



Original Article

Malnutrition in the elderly and its relationship with other geriatric syndromes[☆]

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SUMMARY

Background & Aims: Age related decline in food intake is associated with various physiological, psychological and social factors. Our aim was to assess the nutritional status of our elderly patients and its association with other geriatric syndromes.

Methods: In this cross-sectional population based study, Mini Nutritional Assessment (MNA) test was used to evaluate nutritional status of 413 elderly patients who were admitted to our outpatient clinic in the last 12 months. MNA test results were compared with the laboratory findings and established geriatric syndromes.

Results: Poor nutritional status was found in 44% of the patients ($n = 181$: 13% malnutrition, 31% malnutrition risk). Malnutrition rate was higher among those with subsequent hospitalization ($n = 122$, 25% vs 8%). Patients with poor nutritional status had lower blood haemoglobin, serum total protein and albumin, and revealed more chronic diseases and geriatric syndromes (6 ± 2 vs 3 ± 2 , $p < 0.0001$). Patients with depression, fecal incontinence, decreased cognitive function and functional dependence showed poor nutritional status according to MNA test results.

Conclusions: Malnutrition rate of our patients was comparable with the previous data. Malnutrition risk showed positive correlation with the number of existing geriatric syndromes. Depression, dementia, functional dependence and multiple co-morbidities were associated with poor nutritional status.

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1. Introduction

Aging causes alterations in the body composition, organ functions, adequate energy intake and ability to eat or access food. Abdominal obesity or weight loss together with sarcopenia cause immobility, skeletal disorders, insulin resistance, hypertension, atherosclerosis and disorders of the glucose/lipid metabolism. Chronic diseases (diseases that interfere with the ability of the person to eat food such as stroke and dental problems, malabsorption syndromes, cardiac cachexia, chronic obstructive pulmonary disease, malignancies, hypermetabolic state, neurologic disorders, dementia and drugs such as anti-neoplastic drugs), psychological disturbances and social problems can result in decreased food intake.¹ Therefore, early detection of malnutrition should be a key component of the geriatric assessment to stop this vicious cycle. Mini Nutritional Assessment (MNA) was developed as a reliable screening test to detect malnutrition in old-aged people. Without any laboratory data, nutritional status of the patients can be easily predicted with questions and anthropometric

measurements.² Because of its validity in screening malnutrition, MNA was integrated in our Comprehensive Geriatric Assessment (CGA) tool. In this study, we evaluated nutritional status of our elderly patients and examined its relationship with other geriatric syndromes and laboratory parameters.

2. Materials and methods

This study was conducted in our Geriatrics Outpatient Clinic between October 2007 and October 2008. Elderly patients (65 years or older) who were admitted to Department of Geriatrics or referred by other services for CGA were included in the study. Characteristics of the patients are given in Table 1 together with their previous medical history and reasons for admission. CGA was performed to all patients including patient's general information, social support, review of the systems, physical examination, gait evaluation and review of falls, daily functional status, Lawton scale for daily instrumental activities,³ MNA, Folstein Mini Mental State Examination (MMSE)⁴ and 30-item Geriatric Depression Scale (GDS).⁵ Patients were divided into three groups according to their ages; young old (65–74 years), middle old (75–84 years) and oldest old (≥ 85 years).⁶ Throughout the study, patients were evaluated by the same clinicians. Data of the patients including demographic characteristics, clinical problems, medical history and CGA were

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Table 1
Characteristics of the patients.

	Outpatient (n = 291)	Hospitalized (n = 122)	Total (n = 413)	(%)
Sex				
Male	94	47	141	34
Female	197	75	272	66
Age subgroups				
65–74 years	153	52	205	50
75–84 years	114	55	169	41
≥85 years	24	15	39	9
BMI				
<20.00 kg/m ²	18	13	31	8
20.00–24.99 kg/m ²	104	45	149	36
25.00–29.99 kg/m ²	105	34	139	33
≥30 kg/m ²	67	27	94	23
Previous medical history				
No. of drugs	5 ± 3	7 ± 3	5 ± 3	
No. of diseases	3 ± 2	6 ± 2	4 ± 2	
Reason for admission				
Diabetes	47	23	70	
Cancer	14	18	32	
Cardiovascular disease	47	18	65	
Parkinson's disease	9	5	14	
Arthritis/arthropathy	48	5	53	
Renal failure/uropathy	45	11	56	
Gastrointestinal problems	21	4	25	
Dementia/neurological disorders	42	11	53	
Depression	23	2	25	
Pulmonary disease	29	16	45	
Community acquired infections	37	19	56	
Liver–biliary system disorders	11	8	19	
MNA (score)				
4–16	22	31	53	13
17–23	80	48	128	31
Total	102	79	181	44

collected. All routine biochemical tests were carried out on Diagnostic Modular Systems autoanalyzer (Roche).

Nutritional screening was done according to MNA.² The MNA is an 18-item questionnaire comprising anthropometric measurements (BMI, mid-arm and calf circumference, and weight loss) combined with a questionnaire regarding dietary intake (number of meals consumed, food and fluid intake, and feeding autonomy), a global assessment (lifestyle, medication, mobility, presence of acute stress, and presence of dementia or depression) and a self-assessment (self-perception of health and nutrition). It is a two-step procedure; screening with the MNA small form (MNA-SF, 6 questions) followed by the assessment (9 questions and 3 anthropometric measurements), if needed, by the full MNA.² MNA-SF score ≥12 excludes malnutrition and/or malnutrition risk, which rendered further assessment unnecessary. MNA-SF score <12 indicates full MNA test. Total score >23 means normal nutritional status, 17–23 shows malnutrition risk and <17 indicates malnutrition. Mid-arm circumference <21 cm and calf circumference <31 cm are related with malnutrition risk.

Body Mass Index (BMI) between 20.00 and 24.99 kg/m² is optimal weight in elderly according to ESPEN guidelines. A BMI <20.00 kg/m² suggests that the patient is underweight.⁷

Cognitive functions of the patients were evaluated with the Folstein MMSE test.^{4,8} Time and space orientation, registration, language and motor, immediate and delayed recall and attention/calculation skills of the patients were determined in 11 questions. A

total score <24 (0–30) indicated decreased cognitive functions. The response to each MMSE item was indicated as correct, wrong, does not answer and not applicable (subject not able to either read or write, or with severe vision/hearing impairment). The indication 'does not answer' was considered incorrect. Indication 'not applicable' was re-coded as missing; if more than 6 items were missing, the entire MMSE was considered to be non-assessable. All of the patients were participated to a 30-item GDS. They were asked to respond by answering "yes" or "no" in reference to how they felt over the past week.⁵ Twelve or more unfavourable answers suggested low mood. MNA test results of the patients were compared with their established geriatric syndromes (visual disturbances, hearing loss, urinary and fecal incontinence, falls, insomnia, psychosis, dementia, depression, neurological disorders, diabetes, dizziness and need for a caregiver).

SPSS 15.0 (SPSS Inc., Chicago, IL) statistical software was used to analyse data. Continuous variables were described by the use of statistical characteristics (means, standard deviations, median). Discrete variables were described as counts and percentages. Independent Samples *t*-test and Chi-square test were used during evaluation of the results. A *p* value of <0.05 was taken to define statistical significance. Patients gave their informed consent prior to enrollment in the study, and the Institutional Ethical Committee of Istanbul University, Istanbul Faculty of Medicine approved this study with human subjects.

3. Results

A total of 413 patients (female/male:1.93) were included into the study. Mean age of the patients was 75 ± 7 years (65–97). According to different age groups 205 patients were young old (50%), 169 patients were middle old (41%) and 39 patients were oldest old (9%). Subsequent hospitalization was done in 122 patients (30%) for further examination and/or treatment. Their mean age was 76 ± 7 years (65–97). BMI was <20.00 kg/m² in 31 patients (8%), 20.00–24.99 kg/m² in 149 patients (36%) and ≥25.00 kg/m² in 233 patients (56%) (Table 1). Mid-arm and calf circumferences were low in 8 patients (5 females and 3 males). In the whole group, the number of chronic diseases and daily drug intake were 4 ± 2 and 5 ± 3 respectively, which were 6 ± 2 and 7 ± 3 in hospitalized patients.

MNA showed poor nutritional status in 181 patients (44%, malnutrition risk: 31%, malnutrition: 13%). Malnutrition rates were increased in hospitalized patients (malnutrition risk: 39%, malnutrition: 25%) (Table 1). When different age groups were taken into consideration, 32% of the young old, 56% of the middle old and 51% of the oldest old patients revealed low MNA scores (≤23). Their malnutrition rates (score <17) were 8% (*n* = 16), 16% (*n* = 27) and 26% (*n* = 10), respectively (Table 2).

Patients with low MNA scores had lower blood haemoglobin (12.23 ± 2.11 vs 12.87 ± 1.82 g/dl, *p* = 0.019, *z* = −2.339), serum total protein (6.77 ± 0.79 g/dl vs 7.21 ± 0.76 g/dl, *p* < 0.0001, *z* = −4.361) and albumin levels (3.52 ± 0.64 g/dl vs 3.91 ± 0.54 g/dl, *p* < 0.0001, *z* = −5.496). Their erythrocyte sedimentation rate (46 ± 32 vs 31 ± 25 mm/h, *p* < 0.0001, *z* = −4.177) and C-reactive protein levels (34 ± 24 vs 23 ± 20 mg/l, *p* = 0.002, *z* = −3.039) were

Table 2
Nutritional status of the patients according to different age groups.

	65–74 years (n = 205)	75–84 years (n = 169)	≥85 years (n = 39)
Low MNA score	66 (32%)	95 (56%)	20 (51%)
Malnutrition	16 (8%)	27 (16%)	10 (26%)

MNA score: Normal (>23), Low (≤23), Malnutrition (<17).

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