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MALNUTRITION IN OLD PATIENTS WITH STROKE

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ABSTRACT

INTRODUCTION: Malnutrition is vital issue since it is frequently seen among elders with chronic diseases. The aims of this study were to assess the malnutrition of stroke patients whom were 65 years and older, and make a comparison between Mini Nutritional Assessment (MNA) and Short Nutritional Assessment Questionnaire (SNAQ^{65+}).

METHODS: This cross-sectional study was conducted with 130 stroke patients who were followed in Neurology polyclinic of a University Hospital. The data were collected by a Structured Questionnaire, MNA and SNAQ^{65+} Mean±Standard Deviation, percentage, Chi-Square analysises were used in statistical analysis.

RESULTS: The mean age of patients participating were 74.21±6.04 (Min: 65 Max: 88) years, the majority of them were male.Concerning other findings, it was determined that 34.6% of respondents experienced mouth/teeth health problem; and 57.8% of these persons had dental prosthesis problem; 20% had swallowing difficulty; 96.2% were defecating in three days; and 3.1% had chronic diarrhea. According to MNA, 16.9% of the participants and 18.5% of the participants according to SNAQ^{65+} were found to have malnutrition. According to the SNAQ^{65+} scale, 24 (18.4%) patients were "malnourished" and 29 patients (22.3%) were "malnourished according to the MNA scale.

DISCUSSION and CONCLUSION: Compared to MNA, it was determined that the sensitivity of the SNAQ^{65+} was 68.9%, and its the specificity was %96. According to SNAQ^{65+}, it was determined that 24 patients (18.4%) were "malnourished"; according to MNA, 29 patients (22.3%) had "malnutrition", 9 patients identified as "well fed" by the SNAQ^{65+} scale were "malnourished". While the use of the MNA scale is recommended as "gold standard" in the screening of malnutrition in the elderly population, also the use of SNAQ^{65+} scale is suggested that it could be used to screen malnutrition in elderly stroke patients to our results.

Keywords: Malnutrition, stroke, elderly, MNA, SNAQ^{65+}.

YAŞLI İNME HASTALARINDA MALNÜTRİSYON

ÖZET

GİRİŞ ve AMAÇ: Malnütrisyon, özellikle sağlık sorunları olan yaşlılarda sık görüldüğünden önemli bir sorundur. Bu çalışmanın amacı, 65 yaş ve üzeri inmeli yaşlılarda malnütrisyon durumunu saptamak, Mini Nütrisyonel Değerlendirme Testini (MNA) ve Kısa Nütrisyonel Değerlendirme Ölçeğini (SNAQ^{65+}) karşılaştırmak ve tarama testi olarak kullanılabilirliğini belirlemektir.

YÖNTEM ve GEREÇLER: Analitik ve kesitsel tipteki araştırmanın örneklemini, bir üniversite hastanesinde Nöroloji polikliniğinde takip edilen inmeli yaşlı 130 birey oluşturdu. Veriler Yapılandırılmış Soru Formu, MNA ve SNAQ^{65+} ile toplandı. Verilerin değerlendirilmesinde, ortalama±standart sapma, sayı, yüzde dağılımları, chi-square analizleri kullanıldı.

BULGULAR: Araştırmaya katılan inmeli yaşlı bireylerin yaş ortalaması 74,21±6,04 (Min: 65 Maks: 88) yıl olup büyük çoğunluğu (%61,5) erkektir. Katılımcıların %34,6'sının ağız/diş sorunu bulunduğu ve bunlardan %57,8'inin protez sorunu yaşadığı; %20'sinin yutma güçlüğü çektiği, %96,2'sinin üç gün içinde defekasyona çıktığı ve %3,1'inin kronik diyaresinin olduğu tespit edildi. MNA'ya göre katılımcıların %16,9'u, SNAQ^{65+}'e göre katılımcıların %18,5'inin malnütrisyonlu olduğu bulundu. SNAQ^{65+} ölçeğine göre 24 hasta (%18,4) "kötü beslenmiş", MNA ölçeğine göre ise 29 (%22,3) hasta "malnütrisyonlu" olarak saptandı.

TARTIŞMA ve SONUÇ: SNAQ^{65+} ölçeğinin, MNA ölçeğinin tarama puanına göre duyarlılığı %68,9, özgüllüğü ise %96 olarak belirlendi. SNAQ^{65+} ölçeğine göre 24 hastanın (%18,4) "kötü beslenmiş" olduğu, MNA ölçeğine göre ise 29 (%22.3)

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hastanın "malnütrisyonlu" olduğu, SNAQ65+ ölçeğinin iyi beslenmiş olarak belirlediği 9 hastanın, MNA'ya göre "malnütrisyonlu" olduğu saptanmıştır. Yaşlı popülasyonda malnütrisyonu taramada "altın standart" olarak MNA ölçeğinin kullanımı önerilirken, araştırma sonucumuza göre SNAQ65+ ölçeğinin de inmeli yaşlı hastalarda malnütrisyonu taramak amacıyla kullanılabileceği önerilmektedir.

Anahtar Sözcükler: Malnütrisyon, inme, yaşlı, MNA, SNAQ65+.

INTRODUCTION

The rate of malnutrition in the healthy elderly has been reported to be 10-38%, whereas this rate increases up to 85% in the elderly individuals who stay in hospital/nursing home. Malnutrition is of particular importance since it is common in the elderly with health problems, is a cause of significant mortality and morbidity, and can be corrected by assessment and screening (1-7).

Due to permanent neurological deficits in stroke, many patients become dependent on others. In the elderly people who have had a stroke, progressive dysfunction due to neurological complications is the main cause of malnutrition. In stroke patients, movement restrictions and motor function disorders restrict food intake of patients and increase their energy consumption (8).

The Turkish Society of Clinical Enteral & Parenteral Nutrition (KEPAN) recommends the use of the MNA scale for malnutrition screening in the elderly (9). However, this scale is reported to be not suitable for confused patients, advanced dementia, non-cooperation, aphasic after stroke, acute disease (pneumonia) and who are fed with percutaneous endoscopic gastrostomy (PEG) (2,10).

The Short Nutritional Assessment Questionnaire 65+ (SNAQ65+) was developed by Wijnhoven et al. (2012) for screening malnutrition in female and male patients 65 years of age and over. With the help of an application instruction, the scale can be applied directly by health care team (physician, dietician, nurse, etc.) (11).

Delays in diagnosis and treatment of malnutrition lead to the unintended outcomes, such as deterioration in functional independence, dependence on fulfilling daily activities, deterioration in general well-being, increased risk of falls and fractures, pressure sores, deterioration in cognitive functions, immunity suppression and predisposition to infections, anemia and even increased mortality (4).

Although malnutrition is a major problem in elderly patients with stroke, its screening is neglected, leading to delays in diagnosing malnutrition. In Turkey, there is an insufficient number of studies evaluating malnutrition in elderly patients with stroke.

This study aims to determine the status of malnutrition in stroke patients aged 65 and over, to compare the MNA and SNAQ65+ scales, and to determine their suitability as a screening test.

MATERIAL AND METHODS

The study population of this descriptive and cross-sectional research consisted of patients 65 years of age and older with hemorrhagic or ischemic stroke, followed up in the Neurology Outpatient Clinic of Dokuz Eylül University Hospital (N=1555). The sample, however, consisted of 130 patients, selected with non-probability random method with impact ratio of 1.097, 99% power and 0.05 level of significance, using pilot application data in the NCSS-PASS power analysis program. Voluntary patients in the >65 age group who had had a stroke were included in the study, while those under 65, confused, who have advanced dementia, were aphasic and were fed with PEG were not included. The data were collected through "Structured Questionnaire", "MNA", and "SNAQ65+". The structured questionnaire prepared by the researcher based on literature review (11-16) was finalized after a pilot application with 20 patients, not included in the research, and after obtaining expert opinions. This questionnaire consists of four sections. The first section contains items for introductory information of the participants (gender, level of education, marital status, etc.); the second section consists of outpatient follow-up questions; the third section assesses anthropometric measurements (height, weight); and, fourth section consists of questions to assess nutritional status.

The weight of the individuals was measured by the calibrated hospital scale, and their height was measured by positioning feet side by side and head on the Frankfort plane.

MNA is a screening test, adapted to Turkish by the Turkish Society of Clinical Enteral & Parenteral Nutrition, which quickly and reliably assess malnutrition in the elderly. This screening test consists of 18 items including general health status, mobility, nutritional status, and anthropometric measurements (weight loss, BMI, upper arm circumference, calf circumference) of the patient. According to the scores obtained, those scored 23 and above are classified as "well-nourished", those scored 17-23.5 are classified as "at risk of malnutrition", and those scored 17 and below are classified as "malnourished". SNAQ[65+] was developed by Wijnhoven et al. (in 2012) to screen for malnutrition in individuals 65 years of age and over (men and women). The scale in Table I, adapted to Turkish by Evci et al. (2012), consists of three parts: A) Weight loss; B) Mid-upper arm circumference (cm); and, C) Appetite and functionality. An instruction manual is available for the applications of the sections of the scale. The mid-upper arm circumference (elastic and inelastic as suggested by the WHO) was measured with a millimetric measuring tape, after bending the arm 90 degrees from the elbow, and after marking the midpoint between the acromion protrusion and the olecranon protrusion, with arms hanging loose (17, 18). As a result of these measurements, the patient/individual is assessed as "not undernourished", "at risk of undernutrition" or "undernourished" (Table I). Before starting the research, the required official permission from Dokuz Eylül University Hospital (dated November 5, 2014 and no:82010743/12097), ethical approval (protocol no: 2014/397) from the Adnan Menderes University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee, and verbal consent of the participants were obtained. The data were collected by the researcher using the face-to-face interview technique, between December 2014 and March 2015, in an outpatient setting using structured questionnaire, prepared by the researcher based on literature, and screening scales (MNA standard form and SNAQ[65+]). Statistical analyses were performed using the SPSS (IBM SPSS Statistics 20) package program. Frequency tables and descriptive statistics were used in the interpretation of the findings. The multiple response method was used for questions with multiple answers, and Chi-square tables were used to assess the relations between quantitative variables.

Table I. SNAQ65+ Scale.

1. Weight loss:	< 4kg		≥4kg
2. Mid-upper arm circumference (cm)	≥25 cm		<25 cm
3. Appetite and functionality	Good appetite and/or well-functioning	Poor appetite and poor functioning	
4. Treatment plan	Not undernourished	At risk of undernutrition	Undernourished

* < Less than, ≥ Greater than and equal to

RESULTS

Of the participants, 34.7% had a stroke 5 years age and before, 98.6% was able to come to the neurology outpatient clinic for regular check-ups, 46.9% came to check-ups every 6 months, and 38.5% came for a check-up in the last 3 months-6 months. When the demographic characteristics of the participants were analyzed, the average age of the participants was 74.21±6.04 (min:65 years-max:88 years), 61.5% was female, 43.7% was primary school graduate, and 73.1% was married. Of the participants, 98.6% had social security, 94.6% lived at home with their spouse/children/relatives, and 64.6% had moderate perceived income status (n=130) (Table II).

According to the statements of the participants, 99.2% was fed orally, 75.4% was on a disease-related diet, and 84.7% was on a salt-free diet. The body mass index of 49.2% of the participants in the study was found to be in the range of 25-29.9 kg/m². Of the participants, 87.7% was not consuming alcohol, 89.4% was not a smoker, 61.5% consumed food outside meal times, and 56.2% was found to finish a meal in 10-19 minutes.

Of the participants, 34.6% had oral/dental problems, 57.8% of them had prosthetic problems, 20% had difficulty in swallowing, 96.2% defecated in the last three days, and 3.1% had chronic diarrhea. The difficulty in swallowing was caused by a stroke, which is one of the neuromuscular causes (Table III).

According to the SNAQ[65+] scale, 24 patients (18.4%) were "undernourished", and 29 (22.3%) were "malnourished" according to the MNA scale.

Accordingly, 9 patients identified as well-nourished by the SNAQ[65+] scale were identified as "malnourished" according to the MNA. There was a statistically significant correlation between SNAQ[65+] and the MNA screening score. Compared to the MNA scale, the sensitivity of the SNAQ[65+] scale was 68.9%, and its specificity was 96% (Table IV).

Table II. Distribution of demographic characteristics of the participants (N=130).

Descriptive Information	n	%
Age (74.21±6.04)		
65-74 years	69	53.1
75-84 years	55	42.3
85 years and over	6	4.6
Occupation		
Housewife	44	33.8
Retired Tradesman	20	15.4
Retired Officer	47	36.2
Other	19	14.6
Gender		
Female	50	38.5
Male	80	61.5
Education level		
Illiterate	12	9.3
Primary school	57	43.7
Secondary school and high school	38	29.3
High school and over	23	17.7
Marital Status		
Married	95	73.1
Single (never married, widowed)	35	26.9
Has a social security		
No	2	1.4
Yes	128	98.6
Residential place		
Home Alone	7	5.4
With Spouse/Children/Relatives	123	94.6
Perceived income level		
Poor	28	21.6
Moderate	84	64.6
Good	18	13.8

† Other: Working individuals

Table III. Distribution of problems affecting nutrition of the participants (N=130).

Nutritional Information	n	%
Oral/Dental problems		
Yes	45	34.6
No	85	65.4
Cause of oral/dental problems		
Denture problems	26	57.8
Missing Teeth	15	33.3
Aphtha-Wound	4	8.9
Difficulty in swallowing		
Yes	26	20.0
No	104	80.0
Defecation frequency		
Every day - every 3 days	125	96.2
4 and ≥	5	3.8
Chronic diarrhea		
Yes	4	3.1
No	126	96.9

‡↑= Above

Table IV. Comparison of SNAQ65+ and MNA scales.

SNAQ^{65+}	MNA Screening Score		Total
	11 points and under (Malnutrition)	12 points and above (Normal)	
Undernourished	20 / 96.0%	4 / 31.1%	24 / 100%
Not undernourished	9 / 4.0%	97 / 68.9%	106 / 100%
Total	29 / 100%	101 / 100%	130 / 100%

§ MNA: Mini Nutritional Assessment Scale, SNAQ^{65+}: Short Nutritional Assessment Scale

When the relationship between demographic characteristics of the participants and MNA and SNAQ^{65+} scales were examined, no statistically significant difference was found between MNA and SNAQ^{65+} scales in terms of age, occupation, gender, marital status, place of residence, and income status ($p>0.05$). However, when the SNAQ^{65+} scale was evaluated according to the level of education, a difference was found between the groups, and 27.5% of those with a primary education and lower was found to be malnourished, whereas this rate was 8.2% in those with secondary education and higher. According to the SNAQ^{65+} scale, it is noteworthy that participants become well-nourished as their level of education increases. There was a statistically significant relationship between the level of education and the MNA scores. While 26.1% of those with primary school education and lower was found to be malnourished, this rate was 6.6% in those with secondary education or higher. According to the MNA scale, participants become well-nourished as their level of education increases (Table V).

When the factors affecting nutrition were compared with MNA and SNAQ^{65+} scales, no statistically significant relationship was found between the time of stroke, dieting status, chronic diarrhea, oral/dental health problems and the nutritional status of the participants ($p>0.05$). There was a statistically significant correlation between consuming snacks and the SNAQ^{65+} scores. While 11.3% of those who eat snacks are malnourished, this rare is 30% in those who do not consume snacks. The malnutrition rate decreases in those who eat snacks (Table VI).

Table V. Evaluation of SNAQ65+ and MNA scales according to demographic characteristics of participants.

	SNAQ65+					MNA				
	Not undernourished		Undernourished		p	Normal		Malnutrition		p
	(n)	(%)	(n)	(%)		(n)	(%)	(n)	(%)	
Age										
65-74 years	55	79.7	14	20.3		56	81.2	13	18.8	
75-84 years	48	87.3	7	12.7	0.070	48	87.3	7	12.7	0.365
85 years and over	3	50	3	50		4	66.7	2	33.3	
Occupation										
Housewife	33	75	11	25		34	77.3	10	22.7	
Retired Tradesman	16	80	4	20		17	85.0	3	15	
Retired Officer	43	91.5	4	8.5	0.161	43	91.5	4	8.5	0.198
Other	14	73.7	5	26.3		14	73.7	5	26.3	
Gender										
Female	39	78	11	22	0.411	40	80	10	20	0.459
Male	67	83.7	13	16.3		68	85	12	15	
Education Level										
Primary school and under	50	72.5	19	27.5	0.005	51	73.9	18	26.1	0.003
Secondary school and above	56	91.8	5	8.2		57	93.4	4	6.6	
Marital Status										
Married	80	84.2	15	15.8	0.196	82	86.3	13	13.7	0.105
Single	26	74.3	9	25.7		26	74.3	9	25.7	
Residential place										
Home Alone	5	71.4	2	28.6	0.478	4	57.1	3	42.9	0.060
Spouse/Children/Relatives	101	82.1	22	17.9		104	86.4	19	15.4	
Income Status										
Poor	19	67.9	9	32.1		21	75.0	7	25.0	
Moderate	71	84.5	13	15.5	0.099	72	85.7	12	14.3	0.424
Good	16	88.9	2	11.1		15	83.3	3	16.7	

§ MNA: Mini Nutritional Assessment, SNAQ65+: Short Nutritional Assessment Questionnaire.

Table VI. Evaluation of SNAQ65+ and MNA scales according to factors affecting nutrition.

	SNAQ65+					MNA				
	Not undernourished		Undernourished		p	Normal		Malnutrition		p
	(n)	(%)	(n)	(%)		(n)	(%)	(n)	(%)	
Time of stroke										
Under 1 year	32	72,7	12	27,3		33	75	11	25	
1-5 years	33	80,5	8	19,5	0,081	35	85,4	6	14,6	0,194
5 years ≥	41	91,1	4	8,9		40	88,9	5	11,1	
Dieting status										
Yes	79	80,6	19	19,4		80	81,6	18	18,4	
No	27	84,4	5	15,6	0,634	28	87,5	4	12,5	0,442
Snack eating status										
Yes	71	88,8	9	11,3		70	87,5	10	12,5	
No	35	70	15	30	0,007	38	76,0	12	24,0	0,089
Oral/Dental health problem										
Yes	36	80	9	20	0,742	36	80,0	9	20,0	0,496
No	70	82,4	15	17,6		72	84,7	13	15,3	
Difficulty in swallowing										
Yes	19	73,1	7	26,9	0,214	18	69,2	8	30,8	0,035
No	87	83,7	17	16,3		90	86,5	14	13,5	
Defecation frequency										
3 days and under	104	83,2	21	16,8	0,035	106	68,8	18	11,6	0,001
4 days and ≥	2	40	3	60		2	50	2	50	
Chronic diarrhea										
Yes	4	100	0	0,0	0,334	4	100	0	0,0	0,359
No	102	81,0	24	19		104	82,5	22	17,5	

|| ↑=Above

There was a statistically significant relationship between the frequency of defecation and the MNA and SNAQ[65+] scale scores. Of those who defecated within 3 days, 16.8% was found to be undernourished, whereas this rate was 60% in those who defecated after 4 days. The problem of constipation appears to affect the nutritional status negatively (Table VI). There was a statistically significant relationship between the frequency of defecation and the MNA scores. While 11.6% of those who defecated within 3 days was found to be malnourished, this rate was 50% in those who defecated after 4 days. There was a statistically significant relationship between those with chronic constipation and the MNA scale. While 32.6% of those with chronic constipation was found to be malnourished, this rate was 9.2% in those without chronic constipation. Malnutrition is more common in people experiencing constipation problem (Table VI).

There was a statistically significant relationship between experiencing difficulty in swallowing food and the MNA scale. While 13.5% of those who did not experience difficulty in swallowing food was found to be malnourished, this rate was 30.8% in those who experienced difficulties in swallowing food. Participants were asked whether they had difficulty swallowing when consuming foods. According to responses received, participants who had difficulty in swallowing were found to be more malnourished according to the MNA scale (Table VI).

DISCUSSION

In the study conducted to detect malnutrition in stroke patients 65 years and older (130 patients), followed up in the neurology outpatient clinic, the mean age of the participants was 74.21±6.04 is, more than half (61.5%) was female, about half were primary school graduates (43.7%), and three-quarters were married (73.1%) (Table II). Nearly all the participants were living at home (with their spouse/children/relatives) (94.6%) (Table II), attended neurology outpatient appointments regularly (98.6%), and nearly half were called to check in every 6 months (46.9%). In addition, one-third had a stroke at least five years ago. Accordingly, it's remarkable that the sample group, which has the average age of 74 years and a third had a stroke five years ago, came to their appointments regularly.

In two separate studies, Kruizenga et al. pointed out that 50-80% of patients with malnutrition can be identified by using a screening tool during the admission, and that the duration of hospitalization can be shortened by early screening and treatment. In our study of patients who had a stroke and who were followed up in outpatient clinic, the malnutrition rate was 22.5% according to MNA, and 18.4% was undernourished according to SNAQ[65+] (19, 20).

The prevalence of malnutrition in the elderly is high, and it is one of the leading conditions that affect health negatively. In our study, 24 patients (18.4%) were found to be "undernourished" according to the SNAQ[65+], whereas 29 (22.3%) were "malnourished" according to the MNA scale. Accordingly, 9 patients identified as well-nourished by the SNAQ[65+] scale were identified as malnourished according to the MNA (Table IV). MNA appears to be slightly more sensitive, compared to the SNAQ[65+] scale, in identifying malnutrition.

When the studies on this subject are examined, in a retrospective study conducted by Kaiser et al. in 12 countries using MNA, the malnutrition rate in people aged 65 and over living in the society was reported to be 5.8%, whereas this rate was 13.8% in those living in nursing homes, and 38.7% in hospitalized individuals (21). In a study of 1650 patients over the age of 65 in Australia and New Zealand, which was conducted using the subjective global assessment test, 60% of the patients was found to be malnourished (22). In Turkey, the incidence of malnutrition in elderly people in nursing homes is reported to be 16-85% (4). In a study conducted in patients 65 years and older using MNA-SF (N=2327), Ülger et al. found the rate of malnutrition as 28%, and emphasized that nutritional evaluation should be a part of geriatric evaluation (23). In their study conducted by using MNA in hospitalized patients aged 65 and over, Kuyumcu et al. reported the rate of malnutrition as 12%, and the risk of malnutrition as 69%. In Turkey, the prevalence of malnutrition risk is reported as 28% in geriatric outpatient patients, 5.8-13% in the elderly in the community, 25-38.7% in hospitalized elderly patients, 13.8% in nursing home residents, and 50.5% in the elderly receiving rehabilitation (15).

MNA, adapted to Turkish by Turkish Society of Clinical Enteral & Parenteral Nutrition, is accepted and recommended as a fast and reliable method of assessing nutritional status in the

elderly. In a study by Pulido et al. (2012) using MNA within the first 24 hours following admission to hospital in patients 65 years of age and older, its sensitivity was found to be 96% and specificity was found to be 98% for the elderly (9, 24). When the literature is examined, it is seen that MNA is a worldwide accepted scale, strongly recommended in detecting malnutrition, especially in geriatric patients (21,25-27). The MNA is widely used in geriatric patients, and has been used repeatedly in acute hospitalized geriatric patients and long-term care patients. Additionally, it is difficult to complete in patients with cognitive impairment and communication problems, and also has difficulties in patient evaluation as it is quite time-consuming (approximately 20 minutes in the current patient population). Therefore, patients with advanced dementia were not included in our study. The SNAQ^{65+} screening test is valuable in that it is a simple, quick and easy to apply screening tool (28-30).

It is also suggested that SNAQ^{65+} may be used to assess malnutrition in geriatric patients. Kruizenga et al. noted that SNAQ is an easy, short, valid and reproducible scale for early diagnosis of hospital malnutrition (31). Wilson et al. recommend the use of SNAQ in adults in need of long-term care, simply because it questions loss of appetite and detects weight loss (32). In their study of outpatient patients in the Netherlands, Neelemaat et al. identified a 53-67% malnutrition with the SNAQ test, which the malnutrition identified before SNAQ was 15%, and reported that the SNAQ screening test was applicable for outpatient patients (33).

When the SNAQ^{65+} and MNA scales used in our study was compared, it was found that there was a statistically significant correlation between SNAQ^{65+} and the MNA scores. Compared to the MNA scale, the sensitivity of the SNAQ^{65+} scale was 96%, and its specificity was 68.9% (Table III). Accordingly, it is believed that the SNAQ^{65+} scale can be used to screen for malnutrition in elderly patients. Looking at the studies on this subject, in a cross-sectional study by Rolland et al. in 2012, SNAQ and MNA screening tests were applied to 175 hospitalized patients, nursing home residents and community members, aged 65 and over, and a significant correlation was found between SNAQ and MNA scores (Spearman Test r=0.48, p<.001). The predictive power of the SNAQ screening test in predicting abnormal MNA score was 0.767 (95% confidence interval, 0.69-0.85). The SNAQ

screening test was best for identifying malnutrition or risk of undernutrition, detected in elderly individuals who scored under 14 points. The sensitivity of the SNAQ screening test was 71%, and the specificity was 74%. The study concludes that the SNAQ scale has a poor sensitivity and specificity, compared to MNA, in identifying patients who are "undernourished" and "at risk of undernutrition". However, it is recommended to be used during the first evaluation phase since it identifies weight loss earlier and is easy to use in practice, compared to the MNA (34).

In a Dutch community-based study with 1687 patients aged 65 and over, Wijnhoven et al. (2012) recommended the use of SNAQ^{65+} scale for identifying malnutrition in future studies since it's a fast, easy-to-use valid scale (11).

In a study conducted in 11 rehabilitation centers in the Netherlands in 2012, Hertroijs et al. determined the nutritional status of patients, the amount of weight loss and body mass index (BMI) during the last 1, 3 and 6 months. Patients were evaluated by the Short Nutritional Assessment Questionnaire (SNAQ), Short Nutritional Assessment Questionnaire for Residential Care (SNAQ^{RC}), SNAQ 65+, MNA, and Global Assessment Tool. It was found that 28% of the patients was severely malnourished, and 10% was moderately malnourished. Of the undernourished group, 28% was overweight (BMI: 25-30), and 19% was obese (BMI>30). SNAQ^{65+} is a recommended screening tool due to its fast and easy application with high diagnostic accuracy, 96% sensitivity, and 77% specificity. MNA was identified as a screening tool with the worst diagnostic accuracy with 44% sensitivity (35). In our study, however, the specificity of the SNAQ^{65+} scale was 68.9%, and its sensitivity was 96% compared to the MNA scale (Table III).

Body mass index (BMI) was <60 kg/m^2 (36) in more than 60% of those with psychiatric and neurological diseases (36). In a study by Neelemaat et al., which focused on unintentional weight loss and BMI, as a premise of malnutrition, the specificity and sensitivity for MUST (Malnutrition Universal Screening Tool), MST (Malnutrition Screening Test), and SNAQ were found to be above 70%, and therefore, quick and easy-to-apply tests were reported to have a performance as good as comprehensive screening tests in hospitalized patients. Similarly, in this study, the sensitivity and specificity of MST and

SNAQ quaick and easy screening tool were found to close to the MUST (specificity 64- 68%, sensitivity 80-84%), hence they were found to have a performance as good as the comprehensive screening tools in identifying patients at nutritional risk. In our study, there was no statistically significant relationship between the SNAQ[65+] and BMI and the nutritional status of the participants (p>0.05) (37).

In a study using the MUST, MNA and SNAQ[65+] screening tools in outpatient patients, over 65 years of age, with heart failure (n=56), the risk classification of malnutrition was significantly different between MUST and MNA, MUST and SNAQ[65+] according to the McNemar Bowker test (p<0.05). As for the prevalence, the rate of patients in the lowest risk category was 89.1% with MUST, 69.1% with MNA and 76.8% with SNAQ[65+]. It was found that SNAQ[65+] was more adequate in screening compared to the MUST screening tool in chronic heart failure patients (38).

The fact that patients with advanced dementia were not included in the study, and study was conducted in a University hospital in province of Izmir, Turkey,constitutes the limitations of the study. Lack of bioelectrical impedance analysis, which is considered gold standard in terms of nutritional aspects, inability to evaluate biochemical parameters, and inability to measure the skin curvature thickness are among the limitations of the study.

This study was conducted to determine malnutrition by using SNAQ[65+] and MNA scales in stroke patients of 65 years of age or older, nearly all of whom lived at home, fed orally, regularly visited neurology outpatient clinics for checkups, and one third of whom had had a stroke at least five years ago. Based on the results of the study, 24 patients (%18.4) were found to be "undernourished" according to the SNAQ[65+] scale, 29 patients (%22.3) were "malnourished" according to the MNA, 9 patients considered "not undernourished" according to the SNAQ[65+] scale were identified as "malnourished" according to the MNA. In addition, a statistically significant correlation was found between SNAQ[65+] and MNA scores (p=0.000). It was also found that SNAQ[65+] scale has 96% sensitivity, and 68.9% specificity. Although the MNA scale is recommended as the "gold standard" for screening for malnutrition in the elderly population, our research results suggest that the SNAQ[65+] scale can be used to screen for malnutrition in elderly patients with

stroke. According to the study results, elderly patients with stroke, who had low education level, difficulty in swallowing, who don't eat snacks, with defecation in four days and above are "malnourished/at risk of malnutrition"; and, therefore, it is recommended that they should be screened for malnutrition at each control.

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