

ORIGINAL ARTICLE

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Evaluation of the malnutrition risk status of elderly people: A cross-sectional study in three family health centers

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Abstract

This study aimed to evaluate the malnutrition status of elderly patients by applying a mini nutritional assessment in patients aged 65 years and older. Patients aged 65 years and older who applied to family health centers numbered 22.01.009-026-047 in Edirne province were included in these study. Verbal consent was obtained, and patients were asked to answer 27 questions face to face, including the Mini Nutritional Assessment. The investigators performed the anthropometric measurements required for the assessment. The Number Cruncher Statistical System was used for statistical analysis; $p < 0.05$ was considered significant. A total of 153 subjects, 56.9% ($n=87$) female and 43.1% ($n=66$) male, were included in the study. There were 3 (2%) individuals with body mass index less than 19. There was no significant correlation between educational status and malnutrition test results ($p=0.189$). Twenty-five (16.3%) of the participants had no income, 21 (13.7%) lived alone, and no significant relationship was found with the malnutrition test results ($p=0.537$). A significant negative correlation existed between age and malnutrition test results ($r: -0.346$; $p=0.006$; $p<0.01$). There was a significant decrease in nutritional quality with increasing age ($p=0.004$). This study demonstrated that the malnutrition rate increases with age, therefore, elderly patients should be evaluated more carefully. Early diagnosis and treatment of malnutrition can prevent complications, accelerate recovery, and significantly contribute to maintaining function and improving the quality of life of elderly individuals.

Keywords: Elderly, malnutrition, mini nutritional assessment, preventive medicine

Introduction

As in the rest of the world, the number of elderly people is increasing daily with the development of health facilities in our country. The increase in the number of elderly individuals in society also increases the health expenditure for their care. The increase in the average life expectancy and the proportion of the elderly in the total population requires the identification of health care needs and problems of the elderly population and producing solutions for them [1,2].

Neurological diseases constitute an important part of geriatric syndromes seen in elderly individuals. Another common geriatric syndrome in old age is nutritional disorders [3].

Healthy nutrition is a fundamental requirement for all age groups.

In adulthood, the increase in body weight continues until age 65 and then begins to decrease. The decrease in body weight becomes more obvious, especially after age 80. During the ageing process, a number of changes occur in the body, which in turn influences the person's nutritional status. Lean body mass decreases, adipose tissue increases, and total body water content and basal metabolic rate decrease. Thus, caloric needs decrease as people age while protein and some micronutrients (e.g., calcium, vitamin D, vitamin B12, folate) increase. With the decrease in muscle mass in old age, many systems (cardiovascular, respiratory, gastrointestinal) are negatively affected [3,4]. The vicious cycle between malnutrition and chronic diseases is a major cause of mortality and morbidity in this age group. Malnutrition is an important factor that prevents elderly individuals from maintaining their function and quality of life. Therefore, every elderly patient should be evaluated in terms

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of malnutrition [5,6]. The 2002 European Society of Clinical Nutrition and Metabolism (ESPEN) recommendations suggest that all individuals over age 65 should be routinely screened for nutritional status. All ESPEN guidelines published in the following years include the same recommendation [7,8].

In the study, it is expected that nutritional status will deteriorate with increasing age and malnutrition will occur. In our study, we aimed to evaluate the malnutrition status of elderly patients by applying a mini nutritional assessment in patients over 65 who applied to family medicine units.

Material and Methods

Ethics committee approval for the research was received from Trakya University Scientific Research Ethics Committee on 19.11.2018 (Decision No: 19/33). The type of research is descriptive cross-sectional. The study involved patients who were 65 years of age and older and who applied to family health centres with numbers 22.01.009-026-047 in the central district of Edirne province. Within the scope of the study, patients over the age of 65 who applied to 3 family health centers were evaluated and as a result of the power analysis conducted with G*Power (Version 3.1.9.6), reliability was 95%, effect level was 0.5 and power value was 0.90. In this context, the minimum sample size was calculated as 138. However, it was decided to evaluate 10% more people due to the idea that there would be exclusions or surveys that could show invalid or extreme value characteristics. Accordingly, data was collected from 153 people. Before the survey, patients were informed about the study, and their verbal consent was obtained. A questionnaire consisting of 27 questions, including the Mini Nutritional Assessment (MNA), was administered to patients through face-to-face interaction. The study excluded patients who were below 65 years of age and those who chose not to participate in answering the questionnaire. The Number Cruncher Statistical System (NCSS) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. During the evaluation of the study data, various descriptive statistical methods, such as the mean, standard deviation, median, frequency, ratio, minimum, and maximum, were employed.

Additionally, Student’s t test was utilized to compare two groups of variables with a normal distribution, while one-way ANOVA was used to compare three or more groups with a normal distribution. Pearson correlation analysis was utilized to assess the relationships between variables. The level of significance was set at a minimum of p<0.05.

The MNA consists of 18 questions, 15 based on verbal questioning and three based on anthropometric measurements [Body Mass Index (BMI), upper middle arm circumference, and calf circumference], and all nutritional scoring is based on 30 points. In total, 23.5-30 points indicate normal nutritional status, 17-23 points indicate risk of malnutrition, and <17 points indicate definite malnutrition. The 15 verbal questions in the MNA investigate, the patient's general nutritional status and dietary habits. The most important feature of the test is to detect the risk of malnutrition before severe changes in body weight and serum albumin levels occur when the score is between 17- and 23.5 [7].

Results

The study was conducted with 153 patients, of whom 56.9% (n=87) were female, and 43.1% (n=66) were male. The ages of the patients ranged from 65 to 93, with a mean age of 73.06±8.65 years. The demographic characteristics of the participants are presented in Table 1.

Table 1. Distribution of demographic characteristics

Demographic characteristics		n (%)
Age (years)	Min-Max (Median)	65-93 (73)
	Mean±SD	73.06±8.65
Gender	Female	87 (56.9)
	Male	66 (43.1)
Height (cm)	Min-Max (Median)	140-194 (160)
	Mean±SD	162.34±10.32
Weight (kg)	Min-Max (Median)	45-104 (75)
	Mean±SD	74.77±12.60
BMI (kg/m²)	Min-Max (Median)	18.6-41.7 (27.3)
	Mean±SD	28.56±5.39
Marital status	Single	4 (2.6)
	Married	93 (60.8)
	Widow	56 (36.6)
Education level	Illiterate	13 (8.5)
	Literate	28 (18.3)
	Primary school	85 (55.6)
	Middle school	12 (7.8)
	High school	8 (5.2)
Employment status	Undergraduate and above	7 (4.6)
	Retired	88 (57.4)
	Unemployed	65 (42.6)
Income status	No salary/income	25 (16.3)
	Salary available	101 (66.0)
	Salary + additional income	27 (17.7)
Place of residence	City	137 (95.2)
	Village	16 (4.8)
Person(s) lived with	Alone	21 (13.7)
	Spouse	86 (56.2)
	Child/relative	46 (30.1)

The body mass indices of the subjects by demographic characteristics are presented in Table 2. There was no significant relationship between age and BMI measurements (p>0.05). A significant difference was found between BMI measurements based on gender, and women's measurements were higher than men's (p=0.008; p<0.01). There were no significant differences between BMI measurements according to marital status or education level (p>0.05). There were no significant differences between BMI measurements for employment or income status (p>0.05). There was no significant difference between BMI measurements according to the place of residence (p>0.05).

Table 2. Body mass index evaluation according to demographic characteristics

Distributions and Evaluations Regarding Malnutrition

The subjects' responses to Part 1 of the MNA are presented in

Table 3. Screening scores obtained from Part 1 of the MNA ranged from 6 to 15.5, with a mean of 11.745.

Table 3. Distribution of the mini nutritional assessment part 1 results

Part 1		n (%)
Has food consumption decreased in the last three months due to decreased appetite, digestive problems, or chewing or swallowing difficulties?	Severe decrease in food intake	4 (2.6)
	Moderate decrease in food intake	14 (9.2)
	No decrease in food intake	135 (88.2)
Has there been weight loss in recent months?	>3 kg	5 (3.3)
	Unknown	5 (3.3)
	1-3 kg	18 (11.8)
	No weight loss	125 (81.7)
Mobility?	Bed/chair dependent	6 (3.9)
	Can get out of bed/chair but cannot leave the house	15 (9.8)
	Can leave the house	131 (85.6)
Has the patient complained of psychological stress or acute illness in the last three months?	Yes	38 (24.8)
	No	112 (73.2)

Table 3. Distribution of the mini nutritional assessment part 1 results

Part 1		n (%)
Has the patient had neuropsychological problems?	Severe dementia/depression	4 (2.6)
	Moderate level of dementia	22 (14.4)
	No psychological problems	125 (81.7)
Body mass index (BMI)	<19	3 (2)
	19-21	1 (7)
	21-23	11 (7.2)
	≥23	132 (86.3)
Screening scores	Min-Max	6-15.5 (13)
	Mean	11.745

Table 4 displays the patients' responses to Part 2 of the MNA.

The evaluation scores obtained from Part 2 of the MNA ranged from 4 to 14, with a mean of 12.467±1.7563.

Table 4. Distribution of the mna part 2 results

Part 2		n (%)
Independent living? (not in a nursing home or hospital)	No	9 (5.9)
	Yes	144 (94.1)
Does the patient take three or more medicines per day?	Yes	118 (77.1)
	No	35 (22.9)
Does the skin hurt to the touch or have skin sores?	Yes	5 (3.3)
	No	146 (95.4)
How many full meals does the patient eat per day?	Two meals	46 (30.1)
	Three meals	105 (68.6)
Does the patient consume two or more portions of fruit and vegetables every day?	No	47 (30.7)
	Yes	106 (69.3)
How many glasses of water does the patient drink per day?	3-5 cups	49 (32.0)
	>5 cups	101 (66.0)
Protein intake a: Does he/she consume one serving of milk or dairy products per day? b: Does he/she consume two or more servings of legumes or eggs per week? c: Does he/she consume meat, fish or chicken every day?	0 point: 0-1 yes	18 (11.8)
	0.5 point: 2 yes	97 (63.4)
	1 point: 3 yes	38 (24.8)
How does the patient eat?	Can hardly eat on his/her own	9 (5.9)
	Views self as a person with no nutritional problems	144 (94.1)
Does the patient have any nutritional problems?	Views self as malnourished	3 (2)
	Undecided	35 (22.9)
	Views self as a person with no nutritional problems	115 (75.2)
How does the patient feel about his or her health compared to people of the same age?	Not good	11 (7.2)
	Does not know	16 (10.5)
	Good	83 (54.2)
	Very good	43 (28.1)
Upper middle arm circumference	<21 cm	3 (2.0)
	21-22 cm	23 (15.0)
	≥22 cm	127 (83.0)
Calf circumference	<31 cm	12 (7.8)
	≥31 cm	141 (92.2)
Evaluation scores	Min-Max (Median)	4-14 (13)
	Mean±SD	12.467±1.7563

The distribution of malnutrition characteristics is shown in Table 5. Accordingly, 29.4% (n=45) of the patients were at risk for malnutrition and 5.9% (n=9) were malnourished.

Table 5. Distribution of malnutrition characteristics

Malnutrition classification	n (%)	
	Normal	99 (64.7)
	At risk	45 (29.4)
	Malnutrition	9 (5.9)

Malnutrition indicator scores of participants according to demographic characteristics are presented in Table 6.

A significant negative correlation was observed between age and malnutrition indicator scores, indicating a decreasing score as age increased. The significance level was 34.6% (r:-0.346; p=0.006; p<0.01).

There were no significant differences between the malnutrition indicator scores by gender (p>0.05).

There were no significant correlation between height measurements and the malnutrition indicator scores (p>0.05).

There was a significant relationship between weight measurements and malnutrition indicator scores, with a significance level of 29.6% (r: 0.296; p=0.019; p<0.05).

There was a significant positive correlation between BMI measurements and malnutrition indicator scores, with a significance level of 32.3% (r: 0.323; p=0.010; p<0.05).

There were no significant differences between the malnutrition indicator scores according to marital status or education level (p>0.05).

There were no significant differences between the malnutrition indicator scores according to employment status or income level (p>0.05).

There were no significant differences between the malnutrition indicator scores according to the place of residence or living with a person (p>0.05).

Table 6. Evaluation of malnutrition indicator scores according to demographic characteristics

		n	Malnutrition indicator score		p
			Min-Max (Median)	Mean±SD	
Age (years)	r	153		-0.346	0.006**
	p				
Gender	Female	87	13.5-29.5 (25.5)	25.15±3.48	*0.229
	Male	66	14.5-28.5 (25)	24.02±3.83	
Height (cm)	r	153		-0.110	0.394
	p				
Weight (kg)	r	153		0.296	0.019*
	p				
BMI (kg/m²)	r	153		0.323	0.010*
	p				
Marital status	*Single	4	22.5-27 (24.8)	24.75±3.18	*0.432
	Married	93	14.5-29.5 (25.8)	24.88±3.50	
	Widow	56	13.5-29 (24.8)	24.06±4.14	
Education level	Illiterate	13	23.5-28 (25.8)	25.67±2.21	*0.189
	Literate	28	15.5-29 (24.5)	22.83±4.16	
	Primary school	85	13.5-29.5 (25.5)	24.86±3.84	
	Middle school	12	20-28 (26.3)	25.13±2.94	
	High school and above	15	25.5-28.5 (27)	26.80±1.15	
Employment status	Retired	88	14.5-29.5 (26.5)	25.02±3.68	*0.404
	Unemployed	65	13.5-28.5 (25)	24.23±3.64	
Income status	No salary/income	25	15.5-28.5 (26)	24.81±3.71	*0.422
	Salary available	101	13.5-29.5 (25.5)	24.18±3.79	
	Salary + additional income	27	17.5-29 (27)	25.73±3.20	
Place of residence	City	137	13.5-29.5 (25.5)	24.69±3.71	-
	*Village	16	21-25 (25)	23.67±2.31	
Person(s) lived with	Alone	21	21-26.5 (24.5)	23.93±1.86	*0.537
	Spouse	86	14.5-29.5 (26.3)	25.05±3.48	
	Child/relative	46	13.5-29 (25)	24.00±4.53	

*Since the number of people in the group was insufficient, it was not included in the comparison; r: Pearson Correlation Coefficient; *Studen’s t Test; ^bone-way ANOVA; *p<0.05; **p<0.01

Discussion

BMI is the most commonly used practical method worldwide to determine nutritional status [9]. In our study, 3 (2%) individuals had a BMI lower than 19, and in a study by Kaya and Sahin [10], 5 (5.5%) individuals were identified. A study conducted in Kayseri in individuals over 65 years of age reported that 43.6% of men had a BMI between 25.00-29.9 kg/m², and 58.8% of women had a BMI above 30.00 kg/m² [11]. Similarly, a significant difference was found between BMI measurements by gender in our study, and BMI measurements of women were higher than those of men ($p=0.008$; $p<0.01$). Low BMI, especially in men, has been reported to be associated with poor quality of life [12,13]. Weight loss in the elderly is due to many reasons; ageing, inadequate food intake due to psychological/organic reasons (anorexia of old age and malnutrition), catabolic processes due to chronic diseases (cachexia), and sarcopenia are the main reasons [14,15].

There are studies reporting that weight loss and malnutrition increase mortality and morbidity in elderly individuals. Kaiser et al. [8] determined the risk of malnutrition to be 31.9% and the rate of malnutrition to be 5.8% in a retrospective study conducted with 4507 patients. In a study by Sahin et al. [10], the risk of malnutrition in the elderly was 49.2%, and the rate of malnutrition was 5.8%. In a study by Saka et al. [4], which evaluated patients admitted to geriatric outpatient clinics, the risk of malnutrition was 31%, and the risk was 28% in a study by Ulger et al. [16]. The American Dietetic Association emphasizes the necessity of early recognition and prevention of malnutrition in the elderly by screening methods. ESPEN recommends the MNA for nutritional evaluation in elderly patients [17]. In a literature review evaluating the prevalence of malnutrition in the geriatric age group in the community using the MNA, the risk of malnutrition was reported as 24%, and the frequency of malnutrition was reported as 2% [8]. The MNA has two forms, short and long [18]. As a result of the 18-question long-form MNA, 24.1% of the patients were found to be at risk of malnutrition, and 6.5% were found to be malnourished.

The rate of nutritional status deficiency in the elderly varies between 11-44%, which can reach up to 60% in hospitalized patients [19] and was found to be higher than 50% in nursing homes or hospitalized patients [20]. Kaiser et al. [8] reported that the malnutrition rate was 5.8% in elderly individuals living in society and 13.8% in those living in nursing homes. In a study by Karaman et al. [21], the prevalence of malnutrition was found to be 6%, and the risk of malnutrition was found to be 20.7% in elderly individuals living in the Adana Nursing Home. Our study found no significant differences in malnutrition rates by place of residence or living with a person ($p>0.05$).

Studies conducted on elderly individuals living independently in the community and those hospitalized or residing in nursing homes have reported a higher risk of malnutrition in women than in men [11-16]. In our study, similar to the study by Bayrak F. et al. [22], no difference was found between males and females with respect to malnutrition risk or the presence of malnutrition.

The incidence of depression and dementia increases later in life due to mobility limitations and social isolation [23]. In our study, the percentage of patients with no psychological problems (79%) was the majority, and we think this result occurred due to the insufficient number of participants.

Conclusion

We think that other factors affecting nutritional status, such as marital status, income level, educational status, and chronic diseases, which may vary from region to region, should be examined in detail. The most crucial problem in hospitals is the recognition stage of malnutrition. Due to the holistic approach of family medicine and being the first point of application, it is possible to identify patients at risk of malnutrition by using a test with proven validity and reliability, even if the patient presents with complaints. As observed in our study, the malnutrition rate increases with increasing age; therefore, elderly patients should be evaluated more carefully. Early diagnosis and treatment of malnutrition can prevent complications, accelerate recovery, and significantly contribute to maintaining function and improving the quality of life of elderly individuals.

Limitations of the Study

Although our study was multicentre, the number of participants was insufficient. We think our results should be supported and compared by conducting similar studies with a larger population.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Ethics committee approval for the research was received from Trakya University Scientific Research Ethics Committee on 19.11.2018 (Decision No: 19/33).

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