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# Evaluation of Nutritional Status of Patients that Hospitalized in General Surgery Clinic

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## Abstract

**Aim:** Malnutrition is a common problem in hospitalized patients. Early diagnosis of malnutrition and proper nutritional support decrease the formation of risks due to disease and also minimize morbidity and mortality. In this study, we aimed to determine the nutritional status and nutritional support needs of patients that hospitalized to our clinic for surgery.

**Materials and Methods:** NRS-2002 assessment system was used to evaluate the nutritional status of the patients hospitalized in the general surgery clinic of our hospital, and the preoperative nutritional risks of the patients were determined and postoperative mortality and morbidity numbers were determined.

**Results:** Preoperative NRS values of 1119 patients were zero (52.7%) for 590 patients, one (25.2%) for 282 patients, two (17.1) for 191 patients, three (4.0%) for 45 patients, 6 four (0.5%) for patients, five (0.2%) for two patients, six (0.3%) for three patients.

**Conclusion:** Patients scheduled for surgery are at risk for nutrition. Appropriate nutritional support should be initiated in these patients in the early period. We think that the introduction of nutritional support to preoperative patients with NRS values of 3 or higher will reduce the duration of hospital stay and costs in the post-operative period.

**Keywords:** Nutrition; NRS-2002; Surgery; Mortality

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## Introduction

Adequate and balanced amounts of nutrients in the body and the proper use of these nutrients by body is the basic rule of healthy life. Malnutrition is a clinical process that results in loss of size or function of organs due to malnutrition or increased need. As the individual becomes more susceptible to malnutrition in the event of illness, it is easier for many health problems to emerge [1,2]. Malnutrition is an important factor that negatively affects mental and physical functions. It has been reported that complications, morbidity and mortality increase with malnutrition, as a result of which the healing time is prolonged and the cost increases [3,4].

In addition to disease-related factors such as loss of appetite and digestion in inpatients, non-disease factors such as change of environment and inability of health personnel to provide adequate nutritional support cause malnutrition to occur or progress to existing malnutrition [1,2].

Patient's nutritional status which is mostly overlooked and unnoticed is key factor on morbidity and mortality [5,6]. It is reported that the nutritional status of the patient should be evaluated during routine follow-up as the early identification of malnutrition will provide important contributions to patient health [7,8]. In order to evaluate the nutritional status of the patient continuously and regularly, all health personnel should have sufficient knowledge and skills on this subject [8-10]. It was found that the health care teams lacking general clinical nutritional knowledge were inadequate in detecting the current malnutrition and therefore could not provide adequate nutritional support [6]. Nutritional support is now seen as the most important part of the total care and treatment of inpatients [11]. Since the introduction of Total Parenteral Nutrition (TPN) in 1968, many nutritional assessment methods have been developed. However, an ideal clinical method that can evaluate nutritional complications without pseudo-negativity has not been developed yet [5,6].

In this study, we aimed to determine the nutritional status and nutritional support needs of patients admitted to our clinic for surgery.

## Materials and Methods

In this study, we examined the patients admitted to the general surgery outpatient clinic between 2009 and 2010, who were hospitalized and followed up or admitted to the emergency department. We planned our study as a descriptive study and received local ethics committee approval. We obtained written informed consent from each patient and conducted the study in accordance with the Helsinki Declaration.

We collected data on patients' age, gender, additional diseases, nutritional status, planned operation, whether any complications developed post operatively. We obtained data from patients through anamnesis. In order to collect objective information about additional diseases, we examined pre-admission reports and medications used by the patient.

### Inclusion criteria

1. Patients admitted to the general surgery outpatient clinic in 2009-2010.
2. Patients without respiratory and circulatory support with a glaskov coma scale 15 hospitalized for emergency operation.
3. Patients aged 18-90 years.

### Exclusion criteria

1. Patients whose nutritional status information is not available.
2. Patients deceased before nutritional status assessment.
3. Patients with some missing data during follow-up.

We used the NRS-2002 assessment to assess nutritional status. In this assessment we assessed deterioration in nutritional status and criteria related to severity of disease separately.

1. Patients with normal nutritional status.
2. Patients with more than 5% weight loss in three months or 50-75% of normal requirements for food intake.
3. Patients with more than 5% weight loss in two months or whose body mass index is between 18.5-20.5 along with general medical condition disorder or nutrition intake is 25-60%.
4. Patients who have more than 5% weight loss in one month or have a body mass index of less than 18.5 and general condition disorder or food intake is below 25% of normal.

Assessments on the severity of disease were added to this score.

1. Patients with fracture in femur, cirrhosis, COPD, chronic hemodialysis, diabetes and oncologic patients.
2. Patients with cerebrovascular accident, severe pneumonia, hematologic malignancy and major abdominal surgery experience.
3. Patients with head injury, bone transplantation and ICU patients.

For patients older than 70 years, NRS was added 1 point.

As a result, patients with NRS score above 3 were considered to be under nutritional risk and should be given nutritional support.

### Evaluation of data

Data gathered were stored and assessed by using SPSS 15.0 for Windows

## Results

The total number of patients admitted to the study was 1119 and 49.2% of the patients were male (551 persons) and 50.8% were female (568 persons). While the mean age of men was 46.0, the mean age of women was 48.15.

The distribution of the operations performed in our clinic according to gender in this period is given in **Table 1**. According to the table, hernia interventions have the highest share (18.1%) among all surgical procedures. Acute abdomen requiring emergency surgery is evaluated in one class and it is 23.7%.

1115 of 1119 patients included in the study were discharged from hospital while 4 of these patients died. Discharge rate was found to be 99.6%. Complications related to disease were developed in 4 patients who died. 24 patients (2.1%) developed complications related to the disease. A total of 72 patients (6.4%) received nutritional support, while 17 of them (23.6%) had disease-related complications.

The status of complications developed related to disease in accordance with age distribution is shown in **Table 2**. Complications are most frequently seen at 60-80 years range which makes 66.7% of all cases.

Out of 1119 patient NRS score for 590 patients is found zero (52.7%); one for 282 patients (25.2%); two for 191 patients (17.1); three for 45 patients (4.0%); four for 6 patients (0.5%); five for 2 patients (0.2%); six for 3 patients (0.3%). Status of getting nutritional support in relation with NRS score is shown in 3. According to the patients with high NRS score mostly got nutritional support, from these patients with NRS scores between 5 and 6 only one has not required feeding regimen. Nutritional support was started in 11 of the patients with NRS score 0 **(Table 3).** 4 out of 1119 patients included in the study developed complications related to nutrition. 69 of patients (6.2%) who received nutrition support discharged with full recovery, 3 patients died.

## Discussion

Malnutrition is defined as a factor that has negative effects on clinical picture as well as a nutritional deficiency of which risks can be decreased with the help of adequate nutritional support [12,13] Malnutrition remains largely undiagnosed and untreated in hospitalized patients, as health personnel are not trained and conscious of nutrition [14]. It has been shown in hospitalized patients that weight loss persists in most patients during the

**Table 1** The distribution of the operations performed in our clinic according to gender.

| Performed Surgery | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % |
| Interventions for inguinal, umbilical or incisional hernia | 149 | 27.0 | 53 | 9.3 | 202 | 18.1 |
| Total or subtotal thyroidectomy, parathyroidectomies | 39 | 7.1 | 83 | 14.6 | 122 | 10.9 |
| Including acute abdomen, trauma, massive hemorrhage, intraabdominal abscesses or emergency interventions for ileus, splenectomy and resections | 155 | 28.1 | 110 | 19.4 | 265 | 23.7 |
| Subtotal or total gastrectomy and anastomoses in gastric cancer, including pyloric stenosis | 5 | 0.9 | 6 | 1.1 | 11 | 1.0 |
| Subtotal, total colectomy or anterior resections for colon or rectal cancer | 18 | 3.3 | 9 | 1.6 | 27 | 2.4 |
| Interventions for hemorrhoids, anal fissures, pilonidal sinuses, perianal fistula-abscesses or anal benign lesions | 80 | 14.5 | 32 | 10.0 | 112 | 10.0 |
| Mastectomy, except biopsy in breast cancer | 3 | 0.5 | 24 | 4.2 | 27 | 2.4 |
| Cholecystectomies, conventional or laparoscopic | 59 | 10.7 | 165 | 29.0 | 224 | 20.0 |
| Interventions for simple biopsies or soft tissue masses | 6 | 1.1 | 37 | 6.5 | 43 | 3.8 |
| Initiatives for hydatid cysts | 4 | 0.7 | 10 | 1.8 | 14 | 1.3 |
| Duodenal resections, choledochal enterostomies or whipple surgery | 2 | 0.4 | 1 | 0.2 | 3 | 0.3 |
| Acute cholecystitis without surgical intervention | 13 | 2.4 | 22 | 3.9 | 35 | 3.1 |
| Acute or chronic pancreatitis without surgical intervention | 8 | 1.5 | 4 | 0.7 | 12 | 1.1 |
| Unclassified abdominal pain and gastrointestinal bleeding, surgical or medical treatmen | 4 | 0.7 | 2 | 0.4 | 6 | 0.5 |
| Other | 6 | 1.1 | 10 | 1.8 | 16 | 1.4 |
| **Total** | 551 | 100.0 | 568 | 100.0 | 1119 | 100.0 |

**Table 2** Comparison of disease-related complication rates according to age groups of patients followed up in our clinic.

| Age range | Complications | | No complications | | Total | |
|---|---|---|---|---|---|---|
| | Sayı | % | Sayı | % | Sayı | % |
| 0-20 | - | - | 46 | 4.1 | 46 | 4.1 |
| 21-40 | 2 | 8.3 | 366 | 33.4 | 368 | 32.9 |
| 41-60 | 6 | 25.0 | 454 | 41.5 | 460 | 41.1 |
| 61-80 | 16 | 66.7 | 216 | 19.8 | 232 | 20.7 |
| 80+ | - | - | 13 | 1.2 | 13 | 1.2 |
| **Total** | 24 | 100.0 | 1095 | 100.0 | 1119 | 100.0 |

**Table 3** Comparison of nutritional support status according to NRS 2002 values of patients followed up in our clinic.

| NRS 2002 value | Receives nutritional support | | Did not receive nutritional support | |
|---|---|---|---|---|
| | Number | % | Number | % |
| 0 | 11 | 1.9 | 579 | 98.1 |
| 1 | 7 | 2.5 | 275 | 97.5 |
| 2 | 23 | 12.0 | 168 | 88.0 |
| 3 | 24 | 53.3 | 21 | 46.7 |
| 4 | 3 | 50,.0 | 3 | 50.0 |
| 5 | 2 | 100.0 | 0 | 0 |
| 6 | 2 | 66.7 | 1 | 33.0 |

hospitalization period and that these patients gain weight when appropriate nutritional support program is applied [15-19]. In this study it is shown that only 23% of hospitalized patients' body weight was measured, very few of patients' files contain information about nutrition data suggesting that malnutrition assessment is not done effectively for hospitalized patients.

Many patients are hospitalized with malnutrition. However patient's malnutrition may worsen during hospitalization period [7]. Factors such as decreased appetite, anxiety, changes in the environment and food order, inability to adapt to hospital meals, complications of primary disease and medical treatments, and fasting for examination are among the reasons that lead to the progression of malnutrition in inpatients. [1,2,10,20]. In addition reasons like not measuring patients' weight and height regularly, frequent changes in staff, insufficient follow-up of nutrient consumption, malnutrition of the patient taken into operation also cause an improving malnutrition [2,7].

There are several methods for assessing nutritional status in patients followed up in the clinic. In a study, conducted by Ursula Kyle et al. [21] tests used nutritional assessment purposes

such as NRS (nutritional risk screening), SGA (subjective global assessment), MUST (malnutrition universal screening tool), NRI (nutritional risk index) were compared with each other and concluded that NRS scoring system has the highest sensitivity and specificity. Another study comparing MNA (mini nutritional assessment) to NRS scoring system conducted by Drescher et al. [18] NRS was found to be more outperforming. In addition NRS is more applicable and easier to assess than other tests [18-20]. Because of all these data NRS scoring system has been used to assess nutritional status of patients applied to the clinic.

In general surgery clinics, maintaining nutritional status on an optimal level is in critical importance because of its role in healing process. Especially patients with gastrointestinal malignancy are under risk in terms of nutritional status [19]. It is known that independently of operation malnutrition increases morbidity and mortality and prolongs length of stay in the hospital [22]. A study done by Correia et al. [22] in hospitals in Brazil showed that of some 709 randomly chosen patients, patients of whom nutritional status held in optimal levels spent significantly less days compared to patients with malnutrition.

In our study, operations carried out in our clinic have been classified. Hernia operations, perianal interventions, thyroidectomies, laparoscopic interventions and simple biopsies usually require daily hospitalization, so there is no need for nutritional support. These patients do not need nutritional support because their NRS scores are below 3. Therefore risk of malnutrition for these patients is accepted as nonexistent.

The higher the NRS value, the higher the need for nutritional support. In this study, patients with NRS score higher than 3 are predicted to have malnutrition risk. Nutritional support was initiated in 24 patients with NRS value of 3, while 21 were not started. The majority of the patients who did not start support were those with NRS value of 2 but with age-adjusted NRS value of 3.3 of patients with 4 points NRS score were started to get nutrition support while 3 of these patients were not started. Nutritional support was initiated in 3 of 4 patients with NRS values of 5 and 6. The patient with 7 point NRS score was not included in this group. A study done by Jens Komdrup et al. [20] shows that starting nutritional support has decreasing effects on morbidity and mortality with patients who were given nutritional support at pre and postoperative period. In patients with an NRS value less than 3, it should be assessed whether the NRS value can exceed 3 in the follow-up. For example nutritional planning should be performed even if the accepted NRS values of patients undergoing major surgery are low. Additional nutritional support is also important in patients with complications due to disease [23,24].

## Conclusion

Studies have shown that the initiation of additional nutritional support in the early period in patients who admitted to hospital with low NRS value, but whose condition is complicated by various reasons, slows down or even halts the progression of the disease. Nutritional support was initiated in 23.6% of the patients who developed complications within the study. As a result, patients scheduled for surgery are at risk for nutrition. Appropriate nutritional support should be initiated in these patients in the early period. We think that the introduction of nutritional support to preoperative patients with NRS values of 3 or higher will reduce the duration and cost of hospitalization in the postoperative period.

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