

Narrative review

Oral diseases and their relationship with nutrition in older adults

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Abstract

Population aging is one of the most relevant demographic phenomena of the 21st century. The relationship between oral health and overall health is complex and multifaceted, especially among older adults. Some general health conditions that are prevalent in this age group may act as predisposing factors for oral health deterioration, such as diabetes, which can lead to xerostomia or reduced salivary flow. Moreover, due to the aging process, this population is more likely to experience nutritional problems, caused by decreased regulation of food intake, assimilation, and metabolism, as well as by physical, psychological, and social changes, and the coexistence of age-related diseases. A literature search was conducted in scientific databases such as PubMed, LILACS, and the Virtual Health Library. The review included open access articles published in Spanish and English, between August 2019 and August 2024. This review aimed to describe the main oral diseases in older adults and how they influence nutritional status. Preventing and treating oral diseases is essential to preserving oral health and proper nutrition in this population.

Keywords

Oral Health, Nutritional Status, Older Adult, Dental Caries, Periodontitis.

Resumen

El envejecimiento poblacional es uno de los fenómenos demográficos más relevantes del siglo XXI. La relación entre la salud bucodental y la salud general es compleja y multifacética, especialmente entre las personas mayores. Algunas condiciones de salud general prevalentes en este grupo de edad pueden actuar como factores predisponentes para el deterioro de la salud bucal, como la diabetes, que puede inducir a xerostomía o reducción del flujo salival. Además, por el proceso de envejecimiento, esta población presenta mayor probabilidad de problemas nutricionales, debido a una disminución en la regulación de la ingesta, asimilación y metabolismo de los alimentos, como también cambios físicos, psicológicos y sociales y coexistencia de enfermedades propias a esta edad. Se realizó una búsqueda bibliográfica en bases científicas como PubMed, Lilacs, Biblioteca Virtual en Salud, se incluyeron artículos de libre acceso publicados en español e inglés, entre agosto de 2019 hasta agosto de 2024, con el objetivo de describir las principales enfermedades bucodentales en el adulto mayor y cómo influyen con el estado nutricional. La prevención y el tratamiento de las enfermedades bucales, son fundamentales para mantener la salud bucal y la nutrición en esta población.

Palabras clave

Salud Bucal, Estado Nutricional, Adulto Mayor, Caries Dental, Periodontitis.

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Enfermedades bucodentales y su relación con la nutrición en el adulto mayor

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Introduction

The aging of the population is a global phenomenon that has gained particular relevance in recent decades. According to data from the World Health Organization (WHO), the number of individuals aged 60 years or older is expected to double by 2050.ⁱ This demographic shift presents significant public health challenges, particularly in addressing the specific needs of older adults. The demographics profile of

El Salvador reflects aging trends, influenced by country-specific factors such as birth, mortality, and migration rates. According to the most recent national population census conducted in 2024, the population aged 60 years or older was 894 433, representing 14.83 % of the total population. Of these 381 668 (42.7 %) were men and 512 765 (57.3 %) were women.ⁱⁱ Older adults face unique health challenges, including declining functional capacity, the onset of chronic diseases, and loss of independence.

Oral health is a fundamental component of overall health, yet its impact on nutritional status remains underdocumented.

According to the WHO, nearly 3.5 billion people are affected by oral diseases, with three out of four residing in middle-income countries.ⁱⁱⁱ Oral diseases are among the most prevalent human conditions. It is estimated that over 1 billion cases of oral diseases occur globally, surpassing the combined total of the five major noncommunicable diseases, mental disorders, cardiovascular diseases, diabetes *mellitus*, chronic respiratory diseases, and several types of cancer.

Oral problems such as dental caries, periodontal disease, tooth loss, and the presence of inadequate dentures can limit the ability to chew and swallow, thereby affecting nutrient intake and absorption. In older adults, this interrelationship is even more pronounced due to the higher prevalence of oral diseases and physiological decline in functional capacity.ⁱⁱⁱ A literature search was conducted for articles published in PubMed, LILACS, the Virtual Health Library, in both Spanish and English, between August 2019 and August 2024. Boolean operators and the following search terms were used: Oral Health AND Nutritional Status AND Aged; Oral Health AND Aged AND Periodontitis; Oral Health AND aged AND Dental Caries. A total of 225 articles were obtained. Of these only documents from the United Nations, narrative reviews, systematic reviews, randomized clinical trials and epidemiological surveys were considered, resulting in 46 articles. Of those, studies that did not include data on the nutrition status of the study population were excluded. As a result, 35 articles were included in this review. The objective of this review was to describe the main oral diseases in older adults and how they influence nutritional status.

Discussion

Most oral disorders can be prevented and treated in their early stages. However, the global prevalence of these oral conditions continues to increase, driven by rising urbanization and changes in living conditions.^{iv} In addition, the marketing and consumption of sugar-rich foods and beverages, as well as tobacco products and alcoholic beverages, has intensified, contributing to the development of oral disorders and other noncommunicable diseases.^{iv}

The association of oral health with general health, morbidity, and mortality in older adults underscores its relevance healthy aging.^v

Oral health is a key component of well-being in the general population, especially among older adults, and is directly influenced by socioeconomic conditions and access to health services. Poor oral health is not an inherent of aging. Early detection of common diseases increases the likelihood of maintaining good oral health in later life.

Oral diseases and many chronic systemic diseases share common risk factors, including unhealthy diets, tobacco and alcohol use, which can be improved with health counseling. A growing body of evidence has documented a bidirectional association between oral health and chronic systemic diseases, highlighting the importance to incorporate oral health into chronic disease management strategies. WHO recommends a multidisciplinary approach to oral health, do to the inseparable links between oral and systemic health. However, it is essential to promote awareness of the importance among all the healthcare personnel in order to optimize prevention and care.^{vi,vii} Regarding epidemiological data from El Salvador, some articles were identified that address oral health problems in older adults, however, these do not establish a relationship with nutritional status.

Escobar *et al.*, reported important findings from a population in El Salvador: 100 % (n= 553) of respondents aged 60 years or older had some type of edentulism, of which 90.6 % (n= 501) presented partial edentulism and 9.4 % (n = 52) complete edentulism. The same study found that 52.98 % (n= 293) of this population reported no changes in their quality of life, while 34.18 % (n= 189) reported moderate changes, and 12.84 % (n= 71) reported severe or very severe changes in their quality of life.^{viii}

Vizcaino K *et al.*, noted that the older adult population in Latin America is the most affected by adverse oral health conditions, such as dental caries, periodontal disease, tooth loss, and oral cancer, in addition to having more limited access to and less effective use of dental services.^{ix}

Impact of nutrition on oral health

Nutrition refers to the intake of macronutrients: proteins, carbohydrates, and fats, as well as micronutrients, including vitamins and minerals, that are essential for the proper functioning of the body.^x Eating habits, food choices, culinary preparations, portion sizes and frequency of intake may all influence oral health,^{xi} as there is a bidirectional relationship between oral health, diet, and nutrition. Food and nutrients influence the condition of oral tissues; and compromised

oral health can reduce the body's ability to adequately utilize the nutrients consumed.^x

Oral diseases that affect nutrition in older adults

There are several oral diseases that can directly affect nutrition in older adult, including:

A. Dental caries

Dental caries is the most common oral health problem worldwide.^{xii} It is a dental condition characterized by the demineralization of the tooth structure, caused by cariogenic bacteria that metabolize sugars to produce, primarily, lactic acid.^{xiii}

The main contributing factors to the development of dental caries are largely related to inadequate oral hygiene practices. Key risk factors include the presence of cariogenic bacteria, frequent consumption of sugary drinks, and a diet high in carbohydrates.^{xiv}

Due to age-related changes in salivary function and immune response, along with the presence of multiple comorbidities and drug-induced xerostomia, caries becomes the most prevalent dental disease among older adults.^{xv} In addition, gingival recession, which is common in this stage of life, increases the risk of root caries.

The relationship between systemic diseases and dental caries is significant, as several medical conditions, such as diabetes, polypharmacy, and xerostomia substantially increasing the risk of caries development.^{xvi}

B. Periodontal disease

Periodontal disease includes gingivitis and periodontitis. It is characterized by bacterial infection that leads to gingival inflammation, tooth loss, bone resorption, and gingival recession.^{xvii} Gingivitis is the earliest stage of periodontal disease and refers to inflammation between the gumline and the tooth. Gingivitis is often reversible with improved oral hygiene practices.^{xviii} Periodontitis occurs when inflammation, triggered by microorganisms and mediated by the host response, progresses into a chronic, destructive, and irreversible condition that damages the tooth attachment and supporting bone. Tooth loss and edentulism, defined as the partial or total loss of teeth, represent the final stages of untreated periodontitis.^{xix}

Genco *et al.*, report that with increasing age, there is a greater loss of periodontal support, and by the age of 65, approximately 70 % of individuals are affected by periodontitis.^{xx} O'Connor J *et al.*, emphasize that age-related changes, including immune system alterations, cellular aging, inflammation, and altered wound healing play key roles in the pathogenesis of periodontal disease. Risk

factors for periodontitis in older adults are similar to those in younger age groups and include inadequate brushing and flossing, limited financial resources, lower levels of education, lack of medical follow-up, and cigarette smoking.^{xxi}

Among the aging population, systemic diseases have been identified as accelerators of periodontal disease progression. Diabetes *mellitus*, respiratory disease, cardiovascular disease, stroke, osteoporosis, osteoporosis, arthritis and Alzheimer's disease have all been linked to an increased risk of periodontal disease. A bidirectional relationship exists between periodontitis and systemic disease, with well-established associations between periodontitis and a higher risk of several chronic diseases, including cardiovascular disease, diabetes, rheumatoid arthritis, cancer, and chronic obstructive pulmonary disease (Figure 1).^{xix,xxi}

C. Xerostomia (hyposalivation)

Xerostomia is the sensation of dry mouth, characterized by reduction in salivary flow and alterations in saliva composition. It affects approximately one-third of the older adult population.^{xxii} Age-related changes, chronic diseases, and medication use contribute to xerostomia in older adults. A decrease in saliva production is common among older adults with who experience polypharmacy.^{xxiii} Chan *et al.*, reported that the risk of caries increases by 60 % in older adults with low resting salivary pH and reduced stimulated salivary flow.^{xxiii} Dry mouth and xerostomia are sometimes used interchangeably; however, true xerostomia results from acute or chronic salivary gland hypofunction and is associated with inadequate salivary secretion. Typically, patients report dry mouth when salivary output is reduced by more than 50 %.^{xxiv} Nonetheless, the sensation of dry mouth can also occur despite normal secretory function of the salivary glands, this condition is referred to as pseudoxerostomia or false xerostomia. The causes of this subjective symptom include changes in saliva composition, mouth breathing, atypical oral and facial symptoms, burning mouth syndrome, oral dysesthesia, and mental, psychological, and psychiatric disorders. In more than half of the cases of pseudoxerostomia, a 50 % reduction oral fluids intake was observed.^{xxiv} Age-related factors, including structural and functional changes in the salivary glands, medication use, systemic diseases, and psychosocial factors, contribute to xerostomia in older adults.^{xxiv} Adolfsson *et al.*, found that one in two older adults in a primary care setting experienced some degree of dry mouth,



Figure 1. Periodontal disease conditioned to diabetes *mellitus*. Female patient, 67 years old, with periodontal disease conditioned to diabetes mellitus, with loss of support in the existing teeth, inadequately adjusted upper prosthesis, and multiple missing teeth in the lower jaw.

with a prevalence of 43.6 %, and higher rates observed among women 61.2 %.^{xxv}

The diagnosis of xerostomia is primarily based on a thorough anamnesis, clinical evaluation, and physical examination. Clinical findings may include absence of pooled saliva, sticky mucosal membranes, reddened mucosa, and loss of tongue fissures and papillae. When necessary, sialometry can be used as a diagnostic tool to objectively measure salivary flow rates and assess salivary gland function.^{xxv} Xerostomia can impair the retention of removable dentures and reduce their comfort during chewing in older adults.^{xxvii} Pain while chewing due to ill-fitting dentures has been identified as a risk factor for nutritional deficiency in this population.^{xxvi} However, the evidence linking hyposalivation and malnutrition remains limited.^{xvii,xxvi}

D. Oral cancer

Oral cancer (OC) is the most common type of head and neck cancer and includes cancers of the lips, tongue, palate, oropharynx, tonsils, and other oral structures. The most frequent type is squamous cell carcinoma.^{xxvii} OC is considered a high-risk disease among older adults, with its prevalence increasing with age, typically appearing after 64 years of age. Each year, more than 54 000 new cases and 11 000 deaths from OC are reported.^{xxviii} OC ranks 13th among the most common cancers worldwide, and alcohol consumption is one of the main causes.^{iv}

The risk of oral cancer increases with age and is therefore significantly higher in adults aged 65 years and older.^{xxiii}

Alcohol consumption, especially heavy drinking, also increases the risk of oral cancer. Smoking and alcohol act synergistically, and individuals who both smoke and drink have up to 30 times greater risk of OC compared to non-smokers and non-drinkers.^{xxiii}

OC is also associated with human papillomavirus (HPV) infection. Although the HPV vaccine protects against several HPV types associated with oral cancer, the vaccine first became available in 2006.^{xxviii}

Early diagnosis improves outcomes. The primary method for early diagnosis is a physical examination, consisting of systematic inspection and palpation. The five-year survival rate for early-stage oral cancer exceeds 80 %, only about a one-quarter of cases are diagnosed at this stage.^{xxviii} Once cancer spreads to adjacent tissues or regional lymph nodes, the five-year survival rate declines. For individuals with distant metastases, the five-year survival rate drops to 40 %.^{xxix} Recognizing common presenting symptoms, such as non-healing lesion, red or white patches, and hoarseness, is key to early diagnosis. For thorough visual inspection of the entire oral cavity, tools such as the VelScope (a tissue autofluorescence method), digital palpation, and lymph node evaluation can detect the majority of OC (Figure 2).^{xxx}

E. Cervical non-carious lesions

Non-carious dental lesions in older adults constitute an oral health problem, due to factors that are difficult to control and that can have a significant impact on quality of life. This group of lesions includes: attrition, defined as physiological wear caused by the contact of opposing teeth with each other in the absence of an abrasive substance; the amount of load applied and the duration of load application contribute to this form of wear. Non-axial (lateral) loads associated with chronic clenching (parafunction) cause surface bending in the cervical region that exceeds established enamel failure stresses.^{xxxi} In older adults, attrition may be more severe due to loss of tooth structure over the years.

Abrasion is the loss of tooth structure caused by external abrasive substances, such

as excessive brushing or the use of abrasive toothpastes. Older adults may be more prone to abrasion due to changes in brushing technique or decreased manual dexterity.^{xxxii}

Tooth erosion or corrosion is a loss of tooth structure caused by exposure to acids of non-bacterial origin, such as gastric acids, reflux or vomiting, consumption of acidic beverages and foods. Older adults may be more susceptible to erosion due to dietary changes, medications, or medical conditions.^{xxxiii}

Abfraction is the loss of tooth structure at the cervical crown-root junction area due to excessive occlusal forces. Older adults may experience abfraction due to periodontal support loss and changes in occlusion.^{xxxiv}

However, there are combined lesions, which, in many cases, older adults may present a combination of non-carious lesions, making diagnosis and treatment difficult (Figure 3).

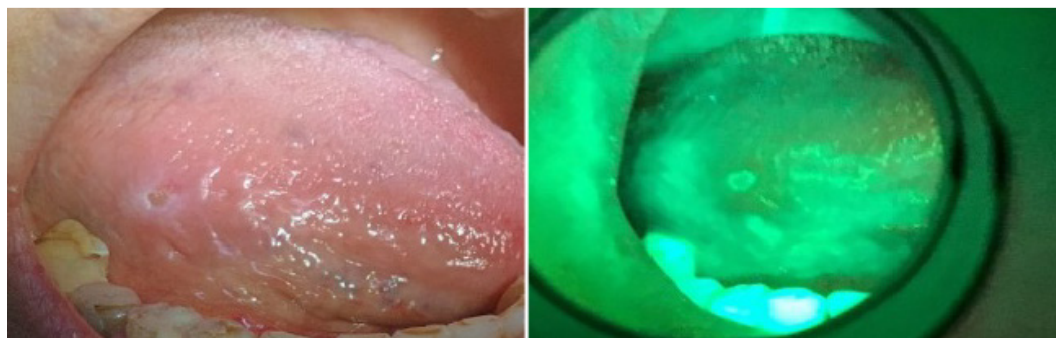


Figure 2. Autofluorescence examination. The non-vascular lesion, the area of inflammation of approximately two centimeters in diameter, can be observed. The lesion coincides with a fracture of obturation in pieces 4-6. Diagnosis: traumatic ulcer.



Figure 3. A 62-year-old female patient presents with periodontal disease conditioned to diabetes mellitus in the lower incisors and non-carious cervical lesions (abfractions and attrition) in canines, premolars, and molars.

F. Impact of oral health on nutrition

The oral cavity is located in the first part of the digestive tract and is responsible for chewing, salivation, and swallowing, allowing the food bolus to reach the stomach for nutrition. In older adults, several common dental problems, such as dental caries, periodontal disease, tooth wear, and OC, can lead to pain, infection, and tooth loss and jeopardize the normal digestive process, for nutritional intake along with the risk of spread of oral infections to the gastrointestinal tract and other parts of the body.^{xxiii}

Salivation is important for taste sensation, bolus formation and swallowing. There are drugs and systemic diseases that cause a decrease in salivary flow, which in turn can affect nutritional intake and favor the development of nutritional deficiencies, as well as increase the risk of frailty, morbidity and mortality in older adults.^{xxiii,xxiv}

G. Implications for improving oral health and nutrition in older adults

Diet, nutrition, and oral health are interrelated. Older adults are at increased risk for nutritional deficiencies and oral disease. Tooth loss is associated with the type of diet and with the nutritional status of older adults.^{xxii} Patano *et al.*, have mentioned the importance of the integrating oral health care into general health care services for older adults.^{xxiii}

A multidisciplinary team including oral and health care professionals should collaborate to carry out a comprehensive geriatric assessment that includes the oral, nutritional, and medical status of older adults to formulate an integrated, coordinated, and patient-oriented treatment plan to improve their oral and general health.^{xxiv} This integration includes policymakers, academics, educators, and organizations.^{xxiv,xxv} The available evidence suggests a knowledge gap regarding the relationship between oral diseases and nutrition in older adults. The current body of literature is limited; therefore further research is recommended to deepen and substantiate this relationship.

Ethical aspects

The photographs are securely stored in the author's archive. The principles established in the Declaration of Helsinki and the international ethical guidelines for health-related research were upheld. Informed consent was obtained from the patients for the publication of the photographs, ensuring respect for autonomy, confidentiality, and privacy.

Conclusion

The relationship between oral diseases and nutrition in older adult is complex and bidirectional. Oral diseases may negatively affect nutrition, as difficulties in chewing and swallowing can lead to insufficient intake of essential nutrients. In addition, inadequate nutrition can increase the risk of developing oral diseases, such as dental caries, periodontal disease, and oral cancer.

Oral diseases, along with their consequences such as tooth loss and oral pain, can impair the ability to eat and digest food. Malnutrition is very common among older adults with oral diseases. Early prevention and timely treatment of oral diseases, particularly dental caries and periodontal disease, are essential to maintaining both oral health and nutrition in older adult. Epidemiological studies should be conducted on the oral health situation in adult and older adult populations in El Salvador, ensuring the inclusion of representative samples. Collaboration among dentists, nutritionists, and other health professionals is essential to address the oral and nutritional needs of the older adults.

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