

# A Review on Geriatric Oral Health: Nutritional Pattern and Dynamics

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## Abstract

Health, a prized possession, has always been a target for generations to achieve. Its vital factor nutrition in every form is an expression of genetic heritage that influences the occurrence and severity of degenerative diseases associated with aging. Nutritional problems may result from changes associated with aging process, medical/psychiatric illness, or other medical conditions. The epidemiological literature on oral health in the elderly is varied across countries and regions, more so as a function of institutionalization. This article intends to present importance of the need to care for oral health, concise review of literature on hardships with repercussions in edentulous patients, and how specific nutrients interact with the body to contribute to an individual's health. The past literature on oral health in elderly was extensively and comprehensively perused, reviewed, and summarized in terms of descriptions on geriatrics nutrition and changes in diet associated with aging. The search for thorough original and review articles were mainly done from the sites such as Google scholar, PubMed, ResearchGate, etc., on geriatrics nutrition and terms such as geriatrician, nutrition assessment, edentulism, denture wearing, impact of nutrition, oral and general health, dental sores, and nutritional deficiencies. This review summarized pertinent articles that described the changes in diet associated with edentulism. Most studies suggested that edentulous individuals lack specific nutrients which bring them to risk of various health disorders. Recent research literature highlighted that dental prostheses supported by implants, significantly improve nutritional status in edentulous patients, provided the individual has sound health to undertake procedure for dental prosthesis. Elderly denture wearers are vulnerable to compromised nutritional health due to various factors. Timely and routine evaluation of nutritional status is important for any nutrition or dietary modification. Dietary counseling along with supportive supervision of the family regarding dental health is an integral part of treatment for denture wearers.

**Keywords:** Complete denture, edentulism, geriatrics, nutrition, nutritional analysis

## INTRODUCTION

Proper nutrition is essential to the health and comfort of oral tissues. Healthy tissues enhance the possibility of successful prosthodontics treatment in the elderly. Besides other factors such as dietary habits, socioeconomic status, which have profound influence on dietary selection in patients with partial or complete tooth loss, prosthetic therapy may be important to maintain or restore masticatory function. Problems vary with the patient and their dental needs. It is important to have good knowledge, awareness, and information about senile changes that influence oral tissues in the elderly. When we have adequate information then only correct treatment and care can be imparted to the elderly at the right time. Most elders take several prescription over-the-counter medications daily. Prescription drugs are the primary cause of anorexia,

nausea, vomiting, gastrointestinal disturbances, xerostomia, taste loss, and interference with nutrient absorption and utilization. These conditions can lead to nutrient deficiencies, weight loss, and ultimate malnutrition.<sup>[1]</sup> Edentulism is another major association for a lack of nutrition in geriatric age group. The problem of edentulism is accentuated when mastication function is not re-established with dental prostheses. It is pertinent to note that the literature suggests that a minimum of twenty functional teeth are necessary to proper mastication

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of food with the paramount condition to be having them in antagonistic pairs. Dry mouth as a health issue is becoming more and more common but is ignored as a public health concern. A high prevalence of xerostomia and salivary gland hypofunction has been found in vulnerable elderly people. There is abundant scientific evidence to support the involvement of oral health in general health of an individual. Given that oral health is a modifiable risk factor, a theoretical viewpoint has stressed that its improvement would reduce the risk of mastication and swallowing problems and the nutritional deficiencies thereof.<sup>[2]</sup> The factors such as nutrient lag, glandular secretions, and decreased adaptability reduce the tissue regeneration in the aged. Mastication, dentition, and nutrition are closely knit phenomenon. Current scenario suggests that a large population geriatrics are edentulous which reduces the capability of masticating with which they eventually make an unconscious shift in the preference of nutrition they should intake. As such, the shift in nutrition intake has a major effect on their health which is an important subject to be studied carefully.

When considering their esteem, wearing dentures have an impact on the oral health as well as physical persona of a person. Appropriate and adequate nutrition of elderly people is of great importance for their general and oral health. An adequate amount of saliva is necessary for the proper masticatory function and swallowing. Saliva plays an important role in the chewing process by binding the food fragments together so that they can be swallowed without the risk of respiratory aspiration.<sup>[3]</sup> Many denture failures are the result of nutritional deficiencies. A lot of agonies, psychological as well as physiological issues are directly associated with their inability to eat. It can also aid them cope with the learning phase in a better manner. Psychological evaluation and counseling must also be inculcated in the treatment. The surveys reflect that an approximately 75% of edentulous patients recommend a complete denture treatment which necessarily includes dietary guidance, counseling, and research into their dietary habits. Issues such as vitamin deficiency, malabsorption, dehydration, and gastric acidity are not uncommon to be noted among this segment of population.<sup>[4]</sup> Preparing the food for digestion is one of the important functions of dentition and requires fundamental research for scientific exploration of the association between dental status and food intake, nutrition, and mastication, especially for the elderly population.<sup>[5]</sup>

There are several implications that edentulism follows multiple repercussions – an ill-fitting dentures, soreness due to ill-fitting dentures, wrinkling which extends downward from the oral commissures, extremely resorbed ridges, denture stomatitis, denture irritation, hyperplasia, traumatic ulcer, flabby ridges, residual ridge resorption, mucosal ulcerations, altered taste perception, burning mouth syndrome, gagging, difficulty in chewing, decreased food intake, sudden weight loss, mandibular prognathism, changes in interalveolar space, and narcotism. It is important

to establish a balanced diet which is consistent with the physical, social, psychological, and economic background of the patient. The provision of temporary dietary supportive treatment such as postoperative healing and soft-tissue conditioning is imperative. The interpretation of factors peculiar to the denture age group can complicate the nutritional therapy.<sup>[6]</sup>

## FACTORS AFFECTING DIET AND NUTRITIONAL STATUS

There are innumerable factors that impact an elderly's interest in using dentures. Denture fit is a prime requisite to avoid painful sores as any uncomfortable experience with the denture might compel the person to discontinue the use. Denture problems may not only lead to poor health but also depression. Geriatric patients with dentures take longer to chew before they gulp the food. The overall mastication efficiency may be reduced to 80%. The elderly with complete upper dentures experience reduced sensitivity as the upper palate is covered. This decreases the pleasure in eating and reduces nutritional intake. This is observed more so among those wearing full dentures rather than partial denture users. It is important to hire responsible and experienced dental services. Yearly dental checkup should be done, and the dentures should be removed each day to maintain hygiene as well as giving scope for gums to relax.<sup>[7]</sup>

## FACTORS AFFECTING NUTRITIONAL STATUS OF ELDERLY

Oral factors that affect diet and nutritional status are xerostomia and sense of taste and smell. Effects of dentures on elderly are on taste and swallowing, chewing ability, food choices, diet quality, general health, and nutrient needs. With the progression of age protein depletion starts to set in leading to a decrease of the skeletal muscle mass. Proteins are a must for denture wearers.<sup>[8]</sup> It is a much-accepted fact that there exists some relationship between health of oral tissues and general health as the age progresses. The absence of teeth affects the health of oral tissues and the body in a huge way by altering the quality of life along with nutrition and food habits. Nutritional well-being plays a major role in health promotion and maintenance in older people; thus, it is important to identify the main determinants of nutritional status in the elderly population. Dietary habits, food intake, and oral health changes are important factors, but their reciprocal effects and relationships with overall nutritional status are complex and controversial. Various factors which may be responsible for the change in one's diet in old age include social isolation, living alone, limited income, lack of mobility, dental problem, diminished taste acuity, food faddism, and presence of chronic diseases.<sup>[9]</sup> Although there are no data to support the contention that the compromised nutrition of edentulous people leads to adverse health conditions, it is known that nutrient deficiencies are associated with a variety of diseases. Therefore, it is possible that edentulous patients with poor nutrition may be at greater risk for a variety of diseases.<sup>[10]</sup>

## RESULTS AND DISCUSSION

A mini nutritional assessment study carried out by Agrawal *et al.*, 2017 on 120 patients revealed 63.9% of the edentulous subjects were either malnourished or at the risk of malnutrition, 90% of denture wearing patients had normal nutritional status, and very minute difference of 90.9% of dentulous patients with normal nutritional status. The dietary selection and the nutritional status of elderly individuals were found related to four important factors, i.e., general health, socioeconomic status, dietary habits, and oral health status including masticatory function. These factors conclude that cause for geriatric malnutrition is generally multifactorial. As edentulism prevails among the elderly population, loss of perception may have a negative effect on masticatory function and nutritional status, leading to the rejection of some foods due to difficulty in chewing them. Consequently, there is a tendency to favor softer, more processed foods develop in the edentulous individuals. This result shows the decreased inclination of edentulous subjects toward hard to chew food such as raw fruits and nonvegetarian food.<sup>[11]</sup> Another study done by Wayler and Chauncey, who examined a sample of 814 subjects concluded after comparing the frequency of ingestion of hard and soft foods, along with their ratings of chewing difficulty that shifts in food selection patterns result from impairments in masticatory ability and appear to depend on the degree of impairment.<sup>[12]</sup> A study done by Saletti *et al.*, 2000, revealed a noteworthy lack of intake of fruits, vegetables, and fiber in a group of edentulous men and showed a direct relationship between edentulousness and malnutrition. Nearly 90% of the dentulous subjects in the study were well nourished according to Mini Nutritional Assessment scale (MNA) having score from 12 to 14 against 35% of edentulous subjects. Wearing dentures in these patients increased their nourishment scale measurement. Ninety percentage were well nourished in comparison to 35% of edentulous subjects.<sup>[13]</sup> Another cross-sectional study conducted by Patel *et al.*, 2015, among the institutionalized elderly of Satara district, India, found that about 85.0% of subjects sometimes had difficulty in eating food because of the problems with teeth or dentures; they had trouble biting or chewing any kind of food such as firm meat or apples. Most of subjects, 95.0% were able to swallow comfortably, and 85.5% had never problems of speaking. MNA showed 3.5% subjects had adequate nutrition, 60% were at risk of malnutrition, and remaining 36.5% were malnourished.<sup>[14]</sup> A cross-sectional study carried out by Chahar *et al.* in 2019 among four purposively selected special geriatric public clinics in Delhi with sample size of 145 elderly patients. The mean General oral health assessment index (GOHAI) score for the population was concluded as 26.69 + 4.44. GOHAI score was compared for age, oral hygiene practices, dental problems in the past 12 months, self-reported oral health, and prosthetic need, and a statistically significant difference was observed.<sup>[15]</sup> A cross-sectional survey by Sujatha *et al.*, 2017 revealed that most common systemic diseases reported are malnutrition, hypertension, and diabetes. The comparison

of oral health on general health implied was found to be significant at  $P < 0.05$ . Thus, it was ascertained that oral diseases influence general health and is an integral part of general health.<sup>[16]</sup> Furthermore, Gupta *et al.*, 2019 carried out a community-based cross-sectional study in Uttarakhand state, India. A total of 1003 elderly population were enrolled from 30 clusters (villages). Body mass index (BMI) and MNA were calculated for assessment of nutritional status. A trained professional assessed the dental health status through physical examination. The results revealed that the prevalence of complete edentulism was 11%. Use of dentures was reported among only 9.6% subjects who were completely edentulous. Prevalence of underweight as defined by BMI and malnutrition as defined by MNA was higher among subjects with complete loss of teeth complete loss of teeth and chewing problems chewing problems and those who did not wear dentures when compared with others. Subjects who wore dentures had significantly lower prevalence of malnutrition when compared with subjects who did not wear dentures. Thus, dental health status was significantly associated with poor nutritional status among elderly subjects in India.<sup>[17]</sup>

## CONCLUSION

Geriatrics is a known population marked by physical, social, and psychological pressure. Most of them have deficient nutrition and lack in fulfillment of their nutritional needs which brings them closer to complex health conditions. The research now shows good evidence that edentulism is associated with poor diet and compromised nutrition. Edentulism when merged with other factors causes health complications which brings them to the periphery of multiple pressures of life which intensifies their struggle in many ways than one. Very little efforts are laid on to manage the conditions they struggle with and nutritional deficiencies add up to their misery. The majority of the past studies over looked to appreciate cause-and-effect relationship in this context for solving such complex issues. Tooth loss and denture wearing, both of which affect many Indians as they age, are associated with a decrease in dietary adequacy that calls for more attention from care givers and dental specialists.

## Recommendation

The finding that loss of teeth and denture wearing, both of which affect many elderly as they age, are associated with a decrease in dietary adequacy. Monitoring the diets of geriatrics more closely is essential to ensure that their general health and dental health do not get adversely affected or decrease in any way. Their rehabilitation with the complete dentures therefore becomes imperative. Hence, there is an urgent need for adequate restoration of their dental health by health-care services to ensure total health and well-being.

The greatest challenge in this aspect is their fragility, which is made more complicated by the presence of multiple medical, dental, social, and psychological conditions. Oral health professionals need to have a thorough insight into the evolution of health status of geriatric patients and their changing

physiology, and how to address these issues optimally. In future, with the changing outlook the elderly will be more aware, capable, and competent of disclosing their problems and learn as to how to deal with them, and this will lead to a drastically divergent scenario as compared to the geriatric population today.<sup>[18]</sup>

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### Conflicts of interest

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