

Review Article

EVALUATION OF MALNUTRITION AMONG ELDERLY PEOPLE ABOVE 75 YEARS OF AGE

Thoai Dang Nguyen^{1,#}, Tram Thi Huyen Nguyen^{2,#}, Pol Van Nguyen¹, Khang Kim Huynh³, Hiep Tung Bui¹

¹ Faculty of Pharmacy, Pham Ngoc Thach University of Medicine, Ho Chi Minh City 700000, Vietnam.

² Department of Pharmacy, Ear-Nose-Throat Hospital in Ho Chi Minh city, Ho Chi Minh City 700000, Vietnam.

³ Faculty of Dentistry, University of Medicine and Pharmacy at Ho Chi Minh city, Ho Chi Minh City 700000, Vietnam.

#: These authors contributed equally to this work and are co-first author.

*Corresponding Author: Thoai Dang Nguyen (PhD.)

Faculty of Pharmacy, Pham Ngoc Thach University of Medicine, Ho Chi Minh City 700000, Vietnam.

Email: thoaind@pnt.edu.vn

Received: 15.12.2019

Revised: 17.01.2020

Accepted: 19.02.2020

Abstract

Background: Malnutrition, which is a very communal disorder in the aged people, is recognized to rise their susceptibility to negative health events.

Objective: This study was held to evaluate the occurrence of malnutrition in the population of the community aged 75 years or higher.

Methods: Practitioners (GPs) used a short the Mini Nutrition Assessment (MNA-SF) version as a tool of screening to study the status of nutrition among the elderly (1,039 people). Using biochemical parameters; malnutrition status was established. People at jeopardy of malnutrition (n = 22) have recommended a modified diet.

Results: A total of 821 participants were included with the average age at 82±5.7. Average MNA-SF score was 12.3±2.0 in which over 75% (n=621) of the elderly people had the score of 12 or greater. MNA-SF confirmed that 21% of older people at danger of malnutrition and biochemical tests had a 3.5% incidence of malnutrition. The counselling regarding the diet enhanced the biochemical parameters and MNA-SF score.

Conclusion: MNA-SF is a simple tool used to assess Malnutrition which will be helpful to diagnose at the initial phase and effectively cured by the attending physician.

Key words: dietary advice, elderly, malnutrition, MNA.

© 2019 by Advance Scientific Research. This is an open-access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.31838/jcr.07.04.15>

INTRODUCTION

Malnutrition requires the consumption or ingestion of calories or insufficient protein, marked by losing weight and improvements in body composition. This is a very common condition in the elderly population that causes serious adverse health events. Poor nutritional status is often manifested by involuntary weight loss^[1]. When the elderly lose weight, they double the risk of death, even if they are overweight. The risk increases especially for people with obesity-related diseases such as diabetes^[2]. Malnutrition also increases the likelihood of a hip fracture or institutionalization, and is an important predictor of weakness syndrome in the elderly. The main causes are physiological, social and economic problems, often referred to as “nine”, i.e. bad teeth, dysgeusia, dysphagia, diarrhea, depression, disease, dementia, dysfunction and drugs^[3]. Protein-energy malnutrition (PEM) is induced, and in older people has serious consequences such as poor quality of life and higher risk of falling, increased morbidity, mortality complications and clinical interventions, extended hospital stay, admission to intensive care and an increase in healthcare costs and an increased risk of institutionalization^[4]. Although PEM is a common problem, it has not been properly investigated.

The prevalence of PEM in older people varies considerably depending on the population studied, the working environment, and the tools used to measure the degree of violence^[5]. The environments with the highest malnutrition rates are nursing homes (up to 85%) and hospitals (up to 62%). The risk of malnutrition affects about half of the elderly who receive home care, and with the increase in the degree of independence gradually decreases in healthy older people living in the community, up to almost loss^[6]. Surveys among non-institutionalized older people yielded very variable results, not only depending on the criteria used to define malnutrition, but

also depending on the geographical areas studied, but prevalence rates reached significant values of up to 30%^[7].

Management of severe PEM is becoming difficult, and early preventive intervention in people considered under or under threat to verify the nutritional status of older people is a key tool for ensuring good aging^[8]. The nutritional status can be examined by clinical methods, biochemical parameters, anthropometric measurements or multidimensional assessments; however, none of them simply has ideal requirements. Among the multidimensional methods, due to high sensitivity, specificity and reliability, Mini Nutrition Assessment (MNA) is used for assessing the population of the elderly and people with normal nutritional status and malnutrition or malnutrition^[9]. The shorter form (MNA-SF) provides results that are well linked to the results of the full version, so that it can be successfully used for detection, with the advantage of being simpler and faster. Determining certain biochemical parameters (albumin, pre-albumin and C-reactive protein) in patients with low results allows later confirmation of malnutrition and assessment of severity. Plasma pre-albumin concentration allows the assessment of acute PEM, while albumin is an indicator of long-term protein changes and is significantly reduced only after prolonged malnutrition. Because inflammation is affected by albumin and pre-albumin levels, they should be evaluated for C-reactive protein (CRP) levels. The substantial incidence of malnutrition in developing nations could have a serious effect on the nutrition health of the elderly people. There was however no scientific report examining the nutritional condition of elderly people in Vietnam^[10]. Therefore, this study was conducted to assess the prevalence of malnutrition of elderly population by using the Mini Nutrition Assessment Short Form (MNA-SF) tool^[11].

MATERIALS AND METHODS

Study design

This is cross-sectional study conducted in randomized chosen clinics located in southern Vietnam from December 2018 to February 2019.

Participants

People who were not institutionalized at the age of 75 or older came to the clinic for therapeutic treatment or were contacted in accordance with the proactive medicine approach. They were informed about the purpose of the study and obtained written consent. Exclusion criteria were: lack of the abovementioned requirements, lack of information about the examination, presence of cancer less than a year ago and/or signs of clinical activity, severe psychiatric symptoms or any of them, list of artificial active nutrition (parenteral, enteral), chronic renal failure (creatinine > 3 mg/dl), prolonged life below 6 months was not allowed.

Because there are no absolute criteria that are widely accepted to determine vulnerability, we focus on sociodemographic features and components associated with physical and social domains. As a result, people who have at least one of these conditions are considered fragile: having more than two chronic diseases or one complex chronic disease, living alone or in a disadvantaged social environment, with exclusionary provisions for low income.

Nutritional evaluation

Nutritional status was tested using the Mini Nutritional Assessment Form (MNA-SF) provided by the Mille win / Mille GPG software used by family physicians. MNA-SF is a condensed version of the MNA nutrient identification device specially built for older people. It comprises six questions relating to weight loss and appetite, strength, acute disorder or psychological stress and body mass index (BMI). Any question is graded between zero and two or three, with a maximum of 14 points. A ranking of 12 and above suggests a good nutritional status; a value of 8-11 demonstrates a possibility of malnutrition and 7 or less implies malnutrition. Plasma pre-albumin, albumin and CRP levels were evaluated in patients with a score of 11. While albumin and pre-albumin are commonly used indicators for the definition and classification of malnutrition, PCR allows to control the possible effect of entanglement of inflammation. We measured prealbumin and albumin using a nephelometric test (BNII, laser nephelometry, Dade Behring). CRP was assessed by turbidimetric method (Modular PP, Roche). All procedures comply with the standards of quality of health services. The degree of malnutrition in patients with MNA results below 12 was classified according to the algorithm shown in **Table 1** ^[12-14].

Table 1. Algorithm for malnutrition assessment

| Albumin (mg/dl) | Prealbumin (mg/dl) | | |
|---|---|------------------|--------------------|
| | ≥17 | 10-17 | <10 |
| ≥3000 | Possible recent recovery of good nutritional status | Recent mild PEM | Recent severe PEM |
| <3000 | PEM in recent improvement | Chronic mild PEM | Chronic severe PEM |
| Abbreviation: PEM, protein-energy malnutrition | | | |

Nutritional recommendation

People with an MNA score of 12 or greater and malnourished were given recommendations for maintaining adequate nutritional status as well as maintaining and improving their lifestyle. The attending physician recommended a personalized dietary recommendation, which refers to the most suitable dietary indications for patients with a certain degree of disability and individual characteristics (gender, weight, chewing ability, independence, shopping skills). PEM was confirmed using MNA scoring and biochemical parameters below 12. In the case of impaired chewing ability, a soft diet was recommended. The selection of patients who needed dietary advice was made by the attending physicians in cooperation with the local Nutrition Unit that prepared the diet. Two months after applying the proposed diet regimen, an additional nutritional status assessment and an additional assessment of plasma biochemical parameters using MNA-SF was performed.

Statistical analysis

The MNA-SF score expressed as mean, standard deviation, albumin and prealbumin concentration was compared between the sexes using the Student t test. Multivariate regression analysis (factors adjusted for gender and age) was performed to assess the variability of biochemical parameters before and after treatment and corrected assessment of MNA-SF for the effect of entanglement associated with CRP. Statistical analysis was performed using R (free R software, version 3.0.3) and the significance was set to 0.05.

RESULTS

The study involved 11 general practitioners with 1,039 people over 75 years of age. Full data is available for 821 of them, offering a 79% participation rate. The main demographic characteristics are shown in **Table 2**. The average age of included patients included was 82±5.7 and 65% of them were women.

Table 2. Demographic characteristics of the enrolled elderly people

| Variables | Females (N=537) | Males (N=284) | Total (N=821) |
|-------------------------------|-----------------|---------------|---------------|
| Age (years), mean (SD) | 82 (6.1) | 82 (4.9) | 82 (5.7) |
| Frailty | 520 (96.8) | 266 (93.7) | 786 (95.7) |
| Comorbidity | 446 (83.1) | 230 (80.1) | 676 (82.3) |
| Living alone | 234 (43.6) | 47 (16.6) | 281 (34.2) |
| Social disadvantage | 28 (5.2) | 6 (2.1) | 34 (4.1) |
| Prescription charge exemption | 431 (80.3) | 197 (69.4) | 628 (76.5) |
| MNA-SF score, mean (SD) | 12.1 (2.1) | 12.7 (1.7) | 12.3 (2.0) |
| 0-7 | 24 (4.5) | 4 (1.4) | 28 (3.4) |
| 8-11 | 124 (23.1) | 48 (16.9) | 172 (21.0) |

| | | | |
|---|------------|------------|------------|
| 12-14 | 389 (72.4) | 232 (81.7) | 621 (75.6) |
| Note: Data was presented as n (%) unless stated otherwise. | | | |

Almost all participants (95.7%) can be considered fragile, mainly due to the presence of diseases and their low-paid prescription fee. Nutritional assessment using MNA-SF showed that 21% of older people are at risk of malnutrition, and the incidence of malnutrition is 3.4%. Both conditions were more common in women (23.1% and 4.5% vs. 16.9% and 1.4%, respectively). Determination of biochemical parameters to confirm malnutrition allowed us to estimate the prevalence at 3.5% (Table 3).

Despite no statistically significant difference observed between the sexes, malnutrition was again more common in women. The majority of malnourished people (69%) achieved an MNA-SF score between 8 and 11, which only indicates the risk of malnutrition. Average levels of biochemical parameters have recently suggested improvement for men and mild PEM for women.

Table 3: Levels of albumin and prealbumin in patients with MNA-SF<12 and malnutrition confirmed by biochemical parameters (N = 29) according to gender and MNA-SF

| | MNA-SF score | Prealbumin (mg/dl) | Albumin (mg/dl) |
|--|--------------|--------------------|-----------------|
| Females (n=17, 58.6%) | 7.8 ± 2.9 | 14.8 ± 3.2 | 3421.5 ± 585.9 |
| Males (n=12, 41.4%) | 9.0 ± 1.7 | 17.8 ± 5.6 | 3189.9 ± 608.4 |
| P-value | 0.214 | 0.079 | 0.311 |
| MNA-SF score 0-7 (n=9, 31.0%) | | 13.2 ± 4.0 | 3061.1 ± 718.9 |
| MNA-SF score 8-11 (n=20, 69.0%) | | 17.8 ± 5.6 | 3444.7 ± 507.5 |
| Total | | 16.0 ± 4.5 | 3325.7 ± 595.9 |
| Note: Data presented as mean ± SD | | | |

The average MNA-SF reached 11. Despite the increase in results, only two subjects remained in the area of malnutrition, while 8 subjects received more than 12 points indicating that their normal nutritional status had improved (data not shown). Albumin and pre-albumin levels have increased and exceeded the 17 mg/dl threshold, in particular indicating that good nutritional status has recently improved.

DISCUSSION

The elderly population is particularly prone to malnutrition. Although this is more common among institutionalized people, prevalence rates, which are not completely insignificant and vary depending on the degree of independence, have been recorded among older people living in society. Asian countries are characterized by a growing increase in life expectancy, but this means that the incidence of negative health events is higher [15]. They are strongly associated with malnutrition and include lower quality of life, greater disease complications, and greater risk of institutionalization, greater fragility and higher mortality. More attention should be paid to malnutrition, which is often not recognized and neglected. In relation to the Indian population, this area is one and a half times more than 64 years old and more than twice more than 84 years old (4% vs. 2%).

This study predicted the prevalence of malnutrition in the community for over 75 years with family physicians [16]. 3.5% of registered older people showed malnutrition, which is confirmed by biochemical parameters. Due to the differences depending on the method used, it is very difficult to compare this finding with the results reported in other studies. However, obtaining updated epidemiological data on the malnutrition of the elderly is a basic requirement for identifying programs to control and prevent malnutrition [17]. MNA-SF has proved to be a reliable, simple and easy tool to detect the risk of malnutrition in older people living in the community. Adoption of the standard methodology offered to family physicians can contribute to timely monitoring of the nutritional status of elderly patients, and early identification of deficiencies can enable the implementation of effective corrective measures [18].

If malnutrition in clinical and subclinical situations is an important and common disorder in the population at risk, physicians should have experience in diagnosis. However, this is not the case. Mowé

and Bøhmer reported that physicians recognized nutritional problems in only 24 of 66 patients [19], only five received nutritional support and none of them were diagnosed with discharge at discharge. The lack of knowledge of doctors may be due to the lack of nutritional education in medical school curricula and non-specific nutrition presentation for the elderly.

Earlier, the region's nutrition service had already carried out nutritional supervision in hospitalized patients in both hospital and protected facilities. This study is also the first experience in personalized nutritional counseling managed by general practitioners according to the Nutrition Service to improve the nutritional status of their patients. In addition to assessing malnutrition, surveillance provided information to maintain the nutritional status of older people with an adequate MNA result, and dietary indications for people with different levels of malnutrition depending on weight and ability of chewing [20]. The interaction and coordination between GPs, nutrition and hygiene, and public health services guarantees a positive multidisciplinary approach that enables the creation of a medical care path with personalized nutrition advice that can improve nutritional status within two months and relevant biochemical parameters in the elderly living in the community [21]. Past experience with nutritional intervention in the elderly population in Europe has yielded conflicting results. A study in the Netherlands did not show any results in terms of weight improvement, physical fitness and grip strength 6 months after dietary recommendations. A year later, a group of older people who received personalized nutrition and physiotherapist advice on physical activity from a dietitian noticed an increase in MNA score of 2.5 points. Older people who received advice also improved their sensitivity and achieved a higher score in the Mini Mental Status Exam (MMSE), which showed that MNA had a better cognitive function compared to the control group in which it was assessed.

Although the study included a limited number of general practitioners and people over 75 years of age, based on a predetermined methodology with two previous observational studies, this allowed us to examine the problem of malnutrition in older people living in the community. In addition, the study population reflects the demographic characteristics that will characterize all Western societies at the end of the demographic

transformation period. Therefore, it can be considered as a paradigm for testing activities aimed at promoting healthy aging.

CONCLUSION

Malnutrition can be assessed using a simple tool, such as MNA-SF, which is diagnosed at the earliest stage and successfully treated by family doctors, as evidenced by a two-point increase in the result observed in patients on a personalized diet. This result has important and promising results in managing the elderly community, as most of them live in the community and can benefit greatly from nutritional counseling. Improving the nutritional status of people living in the community can actually be an effective method of preventing adverse health events such as hospitalization, complications, readmission, institutionalization and mortality.

CONFLICTS OF INTERESTS

The authors have no conflicts of interests to declare.

FUNDING

None.

REFERENCES

- Basibüyük, G.Ö., et al., Evaluation of Malnutrition among Elderly People Living in Nursing Homes by Mini Nutritional Assessment Short Form (MNA-SF) in Turkey. *Maedica*, 2019. 14(1): p. 38-44.
- Wolters, M., et al., Prevalence of malnutrition using harmonized definitions in older adults from different settings - A MaNuEL study. *Clin Nutr*, 2019. 38(5): p. 2389-2398.
- Dent, E., et al., Malnutrition Screening and Assessment in Hospitalised Older People: a Review. *J Nutr Health Aging*, 2019. 23(5): p. 431-441.
- Elghazally, N. and S. Saied, Nutritional Assessment of The Elderly: A Comparative Study Between Residents of Geriatric Homes vs. Community Living Population, Tanta, Egypt. *The Egyptian Family Medicine Journal*, 2019. 2.
- Tagliaferri, S., et al., The risk of dysphagia is associated with malnutrition and poor functional outcomes in a large population of outpatient older individuals. *Clin Nutr*, 2019. 38(6): p. 2684-2689.
- Maeda, K., et al., Reference body mass index values and the prevalence of malnutrition according to the Global Leadership Initiative on Malnutrition criteria. *Clin Nutr*, 2020. 39(1): p. 180-184.
- Madeira, T., et al., Malnutrition among older adults living in Portuguese nursing homes: the PEN-3S study. *Public Health Nutr*, 2018: p. 1-12.
- Turkson, R.K.D. and T.F. Maphhepa, Using novel nutritional assessment tool to assess the nutritional status of the elderly in mazenod: The case of old age pension scheme in lesotho. *Global Journal of Health Sciences*, 2019(2): p. 1-11%V 4.
- Rodrigues, M., et al., The use of comprehensive geriatric assessment in older patients before allogeneic hematopoietic stem cell transplantation: A cross-sectional study. *J Geriatr Oncol*, 2020. 11(1): p. 100-106.
- Vu, H.T.T., et al., Prevalence of frailty and its associated factors in older hospitalised patients in Vietnam. *BMC Geriatr*, 2017. 17(1): p. 216.
- Kaiser, M.J., et al., Validation of the Mini Nutritional Assessment short-form (MNA-SF): a practical tool for identification of nutritional status. *J Nutr Health Aging*, 2009. 13(9): p. 782-8.
- Beck, F.K. and T.C. Rosenthal, Prealbumin: a marker for nutritional evaluation. *Am Fam Physician*, 2002. 65(8): p. 1575-8.
- Shenkin, A., Serum prealbumin: Is it a marker of nutritional status or of risk of malnutrition? *Clinical chemistry*, 2006. 52(12): p. 2177-2179.
- Kwon, O., et al., The association of prealbumin with nutritional markers and inflammation in incident peritoneal dialysis patients. *Kidney Research and Clinical Practice*, 2012. 31(2): p. A47.
- Malazonia, M., et al., Assessment of nutritional status and malnutrition risk in healthy elderly Georgians. *Georgian Med News*, 2019(291): p. 67-73.
- Fukui, S., et al., Malnutrition among elderly patients with severe aortic stenosis. *Aging clinical and experimental research*, 2019: p. 1-7.
- Vearing, R., et al., Evaluation of the impact of a post-hospital discharge Transitional Aged Care Service on frailty, malnutrition and functional ability. *Nutr Diet*, 2019. 76(4): p. 472-479.
- Wintermeyer, E., et al., Assessment of the Influence of Diabetes mellitus and Malnutrition on the Postoperative Complication Rate and Quality of Life of Patients in a Clinic Focused on Trauma Surgery. *Z Orthop Unfall*, 2019. 157(2): p. 173-182.
- Mowé, M. and T. Bøhmer, The prevalence of undiagnosed protein-calorie undernutrition in a population of hospitalized elderly patients. *Journal of the American Geriatrics Society*, 1991. 39(11): p. 1089-1092.
- Muszalik, M., et al., Assessment of the relationship between frailty syndrome and the nutritional status of older patients. *Clinical interventions in aging*, 2019. 14: p. 773.
- Ahmadzadeh Tori, N., et al., Effect of BASNEF-based nutrition education on nutritional behaviors among elderly people and Mini Nutritional Assessment on nutritional status in elderly with diabetes with type 2 diabetes (A clinical trial intervention). *J Educ Health Promot*, 2019. 8: p. 94.