

Malnutrition and oral Health in Elderly: a Narrative Review

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ABSTRACT

The aging process is generally defined as the accumulation of various changes that occur in cells and tissues as we age. According to the World Health Organization (WHO), an elderly individual is defined as a person who has reached or surpassed 60 years of age. Changes in conditions experienced by the elderly are not only physical changes, but also social and psychological changes. These changes influence each other and interact with other factors, which have an impact on the health conditions of the elderly, including appetite regulation which indirectly also has an impact on nutritional status in elderly. As we already know, nutrition is an important component for the elderly that affects the entire aging process and the general health condition of the elderly, including their oral health. Oral health and nutrition themselves have a multidirectional relationship. This relationship is manifested in the oral cavity, including plaque formation, dental caries, periodontal disease and other oral conditions. It is imperative for clinicians to comprehend the interplay between oral health and nutrition, as this knowledge is crucial for the effective management of elderly patients. This article focuses on the relationship between nutrition an oral health and its impact on older adults.

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INTRODUCTION

In recent decades, global life expectancy has increased and the proportion of older adults relative to other age groups has continued to grow, leading to an aging of society, especially in developed countries.(1,2) The proportion of the global population aged ≥ 65 years will nearly double from 12% to 22% between 2015 and 2050.(2,3) According to the World Health Organization (WHO), individuals aged ≥ 60 years are classified as elderly.(2,4)

The aging process is a collection of modifications that occur in cells and tissues as age increases.(5) These changes that older adults experience not only affect their physical well-being, but also their social and psychological conditions.(1,3) Social changes among the elderly population may lead to reduced physical activity, decreased social participation, lower income, and changes in the environment. Meanwhile, emotional changes like loneliness, feeling a lack of purpose, post-power syndrome, and reduced self-confidence often occur.(3)

These changes may affect each other and interact with other factors, ultimately impacting the health of the elderly.

Consumption of balanced and appropriate food is crucial to ensure good nutrition among the elderly, and thereby determine their health status.(3,5–8) Changes in biological (physical), psychological and social conditions affect the process of food consumption in the elderly which has an effect on their nutritional intake.(5,8,9) Nutrition plays a crucial role in the aging process and overall health of the elderly, including their oral health.(5,7) Studies suggest a reciprocal relationship between oral health and nutrition.(10) This study aims to determine the relationship between malnutrition and oral health in elderly.

METHOD

This study was conducted on September to October 2023. The research question was identified using PEO (Population: elderly; Exposure: malnutrition; Outcome: oral health). A search was carried out in PubMed, limited to the title or the abstract and using the following keywords. The keywords used were Malnutrition AND Oral Health AND Elderly. The inclusion criteria used in this study were articles in English and published in the past 25 years.

RESULTS AND DISCUSSION

Appetite regulation mechanism in aging

The elderly generally experience a decrease in appetite and energy expenditure which is closely related to the decline in biological functions, environmental condition and psychological well-being, and pharmacological effect leading to malnutrition.(3,8,11) Most of the elderly take one or more medications related to their health. The pharmacological effects of these drugs can impact sensory abilities, gastric emptying regulation, circulation mechanisms, and brain functions associated with appetite regulation.(11,12) Declining of senses especially taste and smell among elderly individuals lead to loss of pleasure in food and less diverse food consumption.(7,13–15) Decreased function of the senses also has an impact on reduced autonomic nerve function, which in turn can cause an increase cholecystokinin levels, causing decreased peristalsis within the digestive system, resulting in slower stomach emptying and longer-lasting feelings of fullness.(7,14) Slower gastric emptying causes nutrients and energy substrates to be absorbed for longer periods of time.(14–17) Delayed gastric emptying of stomach causes changes in levels of glucose, free fatty acid (FFA), insulin and glucagon.(14) Thus, the high levels of glucose, FFA, insulin, and glucagon in the circulatory system inhibit the release of neuropeptide Y by the hypothalamus, leading to decreased appetite, lack of hunger, and increased satiety.(9,13,14,17) Entering old age there are many changes in the environment around the elderly.(3,18,19) The transition to retirement, a reduction in income, the loss of a spouse, living alone, and changes in one's working or living environment can result in a reduction in the variety of foods consumed by the elderly, or even a loss of pleasure in food.(7,19,20). Similarly, the psychological condition of the elderly can also result in a loss of pleasure in food.(9,11) Furthermore, environmental and psychological factors can indirectly impact the brain, leading to a decline in bodily functions.(21) This, in turn, affects the variety of food consumed by the elderly, leading to a reduction in appetite, a lack of hunger, and an increase in satiation. If this situation is not

properly addressed, it can potentially result in anorexia of aging, which can in turn lead to malnutrition.(9,15)

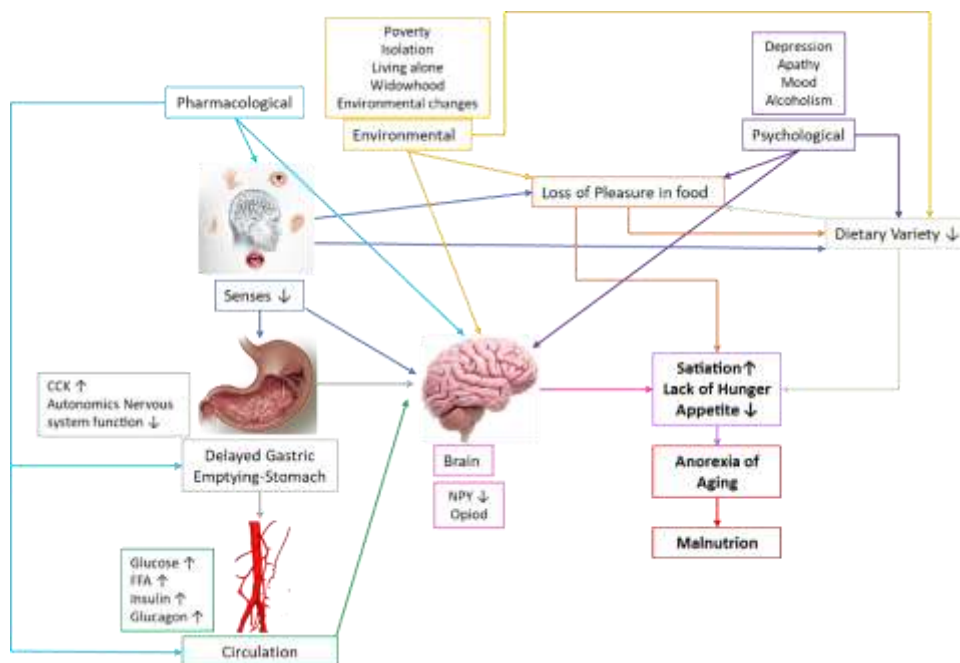


Fig. 1 Appetite regulation mechanism in aging. (Rosenberg 2006, with modification)

Malnutrition in The Elderly

Changes in diet, medications and oral conditions can lead to imbalances in the intake of nutrients and various health issues.(3,5,7,12,22–25). Malnutrition is the resultant effect of imbalances in nutrient intake.(26) Malnutrition can occur due to a deficiency or excess of one or more nutrients.(7,15) In this study, the term malnutrition specifically refers to a condition of nutritional deficiency. Clinical symptoms of malnutrition can manifest in various parts of the body, such as the skin, hair, nails, eyes, mouth, neck, abdomen, extremities, and neurology.(5) The condition can be identified through clinical symptoms and various nutritional assessments, such as dietary, anthropometric, The Global Leadership Initiative on Malnutrition (GLIM), The Malnutrition Universal Screening Tool (MUST), The Mini Assessment (MNA), and biochemical marker assessments.(5,15,27–30) Older adults' dietary habits can be evaluated using dietary assessment, which relies on interviews with the elderly or their families. Anthropometric assessment, which involves comparing weight (kg) to height (m²), is employed to calculate body mass index.(5,28) This assessment can determine whether older adults have a BMI that is considered underweight or obese according to the World Health Organization's categories. These categories include underweight (BMI < 18.5), normal weight (18.5-24.9), overweight (25-29.9), obese (30-39.9), and extreme obesity (>40).(27,29) The Malnutrition Universal Screening Tool (MUST) is a screening instrument that can identify adults who are malnourished or at risk of malnutrition.(28,29) The elderly population has a special assessment system, The Mini Assessment (MNA) & Risk Scales (SCALES), with parameters: Sadness, Cholesterol, Albumin, Loss of weight, eating problems physical/cognitive and Shopping. Plus norma(22,26,28,29) Biochemical markers commonly

used to assess malnutrition in this population include: levels of albumin, transferrin, retinol-binding protein, thyroxine-binding protein, lymphocyte proliferation, low total serum cholesterol, as well as vitamins and trace elements.(5,27)

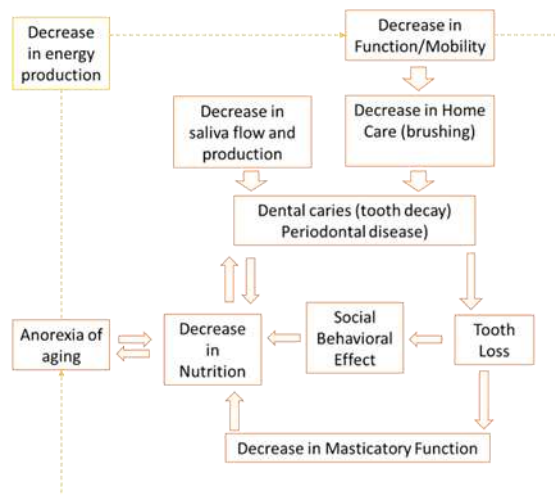


Fig. 2 The relation between oral health and nutrition (Henshaw, 2001 with modification)

Oral Manifestations of Malnutrition in the Elderly

Manifestations of malnutrition in oral health include plaque formation, dental caries, periodontal disease, and other oral conditions.(38) Nutrient intake and the type of food and drink consumed are closely related to the process of plaque formation. In the elderly, a reduced appetite often leads to the consumption of only preferred foods, potentially exacerbating malnutrition.(19,37) If the food consumed contains high sucrose, it leads to the formation of large amounts of plaque.(39,40) Older individuals tend to prefer soft foods, which exacerbates plaque formation. Nutritional intake and consumption of specific foods or drinks also relate directly to caries in the elderly, particularly in the root area of the teeth.(39) This relationship is due to the amount of plaque buildup, salivary flow, and changes in salivary pH.(41) As previously mentioned, the elderly often consume soft foods that are high in sucrose causing a decrease in the pH of their saliva leading to increased plaque formation, particularly in the gingival area.(40) The decreased salivary flow affects the buffering and antibacterial process in the formation of caries.(42)

Other oral manifestations of malnutrition in the elderly in the periodontal tissues can be seen with reduced bone density, resorption and decreased gingival condition.(15,31,39) Additionally, other oral conditions, such as mucosal lesions, cheilitis angularis, glossodynia, and reduced salivary flow (non-physiological), and deterioration of oral function can be found as malnutrition manifestations.(43,44) The complex interplay between the nutritional status, general health conditions, and oral health conditions among older adults demands a comprehensive approach to treatment and care.(5,31)

As a clinician, it is essential to comprehend the relationship between nutrition and oral health conditions to provide optimal care for elderly patients. Collaboration among stakeholders is crucial to curbing the high prevalence of these conditions among the elderly, which can exacerbate both their oral and general health. The present study is subject to

certain limitations; it analyzes only a subset of factors associated with malnutrition and oral health in the elderly. The necessity of further research in this area is evident, particularly in the context of analyzing more comprehensive factors related to malnutrition and oral health in the elderly.

CONCLUSION

The aging process refers to the accumulation of cellular and tissue changes that happen with age, which interact with other factors and affect the health condition of older individuals. Such changes are interdependent and may instigate various health implications. Nutrition plays a crucial role in the health and aging process of elderly individuals, including their oral health. Malnutrition and oral health in the elderly are intricately linked and have a multidirectional and complex relationship. The oral cavity is particularly affected, resulting in conditions such as plaque formation, dental caries, periodontal disease, and other oral health issues.

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