



## Original article

# Assessing the nutritional status of older individuals in family practice: Evaluation and implications for management



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## SUMMARY

**Background & aims:** Malnutrition is emerging as a multidimensional concern of ageing with a high prevalence among nursing home residents. This study investigated the extent of malnutrition among old subjects in family practice and its relationship with major complications.

**Methods:** Over 75 years old subjects ( $n = 274$ ) filled the *Mini Nutritional Assessment* questionnaire. Appearance of major events in the following 6 months were registered.

**Results:** MNA scored were  $11.5 \pm 3.1$ , with 175 (64%) subjects showing no malnutrition, 69 (25%) resulted at risk, and 30 (11%) malnourished. Within at risk group, 1.4% was resident, 7% bed rested, 8% had a history of major bone fracture, 33% was demented and 24.6% hospitalized at least once in the last year. Among malnourished patients, 10% was resident, ten bed rested with 70% showing multiple bedsores, 20% have had bone fractures, 60% were demented and 13% hospital admitted in the previous year. In over 90% of them, malnutrition had neither diagnosed nor considered before. During follow-up, a significantly higher number of major events including death occurred in the malnourished group. By multivariate logistic regression,  $n = 56$  (20.4%) patients resulted at risk of major complications. The sensitivity of the questionnaire in identifying these patients was 84% with the cut-off value of 7 associated with the highest prediction (positive predictive value, 0.92; negative predictive value, 0.71) yielding a specificity of 92%.

**Conclusions:** The prevalence of malnutrition is high among older subjects in the setting of family practice. The *Mini Nutritional Assessment* allows to identify malnourished subjects better than BMI and effectively predicts the risk of major events.

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## 1. Introduction

Although campaigns are continuously advertising genuine food, nutritional changes are dramatically affecting the health status of human beings worldwide (obesity in Western societies, malnourishment in very poor countries). In this scenario the nutritional state of aged people and its impact on concomitant chronic conditions remains poorly considered. Indeed, as the age increases, the energy need varies accordingly. Often, the equilibrium between

caloric intake and body expenditure is imbalanced in aged people, and malnutrition is frequently becoming a threatening sign and a serious problem [1–4].

Malnutrition is defined as a faulty or inadequate nutritional behavior with insufficient food intake, poor appetite, muscle wasting and weight loss [5]. It rapidly declines health status and quality of life. Dependency, loneliness and chronic illnesses are major contributing factors. The social burden of malnourished aged people is high and represents a multidimensional concept encompassing both physical and psychological elements.

The prevalence of malnutrition is relatively low (5–10%) in community living old subjects and considerably high (30–60%) in hospitalized or institutionalized subjects [6,7]. It is estimated that, in US, 50% of hospitalized older persons and 40% of nursing home residents are malnourished [8]. In Europe and Asia [1,9] malnutrition ranges 10%–85% according to the diagnostic criteria used [10]

*Abbreviations:* BMI, body mass index; GPs, general practitioners; MNA, Mini nutritional assessment; MNA-SF, Mini nutritional assessment short form.

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and also in dependence on the Country, rural or town population, residency or home patients, co-morbidities, socio-economic classes. Despite these impressive data, nutritional problems are not yet acknowledged as a priority in managing older persons. Nutritional assessment and intervention are particularly crucial in this population, where incidence of chronic illnesses is high (dentition, dementia, depression, functional limitations, income, polypharmacy) [3,4]. Malnutrition is associated with negative *sequelae*: infections, request of home care, hospitalization, death [11–13]. As the life expectancy increases, malnutrition becomes an emerging problem for general practitioners (GPs), who are required to check the nutritional status of their patients, to make early diagnosis of malnourishment and provide measures.

Conventional techniques assessing the nutritional status include anthropometrics, dietary recall and laboratory investigation together with other expensive approaches difficult to apply in family practice. Another option is the utilization of multidimensional techniques as the *Mini Nutritional Assessment* (MNA) [14–18]. Its short form (MNA-SF) is easy to administer, patient-friendly, inexpensive, very sensitive, highly specific and reproducible [19]. MNA-SF is a questionnaire (six simple and quick questions, plus one in reserve) giving a final score. MNA demonstrated an excellent reproducibility in bed resting patients who are not able to stand and therefore the calculation of the body mass index (BMI) not possible. Most studies are coming from hospitalized patients and few reports exist on the application of this test in the primary care setting.

Therefore, this study aimed to evaluate the nutritional status of patients over 75 in the setting of family practice and to look at the occurrence of major events.

## 2. Patients and methods

This study was entirely conducted in family practice from January to April 2013. The database of four GPs, working in 4 different southern Italian towns, were used to extract the list of patients over 75 years old. Both sexes were included. Patients with terminal illnesses, carrying malignancies, or with terminal renal failure, ascites or recurrent electrolyte imbalance were excluded. Consecutive patients at their first office or home check were enrolled (Table 1).

Body weight and height were measured by a scale with a stadiometer (values were expressed in kg and cm); BMI was calculated and expressed as kg m<sup>-2</sup>; when weight or height or both were not measurable (i.e. bed resting patients), the calf circumference was taken. The last year occurrence of hospital admissions, bone fractures, pressure sores, as well as the presence of senile dementia or the need of bed rest was registered.

**Table 1**  
Demographic features of  $n = 274$  subjects enrolled in the study and divided according to the Mini Nutritional Assessment (MNA) score.

	Total	MNA 12–14	MNA 8–11	MNA 0–7
Number	274	175	69	30
Age	82 ± 5	80 ± 4	83 ± 5	87 ± 6
Sex	m = 133 f = 141	m = 97 f = 78	m = 28 f = 41	m = 8 f = 22
BMI	28 ± 4.7	29 ± 4 (n = 175)	26 ± 8 (n = 64)	24 ± 6 (n = 20)
(kg/m <sup>2</sup> )				
Residents	4 (1.5%)	0 (0%)	1 (1.4%)	3 (10%)*
Bed rested	15 (5.5%)	0 (0%)	5 (7%)	10 (33%)*

Data are reported as mean ± standard deviation and percentage (in brackets). For the BMI values, the number of patients who undergone this measurement is reported in brackets; for the others the calf circumference was taken. \*significantly different ( $P < 0.05$ ) vs. the other MNA classes.

**Table 2**

BMI and MNA score values in  $n = 259$  patients divided in groups according to five years age intervals.

Age (years)	BMI (kg/m <sup>2</sup> )	MNA score
75–79 (n = 110)	29.2 ± 4.7	12.6 ± 2.2
80–84 (n = 91)	27.6 ± 4.3	12.0 ± 2.3
85–89 (n = 42)	26.6 ± 5.3	9.8 ± 3.6
90–94 (n = 12)	26.8 ± 3.3	9.2 ± 4.8*
95–99 (n = 4)	23.2 ± 1.6*	6.3 ± 4.0**

Data are reported as mean ± standard deviation. Significantly different (\* $P < 0.05$  and \*\* $P < 0.01$ ) vs. the others age ranges.

The nutritional status was assessed by the MNA-SF (Table 2): a questionnaire based on six simple questions having three or four different fixed answers. Questions investigate changes in appetite, recent changes of body weight, moving ability, recent stress or acute events, neurological disorders, BMI or calf circumference. Each answer has a corresponding score. The final score is calculated as the sum of answers, and shows three possibilities: 0–7 = malnutrition, 8–11 = at risk of malnutrition 12–14 = normal nutrition.

Enrolled patients were followed for 6 months. The MNA score was revisited and the occurrence of major events (infections, hospital admission, bone fractures, pressure sores, death) was registered.

### 2.1. Statistical analysis

Data are expressed as mean and standard deviation or as percentage. For statistical purposes, data were analyzed by the Student's *t* test and by the Fisher exact test. In all instances,  $P < 0.05$  indicates significant differences. Linear regression analysis was performed to address the relationship between two parameters. The potential effects of age, anthropometric parameters and MNA score, as independent factors, determined in all enrolled subjects, on the appearance of major events (bone fracture, bed sores, hospitalization, death), were calculated as coefficients in a retrospective model of multivariate logistic regression with subject groups (absent vs. present). Positive and negative predictive values were calculated to differentiate patients with malnutrition from those at risk and normal nourished subjects.

## 3. Results

The number of over 75 years old patients extracted from the GPs database was 555 on a total population of 5504 subjects (10%). Of them, 133 males and 141 females for a total of 274 (49%) subjects were seen during the observation period and enrolled in the study. The mean age was 82 ± 5 years (m 81 ± 5; f 82 ± 5) and the mean BMI was 28 ± 5 kg/m<sup>2</sup>, including one patient having <18.5 kg/m<sup>2</sup> and considering that BMI was not calculated in 15 patients because bed rested.

The MNA score had a mean value of 11.5 ± 3.1. In particular,  $n = 175$  subjects (63.9%) showed no signs of malnutrition (score 12–14),  $n = 69$  subjects (25.2%) resulted at risk of malnutrition (score 8–11) and  $n = 30$  patients (10.9%) resulted clearly malnourished (score 0–7).

Among patients at risk of malnutrition, one (1.4%) was resident in a nursing home, five (7.2%) were bed rested including one who had pressure sores, 8 (11.6%) had a history of major fractures in the last year, twenty-three (33.3%) had a diagnosis of dementia, and 17 (24.6%) were hospitalized at least once in the last year. In these patients, the mean value of BMI was 26 ± 8 kg/m<sup>2</sup>, as calculated on 64 of them.

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