

An innovative cloud-based solution for the screening of malnutrition, sarcopenia and dysphagia in older people

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Background and Objectives:

Dysphagia, malnutrition, and sarcopenia are common conditions in institutionalized older people and can have a negative impact on their health and quality of life. Dysphagia can lead to malnutrition, which in turn can cause a reduction in immune defenses, increased vulnerability to infections and a progressive loss of muscle mass and strength (1). Sarcopenia, the loss of muscle mass and strength, leads to reduced mobility, increases the risk of falls and deteriorates the quality of life. Unfortunately, in Nursing Home, screening for these conditions is difficult for economical and organizational issues.

The objective of this study is to develop cloud software that can be used for mass screening of dysphagia, malnutrition, and sarcopenia in institutionalized older people. This software should be easily usable by non-medical personnel to contain costs and increase accessibility to screening.

Materials and Methods:

To achieve this goal, cloud software was developed. This software uses the EAT 10 (10 item Eating Assessment Tool), MNA (Mini Nutritional Assessment), and Sarc-F (Sarcopenia Functional Assessment) questionnaires associated with hand grip strength test to evaluate dysphagia, malnutrition, and sarcopenia, respectively. The software guides personnel in administering the tests, detects any inconsistencies and interprets the results. The test can be performed monthly and requires an average administration time of ten minutes. Statistical analysis was conducted using descriptive analysis, multiple regression, and ANOVA for repeated measures analysis; p-values <0.05 were considered statistically significant. SPSS 21.0 software was used.

Results:

A total of 98 institutionalized elderly people were consecutively enrolled with an average age of 85 ± 1.5 years; 60 patients were female and 38 were male. The study was performed between December 2022 and January 2023

The Hand grip Test (muscle performance index) was found to be correlated with MNA ($r=0.366$, $p=0.001$), confirming the close relationship between malnutrition and sarcopenia. EAT-10 was negatively correlated with MNA, confirming that dysphagia and malnutrition are related ($r=-0.524$; $p=0.001$). Multiple regression showed that both EAT 10 and HG were independently correlated with MNA. 14 patients (14.2%) were found to have dysphagia and they all had protein malnutrition. These patients were treated with a special diet.

After one month of special diet, monitoring showed an increase in hand grip test (a muscle performance index of about+ 10% in dysphagic subjects; $p<0.05$ compared to baseline values) and a slight increase in body weight; $p<0.05$ compared to initial values).

Discussion:

The software allows the identification of dysphagic patients and, in combination with special diets, addresses nutritional problems in institutionalized older people in a simple and cost-effective manner.

Conclusion:

Our approach in one month of follow-up can contrast sarcopenia and malnutrition induced by dysphagia. In the future, it will validate our solution in a prolonged follow-up period, and we expect the development of artificial intelligence to ensure a personalized approach to counteract the progression of disability related to aging.

Bibliography:

1) Moncayo-Hernández AB, Herrera-Guerrero JA, Vinazco S, Ocampo-Chaparro JM, Reyes-Ortiz CA. Sarcopenic dysphagia in institutionalised older adults. *Endocrinol Diabetes Nutr.* 2021;S2530-0164(21)00146-4.