



Original article

Relationship between oral health and nutritional status in the elderly: A pilot study in Lebanon



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ABSTRACT

Background/objective: Oral health is an integral part of the general health and well-being of the elderly. Compromised oral health can have a negative impact on food intake that leads to a deterioration in nutritional status. This study aimed to explore, for the first time in Lebanon, the relationship between oral health and nutritional status in a population of elderly patients newly admitted to a hospital.

Methods: A comprehensive survey was administered to 115 persons aged 70 years and older. They were admitted during 3 consecutive months to various wards of the Rafic Hariri University Hospital (RHUH; Beirut, Lebanon), which is the largest public hospital in Lebanon. Medical, socioeconomic, anthropometric, and dietary data were collected. Nutritional status was assessed by the Mini-Nutritional Assessment (MNA) and oral health was assessed by the Geriatric Oral Health Assessment Index (GOHAI), a tool that evaluates an individual's self-perception of oral health status. This was followed by an examination of the oral cavity to count the remaining teeth, to record the presence and status of dentures, and to assess xerostomia.

Results: The prevalence of undernutrition was 6.1%, with the additional risk of malnutrition observed in 37.4%. More than 50% of individuals in need of dental care (i.e., a GOHAI score > 14) were at risk of nutritional deficits. A negative self-perception of oral status was significantly associated with a risk of nutritional deficit, but the risk disappeared after adjusting for socioeconomic factors, neurosensory disorders, and chronic diseases.

Conclusion: Our results strongly demonstrate the importance of oral care within the elderly Lebanese population to reduce the risk of malnutrition and improve oral health-related quality of life.

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1. Introduction

The aging of the world's population seems inevitable and is correlated with the decline in fertility rates and longer life expectancy. At the beginning of the 21st century, people aged 60 years and older numbered approximately 600 million around the globe. This is three times as many people as there were 50 years ago. By 2050, elderly people are expected to represent 20% of the world's population, and will be more numerous than the population younger than 14 years old.¹ This global trend in population aging is emerging as the major economic, political, and social issue of the

coming decades. At the same time, nutrition, and more specifically undernutrition, has become a real concern in the aging population. In fact, the prevalence of protein-energy malnutrition (PEM) is becoming alarmingly high in hospital and institutional settings. The adverse outcomes of PEM on general health, quality of life, morbidity, and mortality are now well established.² Several risk factors for malnutrition in the elderly have been identified such as age-related changes, high prevalence of chronic diseases, polypharmacy, psychological and social conditions, institutionalization, and poor oral health.³

There is much interest in the oral health problems of the elderly and its influence on nutrition. Poor oral health has a negative impact on dietary intake and nutritional status when the capacity to chew and eat is diminished.⁴ In the elderly population, food selection is limited in people with edentulism, the lack of or

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inadequate prosthetic rehabilitation, dental caries, periodontal diseases, and xerostomia.⁵ Patients who report the presence of oral disorders are at high risk of malnutrition. This underlines the importance of measuring a patient's self-perception of problems related to the oral cavity and performing a clinical examination.⁶

In Lebanon, problems related to oral health in the elderly are poorly understood. This pilot study aims to explore the relationship between oral health and nutritional status in a population of Lebanese noninstitutionalized elderly patients who were newly admitted to hospital for acute medical conditions.

2. Methods

2.1. Design and setting

This cross-sectional study was conducted for 3 consecutive months and designed to include all eligible persons aged 70 years and older who requested admission to the various wards of Rafic Hariri University Hospital (RHUH), which is the largest Lebanese public hospital (544 beds) that is located on the outskirts of southern Beirut. Most RHUH patients have a low socioeconomic status with practically no medical coverage. Prior to the study, the agreement of the hospital's Medical Research and Ethics Committee was obtained.

2.2. Inclusion and exclusion criteria

To be eligible for the study, patients had to meet the following inclusion criteria: Lebanese individuals who were 70 years or older who did not have a hypercatabolic state (i.e., not on dialysis, no end-stage kidney disease, not admitted to the intensive care unit, noncancerous), were physically capable of undergoing examination (i.e., they did not have significant skin lesions, amputation, or lower limb edema), had no problems with malabsorption, were not receiving artificial feeding, and were able to communicate. Eligible patients were required to provide a signed voluntary informed consent form prior to being included. Consenting patients were visited after admission. Their cognitive status was assessed using the Mini-Mental State Examination (MMSE) in its validated Arabic version, which was adapted from the original version.⁷ Only patients with a MMSE score of ≥ 24 , which indicated an acceptable cognitive status, remained in the study population.

2.3. Data collection

Socioeconomic data (i.e., age, sex, living conditions, level of education), medical data, and dietary information (e.g., ability to shop and prepare food, meal consumption, and avoidance of certain solid foods) of the individuals were collected using a general questionnaire that controlled for possible confounding factors [e.g., socioeconomic factors, neurosensory disorders diagnosed by a medical doctor, and chronic diseases such as cardiac failure, respiratory failure, diabetes, rheumatoid arthritis (listed in the patient's medical file)]. Weight (measured by a calibrated mechanical scale) and height were assessed to calculate the body mass index (BMI). Anthropometric measurements were complemented by the circumferences of the arm and calf. The nutritional status of elderly individuals was assessed using the Mini-Nutritional Assessment (MNA) questionnaire in its complete validated form.⁸ It was administered in two steps: the first step detects a decline in food intake, weight loss, loss of mobility, acute disease or stress, neuropsychological problems, and a decrease in BMI in the previous 3 months. The second step assesses the living conditions, the presence of polypharmacy, the presence of pressure ulcers, the number of full meals ingested daily, the number and frequency of intake of

drinks and foods, and feeding mode. The total score obtained allowed participants to be categorized into three groups: (1) patients with good nutritional status (i.e., the MNA score > 23.5), (2) patients at risk of malnutrition (i.e., the MNA score $17-23.5$), and (3) undernourished patients (i.e., a MNA score < 17).

A concomitant inspection of the oral cavity identified the following: the number of natural remaining teeth (≥ 20 teeth, < 20 teeth, or complete edentulism); the wear, type, and status of dentures (i.e., well-fitting or poorly fitting); the presence of dental pain when chewing; and the presence of xerostomia.⁹ Visual inspection of the oral cavity was followed by the administration of the Arabic version of the GOHAI.¹⁰ This 12-item questionnaire measures the patient's self-perception of oral health problems and the need for dental care in three dimensions: (1) oral function, (2) pain and discomfort in the oral cavity, and (3) psychosocial aspects of oral problems. For each item, patients are questioned about the frequency of their experience in the previous 3 months and answered on a 5-level scale: "never", "rarely", "sometimes", "often", and "always"; the answers were coded from 1 to 5, respectively. The total summative score ranges from a minimum of 12 points to a maximum of 60 points, with a higher score indicating compromised oral health. Individuals with GOHAI scores > 14 were considered in need of dental care.¹¹ The Arabic version of GOHAI used in this study is a version previously tested for validity and reliability in Saudi Arabia.¹⁰

2.4. Statistical analysis

Data were collected and analyzed using SPSS version 13.0 for Windows (SPSS Inc., Chicago, IL, USA). Bivariate analyses were used to measure the association of nutritional status (i.e., the dependent variable) with socioeconomic variables, feeding characteristics, and oral status. The Chi-square test was used to test the association for categorical variables, whereas the *t* test was used for two independent quantitative variables. A *p* of ≤ 0.05 indicated statistical significance. A multiple logistic regression model was constructed to evaluate the relationship between nutritional status and oral health while taking into account the confounding variables of socioeconomic factors, neurosensory disorders, and chronic diseases ($p \leq 0.05$). The adjusted odds ratio (OR) was calculated to measure the strength of the association between different variables and the dependent variable (adjustments were performed for age, sex, educational level, and pre-existing chronic diseases).

3. Results

The present study included 115 elderly patients who were aged 70 years or older with a mean age of 76.2 ± 5.6 years. In this sample, 48.7% of patients were illiterate and 33.9% of patients had achieved an elementary level of education (Table 1). For dietary conditions, 23.5% of patients were unable to shop and 25% of patients were unable to prepare their meals. Furthermore, 49.6% of the study population avoided certain solid food items (e.g., steak, lettuce, carrot, radish, apple, and nuts). For general health status, 35.7% of patients had at least three chronic diseases (e.g., hypertension, diabetes, osteoporosis) and approximately one-half (54.8%) of the patients took more than three drugs daily (Table 1). The nutritional assessment on hospital admission detected an undernutrition prevalence of 6% and a 37.4% risk of malnutrition with a mean MNA score of 23.6 ± 4 . For oral health status, 69.6% of the population had complete edentulism; of these only 9% of patients were not wearing a dental prosthesis. Only 5.2% of patients retained ≥ 20 their natural teeth. Among elderly patients wearing a dental prosthesis, 25% of patients complained of ill-fitting dentures. In addition, 69.6% of patients complained of xerostomia. The mean GOHAI score was

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