

## CLINICAL STUDY

# Evaluation of nutritional risk on admission to the general surgery department

Gündođdu Haldun, Ersoy Eren, Aktimur Recep, Kulacoglu Hakan, Ozdogan Mehmet, Ozturk Vedat, Acar Tanju

General Surgery Department, Ankara Atatürk Research and Educational Hospital, Ankara, Turkey.

perenersoy@gmail.com

**Abstract:** *Background:* "Risk Screening 2002" screening index, advised by European Society for Clinical Nutrition and Metabolism in 2003, is gradually being used in surgery clinics.

*Methods:* "Nutritional Risk Screening 2002" was applied in order to evaluate the nutritional status of the patients administered to the department by the staff doctors of the clinic who were trained on standard nutritional education and the use of NRS-2002 between 15 June 2005 and 10 March 2006. The patients having "Nutritional Risk Screening 2002" score 3 were considered as nutritionally under risk.

*Results:* Totally 793 patients were evaluated in double blinded fashion. 75 patients were revealed as being under nutritional risk of whom 26 having benign and 49 having malign etiologies. 84 % of the patients with malignancy were under nutritional risk.

*Conclusions:* Patients, especially the ones having malignancy, admitted to the General Surgery departments, are under nutritional risk. NRS-2002 is a new method to evaluate nutritional risk which is easy to apply and clear to evaluate. It should be applied to all patients routinely during admittance and periodically as long as they stay at the hospital (Tab. 2, Ref. 17). Full Text (Free, PDF) [www.bmj.sk](http://www.bmj.sk).

Key words: malnutrition, nutritional risk screening 2002.

Malnutrition is present in about 30–50 % of all patients admitted to hospitals. A large proportion of this group has malnutrition on admittance apart from some who develop malnutrition at the hospital (1–5). Although different series state different malnutrition ratios it is clearly established to be one of the major factors influencing the outcome of the treatment modalities (6, 7).

Malnutrition is in particular associated with loss of muscle strength and impaired immune function which lead to an increase in complications and a prolonged hospital stay. Therefore proper nutritional treatment may reduce the morbidity, mortality and also the costs. The purpose of nutritional screening is to predict the probability of a better or worse outcome due to nutritional factors and whether nutritional treatment is likely to influence this. The better outcome can be defined as reducing the number and the severity of complications, accelerated and enhanced recovery in terms of physical and mental functions and reduced consumption of the resources (2).

Nutritional status has a major impact on recovery process. Malnutrition still remains undiagnosed and therefore frequently untreated in many hospitals. This results in high mortality and morbidity rates and higher costs which means global deteriora-

tion of results. However the lack of a widely accepted nutritional screening system which will detect patients who might benefit clinically from nutritional support is commonly seen as a major factor of improvement.

A number of nutritional screening tools have been developed to assess the nutritional risk. Although all of them have been developed for the common aim each has some advantages and disadvantages and still the golden standard of nutritional screening remains doubtful.

This study is aimed to investigate the usefulness of NRS 2002 screening tool in a general surgery department. The "Nutritional Risk Screening 2002" screening index (NRS-2002) advised by "European Society for Clinical Nutrition and Metabolism (ESPEN)" in 2003 has been gradually used in a lot of countries but not in Turkey yet.

## Materials and methods

This study took place in our general surgery department between 15 June 2005 and 10 March 2006. All staff doctors of the clinic were trained on standard nutritional education and then introduced to NRS-2002 tool. The initial screening was performed in all patients first on admission (Tab. 1). If the answers were "no" to all questions the patient was accepted as not nutritionally under risk and re-screened at weekly intervals in order to evaluate the iatrogenic malnutrition. If the answer was "yes" to any question then the final screening was performed in the patient (Tab. 2).

General Surgery Department, Ankara Atatürk Research and Educational Hospital, Ankara, Turkey

**Address of correspondence:** Eren Ersoy, MD, Binekasi sokak 17/2, Kucukesat, 06660, Ankara, Turkey.

Phone: +05055254034, Fax: +90.312.2200090

**Tab. 1. NRS 2002 Initial screening.**

	yes	no
1 Is BMI <20.5?		
2 Has the patient lost weight within the last 3 months?		
3 Has the patient a reduced dietary intake in the last week?		
4 Is the patient severely ill? (e.g. in intensive therapy)		

The method of calculating the NRS score was as follows (1):

- 1) Assess the score (0-3) for impaired nutritional status (only the variable with highest score) and severity of disease,
- 2) Add two scores and assess the total score,
- 3) If age is ≥70 years, add 1 to the total score to correct for frailty of elderly.

If age corrected total score was ≥3 then the patient was accepted as nutritionally under risk and evaluated for nutritional support. We applied NRS-2002 to all patients during admittance and also repeated the evaluation weekly when the lengths of stays were more than one week. The patients having NRS score ≥3 were accepted as nutritionally under risk. All patients were grouped according to their gender and the nature of the pathology and evaluated for malnutrition by another expert nutritionist who was not aware of the calculated NRS scores.

**Results**

NRS-2002 was applied to 793 patients in double blinded fashion. From them, 443 were males and 350 were females. The number of patients having malignant pathologies was 172, 621 had benign pathologies. 75 patients (9.5 %) had NRS-2002 score ≥3

and were considered as nutritionally under risk. From those, 26 patients had benign pathologies and 49 had malignancy. 84 % of patients having malignant pathologies were considered under nutritional risk. All patients with malignant pathologies had more than one week staying lengths and iatrogenic malnutrition was not seen in any patient during the hospitalization period. Iatrogenic malnutrition screening was also performed in double blinded fashion as in initial screening.

**Discussion**

Malnutrition is one of the major factors influencing the outcome of the therapy independent from the invasiveness of the attempts. The main problem is to determine the ones who do not seem to be poorly nourished but likely to be nutritionally risky according to personal and therapeutic factors. That means the ones who need to be nutritionally supported are not only the ones having malnutrition obviously just according to the body mass index. On the other hand nutritional support is not a harmless medication and has some complications. Therefore it should not be used when unnecessary. This is the main point of importance, for nutritional screening, of the patients on admission before other interventions. In this way we will be able to distinguish the patients who need nutritional support from those for whom the support is unnecessary.

The purpose of nutritional screening is to predict the probability of a better or worse outcome due to nutritional factors, and whether nutritional treatment is likely to influence this (2). At first the tool should state us the present condition of the patient. That means the present nutritional status and the present comorbidities (e.g. diabetes, chronic obstructive respiratory disease...) which

**Tab. 2. NRS 2002 Final screening**

Impaired nutritional status		Severity of disease	
<b>Absent Score 0</b>	Normal nutritional status	<b>Absent Score 0</b>	Normal nutritional requirements
<b>Mild Score 1</b>	Weight loss >5 % in 3 months or Food intake below 50-75 % of normal requirement in preceding week	<b>Mild Score 1</b>	Hip fracture Chronic patients, in particular with acute complications (Cirrhosis, COPD). Chronic hemodialysis, diabetes, oncology
<b>Moderate Score 2</b>	Weight loss >5 % in 2 months or BMI 18.5 -20.5 + impaired general condition or Food intake 25-60 % of normal requirement in preceding week	<b>Moderate Score 2</b>	Major abdominal surgery, stroke severe pneumonia, hematologic malignancy
<b>Severe Score 3</b>	Weight loss >5 % in 1 month (>15 % in 3 months) or BMI <18.5 + impaired general condition or Food intake 0-25 % of normal requirement in preceding week	<b>Severe Score 3</b>	Head injury, bone marrow transplantation, intensive care patients (APACHE >10)
<b>Score</b>	+	<b>Score</b>	
<b>Total score</b>			

BMI: Body Mass Index, COPD: Chronic Obstructive Pulmonary Disease, APACHE: Acute Physiology and Chronic Health Evaluation System

will probably influence the outcome. Secondly the stability of the situation should be estimated. For example a recent involuntary weight loss would be regarded as instability of the present status. The future aspects should be also included while assessing the nutritional risk of a patient. For example if we estimate that the food intake will decrease because of the pathology or therapeutic attempts we can obviously state that there is a nutritional risk for the patient which will surely influence the outcome negatively. At this point the increase in nutritional requirements because of the metabolic stress (e.g. major surgery, sepsis, trauma...) must also be taken into consideration.

NRS-2002 includes all variables stated above and gives us the nutritional risk status with high accuracy. An important point here is to separate the terms “screening” and “assessing”. Nutritional screening is defined as: “the process of identifying characteristics known to be associated with dietary or nutritional problems. Its purpose is to differentiate individuals who are at high risk of nutritional problems or have poor nutritional status” (8). Therefore screening is the first step that can be taken to address nutrition related problems. After screening patients to identify those at risk, the next logical step is nutritional assessment. This is defined as: “the measurement of the indicators of dietary or nutrition related factors to identify the presence, nature and extent of impaired nutritional status of any type” (8). Therefore screening is the first step of the assessment and assessment includes a detailed examination of metabolic, nutritional or functional variables by an expert clinician (9).

The outcome from the nutritional treatment may be assessed in a number of ways (2):

- 1) Improvement or at least prevention of deterioration in mental and physical function.
- 2) Reduced number or severity of complications of disease or its treatment.
- 3) Accelerated recovery from disease and shortened convalescence.
- 4) Reduced consumption of resources, e.g. length of hospital stay and other prescriptions.

The NRS-2002 screening system is based on an analysis of previous intervention trials by relating reported clinical outcome to scores for nutritional status and severity of disease in each study. And it is confirmed that patients identified by this system will improve clinically from nutritional intervention since the severity of complications was reduced as shown by reduced length of hospital stay periods. This system is based on evidence to a higher degree than other systems that have only been validated by interobserver variation such as the “Subjective Global Assessment (SGA)” system. In comparison studies NRS-2002 seemed to have higher sensitivity, and specificity than “Malnutrition Universal Screening Tool (MUST)” and “Nutritional Risk Indicator (NRI)” compared to SGA (10). In one study “Mini Nutritional Assessment” index is claimed to be the first choice for geriatric patient population but NRS 2002 is recommended for whom MNA cannot be applied (11). In another study “Nutritional Risk Classification (NRC)” is found to be the best prediction for the occurrence of postoperative infectious and wound

complications in elderly surgical patients (12). On the other hand NRS 2002 seems to be gradually accepted for malnutrition risk prediction on admission. Some studies state that screening tools may give different results about nutritional risk status of the same patient and this shows us that we still do not know the most reliable tool to screen the risk status (13–15).

Although malignant patients are more likely to have malnutrition and also more likely to have greater nutritional risk, this statement should be based on evidence. That means all malignancy patients do not need nutritional support before and/or after surgery. Therefore a screening tool is needed to distinguish the patients under nutritional risk from the others.

In our study, before using NRS-2002, all staff doctors of the clinic were trained on standard nutritional education and no one had problems using NRS-2002. The system is easy to apply and does not need any interpretation to get the risk scores. This also increases the validity of the tool. However, staff education is obligatory for use of screening tools (16).

Another major problem is the iatrogenic malnutrition and no golden standard for its diagnosis has not been identified yet. Although we have shown no iatrogenic malnutrition in our study it is not possible to claim that NRS 2002 is proper for iatrogenic malnutrition screening. This statement must be supported with more multiple centre randomized controlled trials.

The nutritionists are trying to identify golden standards for implementation of nutritional therapy in hospitals since the importance of malnutrition is well understood. At this point evaluating the nutritional risk seems to be an important step in order to define the concept and goals of nutritional support (17).

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