Accuracy and Reliability Study of the Simplified Nutritional Assessment Questionnaire (SNAQ) in Turkish Patients in Nutritional Evaluation

Nütrisyonel Değerlendirmede Basitleştirilmiş Beslenme ve İştah Anketinin (SNAQ) Türk Hastalarda Doğruluk ve Güvenilirlik Çalışması

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ABSTRACT

Aim: This study aims to reveal the accuracy and reliability of Simplified Nutritional Assessment Questionnaire (SNAQ), which is a test relatively simple and easy to apply, in the Turkish population.

Materials and Methods: This study was planned as monocentric and prospective. Patients who were hospitalized in the internal medicine ward and over 65 years old participated in the study. Since there is no SNAQ test in Turkish, its English version was translated into Turkish by a certified translator, and then translated back into English again for verification. The sample size of the study was determined as 200 patients. For each patient included in the study, Mini Nutritional Assessment, Nutritional Risk Screening-2002 and SNAQ tests were applied.

Results: Participants consisted of 51% female and 49% male. 55.5% were at the age between 65 and 74 years, 23.5% were between 75 and 84 years, and 21% were over 85 years old. The reliability coefficient of the SNAQ test was found as 0.86. This value satisfied the lower limit criterion of 0.60 proposed in the literature.

Conclusion: Turkish SNAQ was validated and proved to be reliable for the nutritional evaluation of the geriatric Turkish patient population.

Keywords: NRS-2002, MNA, SNAQ, Turkish validation, malnutrition

ÖZ

Amaç: Bu çalışmada oldukça basit ve kolay uygulanabilir bir nütrisyonel değerlendirme testi olan Basitleştirilmiş Beslenme ve İştah Anketi (SNAQ) testinin Türk popülasyonunda doğruluk ve güvenilirliği araştırıldı.

Gereç ve Yöntem: Çalışma tek merkezli prospektif bir çalışma olarak tasarlandı. İç hastalıkları kliniğimize yatan 65 yaş üstü hastalar çalışmaya dahil edildi. SNAQ testinin Türkçe formu bulunmadığından yeminli tercüman tarafından İngilizce'den Türkçe'ye çevrildi ve sağlamasını yapmak üzere Türkçe'den İngilizce'ye çevirisi yapıldı. Çalışmanın örneklem genişliği 200 hasta olarak tespit edildi. Çalışmaya alınan her hastada Mini Beslenme Değerlendirmesi, Nütrisyonel Risk Tarama Aracı-2002 ve SNAQ nütrisyonel değerlendirme testleri uygulandı.

Bulgular: Araştırmaya katılanların %51'i kadın, %49'u erkekti. Katılımcıların %55,5'i 65 ile 74, %23,5'i 75 ile 84 yaş aralığında ve %21'i ise 85 yaş ve üzerindeydi. Basitleştirilmiş beslenme ve iştah anketinin güvenilirlik katsayısının 0,86 olduğu görülmektedir. Bu değerin literatürde öngörülen 0,60 alt limit kriterini sağlamakta olduğu görüldü.

Sonuç: Türk geriatrik hasta popülasyonunun nütrisyonel açıdan değerlendirilmesinde Türkçe SNAQ doğruluk ve güvenilirliği ispatlanmıştır.

Anahtar Kelimeler: NRS-2002, MNA, SNAQ, Türkçe validasyon, malnütrisyon

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INTRODUCTION

More than 50% of hospitalized patients have varying degrees of malnutrition[1]. Studies have reported that there is a positive correlation between the length of hospital stay and the development of malnutrition[1]. Although there are various nutritional assessment tools to assess hospitalized patients for nutritional risk, there is still no ideal test that can be most recommended and agreed upon. An ideal nutritional risk assessment test should be simple and fast, sensitive and specific, easy to understand, and able to identify patients with moderate and severe malnutrition for early intervention.

The European Society of Parenteral and Enteral Nutrition recommends the Nutritional Risk Screening-2002 (NRS-2002) and Mini Nutritional Assessment (MNA) methods for nutritional assessment[2]. NRS-2002, the predictive validity of which has been demonstrated in many studies, is recommended for hospitalized adult patients[2]. MNA is considered the "gold standard" especially for the elderly patients, but has low efficacy. In addition to questions about diet, the existence of questions that address physical and mental status may explain the limited predictive capacity.

Moreover, there are studies reporting that nutritional risk tests, such as MNA and NRS-2002, which use body mass index as a criterion especially in the elderly patients, cannot be reliable tests.

The aim of this study was to determine the accuracy and reliability of the Simplified Nutritional Assessment Questionnaire (SNAQ) test, which is a very simple and easily applicable nutritional assessment test, in the Turkish population.

MATERIALS AND METHODS

Technical Information

This study was designed as a cross-sectional study and was approved by the Local Ethics Committee of Ümraniye Training and Research Hospital Clinical Research Ethics Committee (date: 16.06.2015; number: B.10.1.TKH.4.34.H.GP.0.01/28). For power analysis, the study of Kruizenga et al.[3] was taken as reference. For the SNAQ test, which included a four-question questionnaire, a minimum of 25 per question, type 1 error of 0.05, and the power of the study was calculated as 80%. A total of 200 patients were included in the study with a 20% loss.

All patients participating in the study were informed about the purpose and duration of the study, the type of applications to be carried out, the objectives, the study forms used, and the purpose for which they were used, and their consent was obtained.

Patients over the age of 65 years, who were admitted to the Internal Medicine Clinic of University of Health Sciences Turkey, Ümraniye Training and Research Hospital, were included in the study. This study was planned as a single-center prospective study. Since there is no Turkish version of the SNAQ test, it was translated from English to Turkish by a sworn translator and translated from Turkish to English for verification. The sample size of the study was determined as 200 patients, and it was planned to be performed in a single center for three months. MNA, NRS-2002 and SNAQ (Figure 1) nutritional assessment tests were applied to each patient included in the study. In the SNAQ test, patients were asked to complete the questionnaire by circling the correct answers. According to the answers given by the patients, they were scored as a=1, b=2, c=3, d=4 and e=5. The sum of the scores corresponding to the answers to the questions forms the SNAQ score. A SNAQ score of ≤14 indicates a significant risk of at least 5% weight loss within six months.

Name: .... Gender: (please circle) Male - Female

Age: .... Weight: ....   Height: ....

Date: ....

1. My appetite is
a. Very bad
b. Bad
c. Average
d. Good
e. Very good

2. When I eat
a. I feel full after eating just a few spoonfuls
b. I feel full after eating about a third of the meal
c. I feel full after eating more than half of the meal
d. I feel full after eating most of the food
e. I never feel full

3. Food tastes
a. Very bad
b. Bad
c. Average
d. Good
e. Very good

4. Normally, I eat
a. Less than one meal a day
b. One meal a day
c. Two meals a day
d. Three meals a day
e. More than three meals a day

Figure 1. Simplified Nutritional Assessment Questionnaire (SNAQ)

Statistical Analysis

The research findings were obtained as a result of the analyses performed on the data obtained from the participants, using the SPSS v23.0 package program.

The mean and standard deviation values, which are the descriptive findings of the data obtained, were analyzed and the results were presented in tables. While evaluating the findings, reliability analysis, difference analysis and multiple agreement analysis were applied, and the results were given in tables and graphics.

RESULTS

Of the participants, 51% were female and 49% were male. 55.5% of the participants were 65 to 74 years old, 23.5% were 75 to 84 years old, and 21% were 85 years old and over. The age of the participants ranged from 65 to 95 years. The mean age was 75.88 years and the standard deviation was 9,038. The general characteristics of the patients participating in the study are summarized in Table 1.

Before moving on to the descriptive values of the research variables and the analyses for the compatibility of the variables with each other, the questions whose grouping forms were finalized in the SNAQ were combined according to the results obtained and subjected to reliability analysis. In the reliability analysis, Cronbach's alpha coefficient was taken into account in measuring the internal consistency of the statements.

The reliability coefficient was found to be 0.86. This value provides the 0.60 lower limit criterion predicted in the literature[3,4]. The obtained values revealed a high degree of internal consistency of the statements on the (SNAQ) used in the study.

The NRS-2002 scale ranged from 0 to 6 points.

At the same time, its mean was 2.70 and its standard deviation was 1.707. When the MNA scale was examined, it was seen that the scale was scored between 1 and 30, with a mean of 16,563 and a standard deviation of 7.0890. It was observed that the scores of the SNAQ scale were between 4 and 20, with a mean of 12.01 and a standard deviation of 3,732 (Table 2).

When Table 3 is examined, it is seen that there is a 2-dimensional structure. The Cronbach's alpha value of the first dimension was 0.948 and the Cronbach's alpha value of the second dimension was 0.792, and reliability levels were found to be high. The first and second baseline inertia values were calculated as 0.763 and 0.445, respectively. While the first dimension explains 76.33% of the total inertia, the second dimension explains 31,809%. On the other hand, the eigenvalues obtained as a result of the analysis were found as λ_1=5,343 and λ_2=3,117. The eigenvalues obtained give an exact measure of the fit between the real graph and the resulting two-dimensional graph.

Accordingly, the fit value between the real graph and the two-dimensional graph obtained is 8,460.

Figure 2 shows the multiple fit analysis graph. When the graph obtained as a result of multiple coherence analysis is examined, it is determined that;

- The group without nutritional deficiencies in the SNAQ scale and those without nutritional deficiencies in the NRS-2002 scale were compatible,

- The nutritional deficiency group in the SNAQ scale was compatible with the nutritional deficiency group in the NRS-

Table 1. General characteristics of the individuals participating in the study		
Groups	**Frequency (n=200)**	**Percentage (%)**
Gender		
Female	102	51
Male	98	49
Age		
Age range of 65-74 years	111	55.5
Age range of 75-84 years	47	23.5
Age 85 years and over	42	21

Table 2. Descriptive findings of all patients					
Variables	**N**	**Minimum**	**Maximum**	**Mean**	**Standard deviation**
NRS-2002	200	0	6	2.7	1.707
MNA	200	1	30	16,563	7,089
SNAQ	200	4	20	12.01	3,732
NRS-2002: Nutritional risk screening, MNA: Mini Nutritional Assessment, SNAQ: Simplified Nutritional Assessment Questionnaire					

Table 3. Multiple fit analysis values				
Size	**Cronbach's alpha**	**Eigenvalue**	**Inertia**	**Explanatory percentage**
1	0.948	5,343	0.763	76,333
2	0.792	3,117	0.445	44,524

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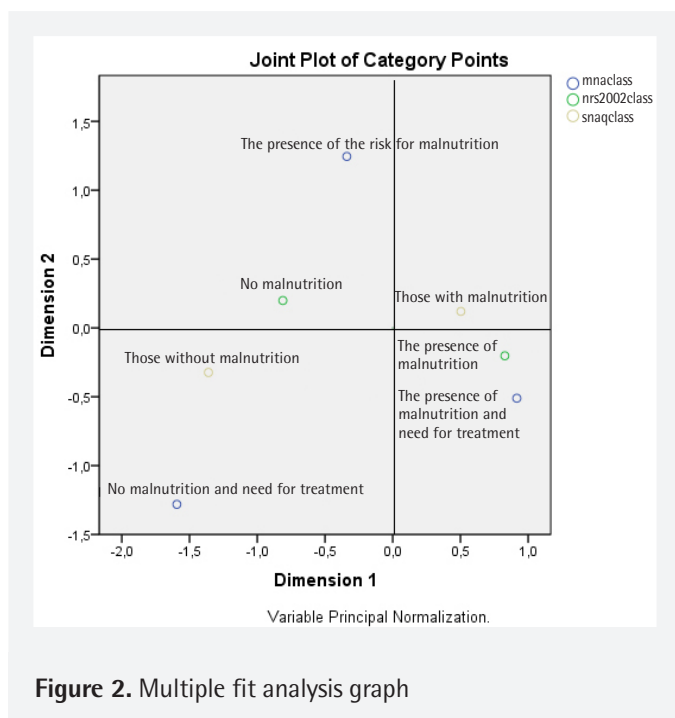
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Figure 2. Multiple fit analysis graph

2002 scale and those in need of treatment for nutritional deficiency in the MNA scale,

- The group with the risk of nutritional deficiency in the MNA scale and those without nutritional deficiency and the need for treatment were not compatible with the other groups.

DISCUSSION

With this study, the accuracy and reliability of the Turkish SNAQ questionnaire has been proven in the nutritional evaluation of the hospitalized Turkish geriatric patient population.

Malnutrition is a condition that is not noticed by many clinicians, and even if it is diagnosed, its treatment is not dealt with much[4]. According to studies, early diagnosis and adequate and qualified treatment of malnutrition can prevent complications, accelerate recovery, and make an important contribution to the fight of the elderly in preserving their functionality and preventing the loss of their quality of life[5]. Therefore, early recognition and appropriate treatment of malnutrition are of great importance. Its prevalence can be found to be 23-62% in the elderly in the hospital and 85% in the patients staying in the nursing home[6].

In our study, similar results were obtained with other studies, and the NRS-2002, MNA and SNAQ scales showed a statistically significant difference according to age.

In a meta-analysis of 36 studies examining hospital malnutrition using MNA between 1997 and 2006 in different countries, it was seen that the mean malnutrition rate was 23% (1-74%) and the risk of malnutrition was 46% (8-63%)[7].

In another meta-analysis in which the nutritional status of hospitalized elderly individuals was questioned using various methods, malnutrition was found at rates ranging from 0.7% to 76.7%[8]. The reason for the different malnutrition rates found in malnutrition studies from the past to the present is not only the differences in geographical and medical practices, but also different societies and different malnutrition detection methods that are used[8].

Unfortunately, different definitions of malnutrition and different methods that are used prevent direct comparison of the obtained results regarding the risk of malnutrition in the hospital.

Elderly malnourished patients, on the other hand, have 2-20 times more complications, nearly 100% longer hospital stays, and increased hospital costs than individuals without malnutrition[9]. In addition, in elderly individuals, malnutrition is associated with time of re-admission to the hospital, infections, gait disturbances, falls, fractures, and delayed healing of wounds[10]. In a systematic review, it was stated that individuals with low MNA scores had longer hospital stays than those with high MNA scores[11]. Unlike these studies, some studies reported that no relationship was found between malnutrition and length of hospital stay[12,13].

In our study, it was determined that people between the ages of 65 and 74 years had lower MNA levels than those who were between the ages of 75 and 84 years and those aged 85 years and over.

In the SNAQ scale, people aged 65 to 74 years were found to have higher SNAQ levels than those aged 75 to 84 years and those aged 85 years and over.

Also, people aged 85 years and over had lower SNAQ levels than people aged 75 to 84 years.

In the study of Leistra et al.[14] involving heterogeneous patients followed up in the hospital, it was reported that the SNAQ test was a reliable, fast and easy-to-apply test in determining the nutritional risks of patients.

In our study, the NRS-2002 levels of people aged 75 to 84 years were higher than those aged 65 to 74 years. At the same time, people at the age of 85 years and over had higher NRS-2002 levels than people aged 65 to 74 years and 75 to 84 years.

MNA is a rapid, patient-friendly, inexpensive nutritional assessment method that does not require laboratory examinations and was developed for use in the evaluation of the nutritional status of the elderly in staying in clinics, nursing homes and hospitals or being defined as frail[15]. Recently, MNA has been widely used in the assessment of nutritional status[15]. The development of the MNA test began in 1989 due to a discussion at the meeting of the International Association of

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Geriatrics and Gerontology, and the first article was published in 1994[16].

While the complex biological effects of aging accompanied by socio-economic factors affect the nutritional status of elderly individuals, weakness and physical dependence cause an increase in the prevalence of malnutrition[17].

In our study, 10% of the participants in the MNA scale who did not have nutritional deficiency and did not need treatment were female and 8% were male. Of the participants at risk of malnutrition, 18.5% were female and 18.5% were male. Of the participants with malnutrition and need for treatment, 22.5% were female and 22.5% were male. Of the participants, 18% did not have nutritional deficiency and did not need treatment, 37% were at risk of malnutrition, and 45% were malnourished and in need of treatment. In the SNAQ scale, 14% of the participants without nutritional deficiencies were female and 13% were male. 37% of the participants with malnutrition were female and 36% were male. While 27% of the participants were not malnourished, 73% had malnutrition. In the NRS-2002 scale, 25% of the participants without nutritional deficiencies were female and 25.5% were male. Of the participants with malnutrition, 26% were female and 23.5% were male. While 50.5% of the participants were not found to be malnourished, 49.5% had malnutrition.

In our study, in the light of these values, it was found that there was a difference among the averages of the NRS-2002, MNA and SNAQ scales according to gender; however, it was found that this difference was not statistically significant.

The number of studies on malnutrition in elderly individuals in Turkey is very few. In a multicenter study conducted by Korfali et al.[12], involving 29,139 people and 62 hospitals, 25.0% of 10,325 people over the age of 60 years were found to be at risk of malnutrition with NRS 2002. In another study including 140 individuals over the age of 65 years, who applied to the Gendarmerie Dispensary Internal Medicine Clinic of Karşıyaka District of İzmir Province, the rate of malnutrition and malnutrition risk with MNA was found to be 16.0%[13]. Four hundred and thirteen people who applied to the Internal Diseases Unit of Istanbul University Hospital within 1 year were evaluated with MNA, and 13.0% were found to have malnutrition and 31.0% were found to be at risk of malnutrition[18].

Rolland et al.[19] conducted a study on 175 people aged 65 years and over and they compared SNAQ and MNA in malnourished patients. They concluded that the SNAQ was a rather poor tool for predicting the elderly with abnormal MNA scores, but an abnormal SNAQ result might identify the elderly who would experience future weight loss earlier than MNA[19].

Sties et al.[20], in their study in which they tried to determine the clarity and validity of the SNAQ scale in Brazilian patients, observed that the Brazilian version of the SNAQ was valid and an important tool in the assessment of appetite.

Study Limitations

Our study had some limitations. Our study was a single-center cross-sectional analysis. In addition, the SNAQ scale was evaluated at a single time point.

CONCLUSION

SNAQ has proven its accuracy and reliability in detecting and treating malnourished patients in hospitalized patients, without the need to calculate weight loss or body mass index.

SNAQ is a practical tool that can be easily applied in all Turkish hospitals and all medical departments, without the need for specific details about the nutritional status of patients obtained by nurses or health personnel.

The Turkish version of the SNAQ test, which is a very practical test that has been studied in many countries, is a valid and reliable test in hospitalized patients over the age of 65 years.

Ethics

Ethics Committee Approval: The study were approved by the Local Ethics Committee of the Umraniye Training and Research Hospital (date: 16.06.2015; no: B.10.1.TKH.4.34.H.GP.0.01/28).

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: K.K.T., Concept: K.K.T., Design: K.K.T., S.U.B., Data Collection or Processing: R.S., Analysis or Interpretation: K.K.T., Literature Search: R.S., S.U.B., Writing: K.K.T., S.U.B.

Conflict of Interest: No conflict of interest was declared by the authors.

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