Original Article

Determination of nutritional risk rate in patients hospitalized in the Gastroenterology Service at Turkey hospital

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Summary. *Aim:* This study aims to determine the nutritional risk of the patients hospitalized in Gastroenterology Clinic during the initial hospitalization. *Methods:* A questionnaire including descriptive characteristics of the 241 patients who hospitalized in the Gastroenterology Clinic and NRS-2002 to assess the nutritional status. The Friedman repeated analysis of variance was used. *Results:* The mean age of the patients recruited in the study was 56.60±17.7 years. 43.2% of them were male and 56.8% were female. There was no statistical difference in nutritional deterioration scoring between the first, second and third screenings. However, at the first screening, 12% and 3.7% of the patients were categorized as mildly undernourished and as severely undernourished. At the third screening, 15% were categorized as mildly undernourished and 1.7% as severely undernourished (p>0.05). *Conclusion:* The present study concluded that the rate of the patients at the risk of malnutrition was high.

Key words: Nutritional risk rate, hospitalized patient, Gastroenterology Service

«Valutazione del tasso di rischio nutrizionale in pazienti ospedalizzati nel servizio di gastro-enterologia in un ospedale in Turchia»

Riassunto. *Obiettivo*: Scopo di questo studio è quello di determinare il rischio nutrizionale di pazienti ospedalizzati in Clinica Gastroenterologica durante il ricovero iniziale. *Metodi:* È stato utilizzato un questionario che comprende le caratteristiche descrittive dei 241 pazienti ricoverati in Clinica Gastroenterologica e il NRS 2002 per valutare lo stato nutrizionale. È stata utilizzata l'analisi della varianza ripetuta di Friedman. *Risultati:* L'età media dei pazienti arruolati nello studio era di 56,60±17,7 anni. Il 43,2% di questi erano maschi e il 56,8% erano femmine. Non c'era differenza statistica nel punteggio di deterioramento nutrizionale tra il primo, secondo e terzo screening. Tuttavia, al primo screening, il 12% e il 3,7% dei pazienti sono stati classificati rispettivamente come moderatamente e gravemente denutriti. Al terzo screening, il 15% è stato classificato come moderatamente denutrito e l'1,7% come gravemente denutrito (p>0,05). *Conclusioni:* Il presente studio ha concluso che il tasso dei pazienti a rischio di malnutrizione era alto.

Parole chiave: Tasso di rischio nutrizionale, paziente ospedalizzato, servizio di Gastroenterologia

Introduction

Malnutrition leads to functional and structural consequences on different organs and systems. Especially malnutrition in hospitals and nursing homes is a major problem. Due to tissue damage and organ dysfunction caused by malnutrition, morbidity and mortality rates of patients increase and hospital stays are prolonged (1-3).

Malnutrition can influence all functions of patients and is often overlooked. Although malnutrition mostly occurs due to cancer, trauma, acute inflammation, obstruction and fistula, 10 to 50% of patients develop eating disorders apart from the primary disease of interest during the period of hospitalization. This type of malnutrition is called iatrogenic malnutrition which can arise due to many different factors. Knowledge of these factors plays a role in the prevention of the worsening of existing malnutrition and in the regulation of appropriate treatment (4, 5).

Today in developed countries, more than 50% of patients hospitalized for various reasons have varying degrees of malnutrition (6-9). This rate varies according to the type and regions of hospital, groups of patients of interest, and the nutrition screening method used. The rate is higher particularly in the elderly and populations with chronic diseases (10-12).

Nutritional status of individuals is impaired during the length of stay, which eventually affects clinical outcomes in patients. The lack of malnutrition screening and assessment and related application protocols as well as the lack of nutritional knowledge of health care personnel, in particular, delays the diagnosis of malnutrition in hospitals. The lack of a standardized test can be associated with the unsettlement of a well-defined "nutritional risk" concept. Incorrect risk grouping of patients with improper test leads to wrong intervention, delayed intervention, and a waste of resources. An ideal nutritional risk assessment test must have high sensitivity and specificity, be easily and quickly applicable, and be able to identify patients with moderate and severe malnutrition for early intervention (12-14).

Nutritional screening and assessment provides information about the risk of malnutrition and basic energy requirements. Weight loss, body mass index, food intake, and disease severity are simple screening criteria accessible during treatment. Nutritional Risk Screening 2002, NRS2002 both involves these parameters and is reliably and practically implemented in the malnutrition screening of inpatients for ease of use. "Malnutrition Universal Screening Tool, MUST" and "Subjective Global Assessment, SGA" are among other accepted methods are (12-15).

Being aware of malnutrition is the first step of prevention. Malnutrition has recently been taken into consideration especially in hospitalized patients and tried to be prevented. However, this awareness has not led to the adequate reduction of malnutrition (12,15).

Determination of nutritional risk in hospitalized patients will help observe at-risk patients carefully during the length of stay and reverse deteriorating nutritional status earlier. Thus, hospital dieticians are required to assess the nutritional status of hospitalized patients in a controlled manner.

The objective of the present study is accordingly "to assess the nutritional status" of the patients hospitalized in the gastroenterology clinic and to identify nutritionally at-risk patients.

This study aims to determine the nutritional risk of the patients hospitalized in the clinic during the initial hospitalization, to find the rate of nutritional support intake in at-risk patients, to determine the nutritional risk one week and two weeks after the hospitalization, and to determine morbidity and mortality rates.

Method

This descriptive study was conducted with the patients hospitalized in the gastroenterology clinic at Turkey Yuksek Ihtisas Hospital from 15 May to 15 June 2011. The reason for choosing the gastroenterology clinic is the frequent occurrence of digestion and absorption problems and accordingly the at-risk group of patients who most likely to develop malnutrition in the gastroenterology clinic.

Sample

The study recruited 241 patients who were accessible and admitted to the clinic within the state dates and agreed to participate in the research.
Data Collection Tools

A questionnaire including descriptive characteristics of the patients and NRS-2002 to assess the nutritional status of the patients were used as data collection tools.

NRS-2002 (Nutritional Risk Screening) Method

NRS-2002 is based on existing randomized clinical trials (12,16). Nutritional risk is defined as the current nutritional status and the risk of its deterioration depending on requirements increased by stress metabolism. In the assessment of nutritional risk, total score is reached by evaluating three separate scores including the factors of patient's nutritional status, severity of the disease and age. In NRS 2002 scoring system, deterioration of nutritional status and severity of the disease are the two main factors assessed. Patients score from 0 to 3 points in these factors. 1 point is also added to the score if patients are aged over 70. Total score varies between 0 and 7. When the score is 3 or above, the patient is considered to be at the risk of malnutrition (12,16). Total score: A NRS score ≥3 means that patients are at nutritional risk and a nutritional care plan is launched. A NRS score <3 means that patients should be screened once a week. If a major operation is scheduled, a nutrition care plan should also be developed. Nutritional support planning is indicated in such patients: (1) at severe undernourished (score=3), or (2) seriously ill (score=3), or (3) moderately undernourished + mildly ill (score 2+1), or (4) mildly undernourished + moderately ill (score 1+2).

Procedure: It was planned to administer the NRS forms three times as from the moment when the patients were hospitalized in the clinic; however, they were administered only once or twice to some patients for some reasons such as death or early discharge of the patients, etc. As it was assumed that weight change would be in one week at the earliest after the hospitalization, the NRS forms were administered three times as at the initial hospitalization and at the end of the first week and second week. The patients hospitalized in the gastroenterology clinic were assessed within the first 24 hours by a nutritionist dietician trained on the issue.

Ethic: Routine treatment and care protocols normally administered to the patients in the hospital were fully implemented and this study did not lead to any change in the treatment and interventions provided to the patients. The patients were first informed about the subject of the study and then their approval was received. Ethics committee approval was also obtained

Data Analysis: The Friedman repeated analysis of variance was used in non-parametric measurement (because the number of individuals in the total score is not equal). Paired t-test and McNemar's test were performed in repeated parametric measurement. The level of significance was accepted as $p < 0.05$.

Findings

The mean age of the patients recruited in the study was 56.60 ± 17.7 years. 43.2% of them were male and 56.8% were female. 91.7% of the patients (n=221) were hospitalized in the clinic due to various diseases of the gastrointestinal tract (liver, gallbladder, bowel, etc.), 7.9% (n=19) due to malignant diseases of the gastrointestinal tract gastrointestinal, and 0.4% (n=1) due to drinking corrosive substances.

There was a statistically significant difference in weight between the initial and second screening and between the initial and third screening (t=4.161, $p<0.001$; t=2.341, $p<0.05$, respectively). A decrease in the weight of the patients measured at the time of hospitalization was observed and weight loss increased during the length of the hospitalization (Table 1).

There was no statistical difference in nutritional deterioration scoring between the first, second

and third screenings. However, at the first screening, 12% and 3.7% of the patients were categorized as mildly undernourished and as severely undernourished, respectively. At the second screening, 11.6% were categorized as mildly undernourished and 2% as severely undernourished. At the third screening, 15% were categorized as mildly undernourished and 1.7% as severely undernourished (p>0.05).

Nutritional support was assessed with analysis of variance at the first, second and third repeated measurements and P was found to be >0.05. Of the patients, 0.8% received nutritional support at the first screening, 2.5% at the second screening, and 11.5% at the third screening. Of the patients with a NRS score higher than 3, two patients received nutritional support at the first screening, three patients at the second screening, and five patients at the third screening.

According to NRS-2002, 28.2% (68 of 241 patients) were found to have a score ≥3 and be at the risk of malnutrition at the first screening; 30.1%

(49 of 163 patients) had a score ≥3 and were at the risk of malnutrition at the second screening; and 30.4% (21 of 69 patients) had a score ≥3 and were at the risk of malnutrition at the third screening. The present study also investigated iatrogenic malnutrition, but observed no case. The nutritional risk status of the patients was also assessed out of the total score according to NRS-2002 during the hospitalization. No difference was found in the statistical analysis performed at the first, second and third repeated measurements (Table 3).

94.6% of all patients were discharged; however, 5.4% were exitus. Of the patients with a NRS score ≥3, 11.8% were exitus at the first screening, 12.2% were exitus at the second screening, and 23.8% were exitus at the third screening.

The discharge and exitus of the patients were evaluated according to the nutritional risk depending on the hospitalization. The level of discharge from hospital was higher in the patients with normal nutritional status than those with impaired nutritional status. 22.7% of the patients with impaired nutritional status resulted in exitus. The present study also discovered that the risk of exitus was higher in the patients with impaired nutritional status than those with normal nutritional status, and the difference between them was found to be statically significant (p<0.002).

Table 1. The distribution of the weight change of patients during the hospitalization

Weight (kg)*	n	x± SD	statistics	
Age	241	56,6±17,7		
Screening 1	239	71,6±16,5	T=4.161	
Screening 2	73	70,2±15,9	p=0.001	T=2.341
Screening 3	32	66,8±16,4		p=0.026

Table 2. The change in the nutritional status of patients at the screenings at weekly intervals

	Deterioration in nutritional status *					
Score	Screening 1		Screening 2		Screening 3	
	n	%	n	%	n	%
0 (nil)	126	52,3	67	45,6	29	48,3
1 (mild)	77	32.0	60	40,8	21	35,0
2 (moderate)	29	12,0	17	11,6	9	15,0
3 (severe)	9	3,7	3	2,0	1	1,7
Total	241	100,0	147	100,0	60	100,0

*p<0.05

Table 3. Assessment of the nutritional risk of the patients during the length of hospitalization according to NRS-2002

	NRS- 2002 Total Score *					
Total Score	Screening 1		Screening 2		Screening 3	
	n	%	n	%	n	%
0	1	0,4	1	0,6	-	-
1	98	40,7	56	34,4	29	42,0
2	74	30,7	57	35,0	19	27,5
3	48	19,9	38	23,3	14	20,3
4	17	7,1	10	6,1	7	10,1
5	3	1,2	1	0,6	-	-
Total	241	100,0	163	100,0	69	100,0

*p<0.05

Discussion

Malnutrition is often observed in hospitalized patients. The rate of malnutrition may vary according to the type and regions of hospital, groups of patients of interest, and the nutrition screening method used (6). The assessment of nutritional risk is the first step to identify and prevent malnutrition. Numerous scoring systems, anthropometric measurements, biochemical tests, and electrophysiological tests have been used to assess nutritional risk. However, no method has gained general acceptance (14,17-20).

According to the results of this study, in the group of patients admitted to the gastroenterology service, 28.2% (68/241) were found to be at nutritional risk at the initial admission. This rate approximately equals to one third of the patients. At the second screening, 30.1% (49 of 163 patients) were at the risk of malnutrition, while 30.4% (21 of 69 patients were at nutritional risk. Study (21) has found the rate of malnutrition at the time of admission to be 8% and 42% in the service and intensive care patients, respectively (p< 0.05).

Yavuz et al. (2013) concluded that 28 (21%) of 133 patients operated due to acute abdomen had a NRS score higher than 3. This was attributed to the fact that factors such as mechanical obstruction, anorexia or drug side effects led to the reduction of oral food intake and thus to malnutrition (22). Genel et al. (1997) found the prevalence of malnutrition to be 56.6% in 350 cases aged from 1 month to 6 years (156 girls, 194 boys) monitored at Children's Hospital (23). The results of this study are similar to those of the present study. Malnutrition may be mostly overlooked because the complica-

tions of patients and the treatment of disease are primarily considered.

The mean age of the patients involved in the present study was 56.6 years. The risk of malnutrition increases in older age. In a study conducted in 1999, the rate of severe malnutrition was 16% in 369 patients over the age of 70 admitted to the general medical service and the rate of mortality was 2.8 times higher in this group of patients (24). In a mini nutritional assessment in Spain, 200 old persons were evaluated by a screening including the parameters of albumin, anthropometric measurements, haemoglobin, and transferrin; the mean age was 80 years and the mean BMI was found to be 24.50%. 50% of this population was malnourished (25).

Unlike these studies, the risk of malnutrition was lower in the present study. It may be attributed to the lower mean age of the individuals recruited in the present study. The risk of malnutrition increases with age. Thus, the present study conducted with a younger population may have this result.

In a study carried out in our country, Nursal et al. reported the rate of malnutrition was 11% in 2211 patients using Subjective Global Assessment (SGA). In another study involving 251 patients, Sungurtekin et al. determined the rate of malnutrition to be 36% using the Nutritional Risk Index (27).

Considering the BMI was < 18.5 and albumin was < 3.5 g/dL, Shum found the rate of malnutrition to be 16% in the population with the mean age of 80 (28). As seen, the rates of malnutrition vary due to differences such as the screening methods used in studies, the patient population recruited in the study, and age group. Malnutrition leads to

Table 4. Assessment of the discharge of the patients with at-risk nutritional status according to NRS-2002

	Discharge of the patients with a NRS Score ≥3							
	Discharge		Screening 1		Screening 2		Screening 3	
	n	%	n	%	n	%	n	%
Exitus	13	5,4	8	11.8	6	12.2	5	22.7
Discharge	228	94,6	60	88.2	43	87.8	17	77.3
Total	241	100,0	68	100.0	49	100.0	22	100.0

increased mortality in old and/or critically ill patients. In these groups of patients, the rate of mortality is 25% while it is 4% in the well-nourished population in the same age group. The same study have reported that just being able to do activities of daily living, polypharmacy, depression and cognitive dysfunction are risk factors for malnutrition. The present study shows similarity in terms of the fact that patients have digestive tract diseases, although the mean age is lower.

It is reported that long hospital stays increase the risk of malnutrition. In the study of Mc Whirter, two third of the patients were noticed to have lost 5% of their body weight when they were reassessed at the time of discharge (29). In the present study, the patients who were still hospitalized at the time of third screening were found to have lost 3 to 4 kg of their body weight.

Conclusion

The present study concluded that the rate of the patients at the risk of malnutrition was high. It was found that the risk of malnutrition could occur during the length of hospitalization and weight loss could also occur during long stays. The study also determined that the mortality rate was higher in the patients at the risk of malnutrition than others.

In the light of these results, it can be suggested to assess the risk of malnutrition of inpatients at regular intervals as from the initial hospitalization, to meet necessary nutritional requirements of at-risk patients, and to repeat similar studies in different populations.

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