factors:
Drugs can affect the absorption and utilization of some vital nutrients. Prescription drugs are the primary cause of gastrointestinal disturbances, xerostomia, taste loss, and interference with nutrient absorption and utilization. These conditions can lead to nutrient deficiencies, weight loss, and ultimate malnutrition (1).

Oral Factors Affecting the Nutritional Status

A myriad of oral condition has been stated that affect nutrition in geriatric.

a. Dental status:
Dentate status can affect diet, nutrition status, and general health. The role of nutritional factors in the development and prevention of tooth loss and oral infections becomes increasingly important as the number of older individuals maintaining good dentate status continues to increase (9) (10).

b. Xerostomia:
When saliva levels decline, teeth become more susceptible to dental caries and associate with increased periodontal disease. Xerostomia can also impair complete denture retention and poses difficulties in chewing and swallowing that can adversely affect food selection and contribute to poor nutritional status (2).

c. Dental diseases:
With the increase in the elderly population, greater numbers of teeth are being retained till old age. Hence, the elderly show evidence of root caries, periodontal disease and exacerbate by nutritional deficiencies and vice versa (11).
d. *Gustatory and olfactory function:*

Decreased function may be result of health disorders, medications, oral hygiene, denture use, and smoking. The principal taste problem associated with aging is inappropriate tastes sensation rather than loss or diminution of function (12).

**Effect of Dentures on Food Choices, Diet Quality and General Health**

A complete denture can have an impact on taste, as hard palate contains taste buds, and chewing ability. Masticatory ability determined by degree of dental impairment and food selection. Masticatory efficiency in complete denture wearers is approximately 80% lower than in people with intact natural dentition. Other factors that affect chewing ability include mobile teeth, bone resorption, reduced sensory perceptions, and motor impairment (13).

The effect of dentures on nutritional status varies greatly. Some individual compensate for decline in masticatory ability by considering processed or cooked foods rather than fresh and by chewing longer before swallowing. Others may eliminate entire food groups from their diets. The number of oral problems including limited chewing ability was the most important predictor of weight loss. Intake of vitamin A, calcium and fibres also declined as the number of teeth decreased. Also, exchanging optimal complete dentures for implant-supported dentures has not resulted in significant improvement in food selection or nutrient intake (14) (15).

**Role of Clinician and Dietician in Geriatric Nutritional Status**

It involves the screening procedures to rectify the risk factors that could compromise nutrition followed by the dietary counseling, through consult with registered dietitian, to motivate and institute appropriate eating habit and promote diet adequacy (16).

Assessment can be done through the Food Guide Pyramid, whenever possible. (Figure 1)

1. **Assessment of Nutritional Status:**

Assessment of Nutritional status encompasses:

*Clinical Assessment:*

A well-structured case history may be useful in assessing nutrition status. It involves routine assessment such as general examinations, systemic and oral manifestations, unintentional weight loss, and associated reduction in appetite. Case history may also reveal associated physiologic, psychosocial, functional and pharmacological factors in nutritional deficiencies.

*Anthropometric Evaluation:*

This includes the relationship of height to weight, Centile charts, Body Mass Index.

*Biochemical Test:*

Blood and urine investigations can be used to evaluate body mineral levels, total protein, albumin, cholesterol, body glucose level etc.

2. **Triphasic Nutritional Analysis:**

This is the three phase nutritional evaluation of geriatric population.

*Phase 1:*

It encompasses obtaining information from medical-social history. While assessing clinical signs of deficiency selected anthropometrical measurements are conducted and the adequacy of dietary intake can be assessed. Hence, a qualitative dietary assessment is required.
• Qualitative Dietary Assessment:
  This determines what kind of diet individual is having now, in the past and any recent changes diet. This can be accomplished through questionnaire based on assessment. If potential nutritional problems detected the nutritional evaluation should progress to phase 2. However, phase 1 can be concluded after enough information is available to ensure a rational nutritional therapy; the nutritional assessment should be terminated (17).

- Semi quantitative Dietary Analysis:
  Nutrient status of all diet consumed during a 3-5 days period are calculated using food composition tables, or computer assisted nutrient analysis programs. Average calorie and nutrient intakes, then calculated and compared with normal value range.

- Biochemical Assessment:
  Blood tests are useful aid in providing definitive information on the nutritional status.

**Phase 3:**
This phase is reserved for more complex nutritional problems and should be accomplished under the direction of a physician, includes comprehensive nutritional biochemical assays of blood, urine as well as tests of metabolic and endocrine function (18).

**Dietary Guidance for Geriatric Denture Population.**
Prosthetic reconstruction can requires a series of appointments, dietary analysis and counseling can be easily incorporated into the treatment sequence. The clinician should advice patient to master the complex masticatory movements in reverse order. Hence, first few days swallowing should be practiced, such as liquid diet should be prescribed for first few days after insertion of denture. The use of soft foods is advocated for the next few days and a firm or regular diet can be eaten by the end of the week (19) (20).
Conclusion
Geriatric denture population is particularly vulnerable to compromised nutritional health. This paper provides an overview regarding the risk factors associated with malnutrition in the geriatric population but as noted most important factor to consider is inability to eat and chew food properly. Because dental prosthetic rehabilitation requires a series of appointment, dietary analysis and counselling can be easily incorporated into geriatric treatment planning. The clinician must be aware of beneficial effects of prosthetic treatment and must encourage intervene counteractive dietary guidance. Hence, under individual case scenario, dental and nutritional need may vary and it must be tailored along with dietician to meet the patient’s specific needs.

References