



# Effects of malnutrition on quality of life in inflammatory bowel disease

İnflamatuvar bağırsak hastalığında malnütrisyona yaşam kalitesi üzerine etkisi

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**Background and Aims:** In the course of inflammatory bowel diseases, malnutrition is a common condition for both the disease itself and some other reasons, such as the drugs used. Malnutrition can also lead to an increase in patients' risk of morbidity and mortality, an increase in treatment costs and impairment in quality of life. Therefore, early detection, treatment and determination of the risk factors for malnutrition are important for inflammatory bowel diseases patients. In our study, we aimed to determine the frequency of malnutrition, the effects of malnutrition on the overall quality of life, and the demographic, clinical and laboratory features of patients with inflammatory bowel diseases. **Materials and Methods:** Patients diagnosed with inflammatory bowel diseases who were admitted to Gastroenterology Outpatient Clinic between 2020 and 2021 were screened for the risk of malnutrition by MUST score. The overall quality of life of the patients was investigated using the EQ-5D index. **Results:** The risk of malnutrition was high in 11% of the patients in the Chron's disease group and in 10% of the patients in the ulcerative colitis group. In general quality of life evaluation, EQ-5D index was  $0.83 \pm 0.16$  and EQ-5D VAS score was  $63.75 \pm 19.88$  in the Chron's disease group; in the ulcerative colitis group, the EQ-5D index was  $0.81 \pm 0.19$  and the EQ-5D VAS score was  $67.99 \pm 22.09$ , and when both groups were compared in terms of general quality of life, no statistically significant difference was observed ( $p = 0.355$ ,  $p = 0.202$ , respectively). When the remission and activation groups of patients diagnosed with Crohn's and ulcerative colitis were compared in terms of malnutrition and general quality of life, no statistically significant difference was found between both groups (activation and remission). **Conclusion:** No significant correlation was found with the activation status of the patients, their malnutrition and general quality of life. Evaluation of weight status, nutritional status and general quality of life in inflammatory bowel diseases patients in polyclinics gives us the chance to prevent possible malnutrition and deterioration of general quality of life during the course of the disease with prophylactic measures. Considering the effect of malnutrition on the prognosis of diseases, evaluation of inflammatory bowel diseases patients in terms of malnutrition is very important.

**Key words:** Inflammatory bowel diseases, malnutrition, quality of life

**Giriş ve Amaç:** İnflamatuvar bağırsak hastalıkları seyrinde, hem hastalığın kendisinden hem de kullanılan ilaçlar gibi bazı nedenlerden dolayı malnütrisyona sık görülen bir durumdur. Malnütrisyona ayrıca hastaların morbidite ve mortalite riskinde artışa, tedavi maliyetlerinde artışa ve yaşam kalitesinde bozulmaya neden olabilir. Bu nedenle inflamatuvar bağırsak hastalığı olanlar için erken teşhis, tedavi ve malnütrisyona ilişkin risk faktörlerinin belirlenmesi önemlidir. Çalışmamızda inflamatuvar bağırsak hastalığı olanlarda malnütrisyona sıklığını, malnütrisyona genel yaşam kalitesine etkilerini, demografik, klinik ve laboratuvar özelliklerini belirlemeyi amaçladık. **Gereç ve Yöntem:** 2020-2021 yılları arasında Gastroenteroloji Polikliniği'ne başvuran inflamatuvar bağırsak hastalığı tanısı alan hastalar MUST skoru ile malnütrisyona riski açısından tarandı. Hastaların genel yaşam kalitesi EQ-5D indeksi kullanılarak araştırıldı. **Bulgular:** Crohn hastalığı grubundaki hastaların %11'inde, ülseratif kolit grubundaki hastaların ise %10'unda malnütrisyona riski yüksekti. Genel yaşam kalitesi değerlendirmesinde Crohn hastalığı grubunda EQ-5D indeksi  $0.83 \pm 0.16$ , EQ-5D VAS skoru  $63.75 \pm 19.88$ ; ülseratif kolit grubunda EQ-5D indeksi  $0.81 \pm 0.19$  ve EQ-5D VAS skoru  $67.99 \pm 22.09$  olup, her iki grup genel yaşam kalitesi açısından karşılaştırıldığında istatistiksel olarak anlamlı bir fark gözlenmedi (sırasıyla  $p = 0.355$ ,  $p = 0.202$ ). Crohn hastalığı ve ülseratif kolit tanısı alan hastaların remisyon ve aktivasyon grupları malnütrisyona ve genel yaşam kalitesi açısından karşılaştırıldığında her iki grup arasında (aktivasyon ve remisyon) istatistiksel olarak anlamlı fark bulunmadı. **Sonuç:** Hastaların aktivasyon durumları, malnütrisyona ve genel yaşam kalitesi arasında anlamlı bir ilişki bulunamadı. İnflamatuvar bağırsak hastalığı hastalarında polikliniklerde kilo durumu, beslenme durumu ve genel yaşam kalitesinin değerlendirilmesi, profilaktik önlemlerle hastalığın seyrini sırasında olası malnütrisyona ve genel yaşam kalitesinin bozulmasını önleme şansı vermektedir. Malnütrisyona hastalıkların prognozu üzerindeki etkisi dikkate alındığında inflamatuvar bağırsak hastalığı hastalarının malnütrisyona açısından değerlendirilmesi oldukça önemlidir.

**Anahtar kelimeler:** İnflamatuvar barsak hastalıkları, malnütrisyona, yaşam kalitesi

## INTRODUCTION

Inflammatory bowel diseases (IBD) are chronic diseases that progress with attack and remission periods, are accompanied by abdominal pain, diarrhea, and weight loss, and deeply affect the family, social and quality of life of the patients (1). The incidence of it is currently increasing in tandem with socioeconomic development.

Nutritional disorders are common in IBD patients, and malnutrition can even occur in patients who are in remission (2). The causes of malnutrition in IBD patients are multifactorial and are known to be caused by complex pathophysiological processes (3). As examples of these pathophysiological processes, reduced food intake due to symptoms such as abdominal pain, diarrhea, and anorexia, inadequate absorption, previous bowel resection, and metabolic stress caused by steroid therapy and inflammation may be shown (3). Malnutrition is a factor that contributes to mortality and morbidity in acute and chronic gastrointestinal system diseases. Recent studies have found a relationship between malnutrition and low quality of life (4).

Quality of life (QOL) is a multidimensional indicator that reflects functional status, emotional state, well-being and welfare level. The measurement of quality of life is determined by how patients perceive their well-being. QOL is the current clinical parameter that evaluates the general condition of patients and the benefits of new treatment strategies (4). This study aims to investigate the connection between IBD and malnutrition, and the effects of malnutrition on the quality of life of these patients.

## MATERIALS and METHODS

### Patient Group

This observational study was conducted with a cohort of 162 IBD patients who underwent follow-up at the gastroenterology clinic between 2020 and

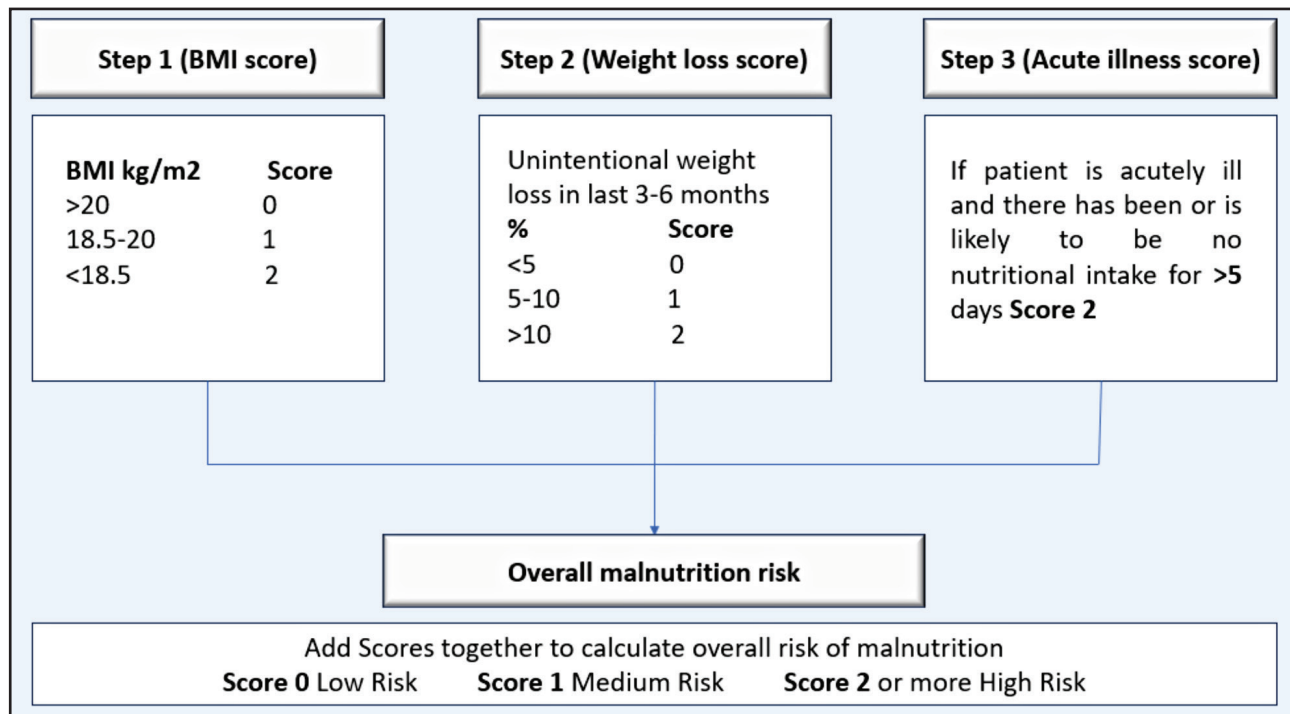
2021. IBD patients were evaluated in two groups, 82 patients in the ulcerative colitis (UC) group and 80 patients in the Crohn's disease (CD) group. The patients' age, gender, harmful habits, age at disease onset, history and number of gastrointestinal operations, history of appendectomy, number of visits to routine check-ups in the last 2 years, number of hospitalizations, and number of activations were questioned. Complete blood count, erythrocyte sedimentation rate, C-reactive protein, prealbumin, vitamin B12, vitamin D and ferritin levels were examined in patients in terms of inflammation and nutritional status.

### Evaluation of Disease Characteristics

In the UC and CD groups, the location of disease involvement was determined according to the Montreal classification (5). Disease activation and remission in UC patients were evaluated using the Mayo score. According to the Mayo score, clinical response was classified as complete or partial. Disease severity was categorized into remission ( $\leq 2$ ), mild (3-9), moderate (6-10), and severe (11-12) based on this score (6). Crohn's patients were evaluated for activation using the Harvey-Bradshaw index (HBI). HBI is a test that is both simplified and easy to calculate, making it suitable for long-term follow-up and clinical use. In this test, 5 clinical parameters are questioned; general well-being of the patient, abdominal pain, number of defecations per day, palpable abdominal mass and complications (7).

### Malnutrition and Quality of Life Assessment

MUST scoring was used in patients to evaluate malnutrition (8). MUST scoring was done in three steps. The initial step involved calculating the body-mass index (BMI) of the patients. Those with a BMI of 20 kg/m<sup>2</sup> and above were given 0 points, those with a BMI of 18.5 kg/m<sup>2</sup> - 20 kg/m<sup>2</sup> were given 1 point, and those with a BMI below 18.5 kg/m<sup>2</sup> were given 2 points. In the second step, involuntary weight loss



**Figure 1** MUST score.

in the last 3-6 months was questioned. Those with weight loss below 5% of their body weight were given 0 points, those with weight loss between 5-10% were given 1 point, and those with weight loss over 10% were given 2 points. The evaluation of weight loss did not involve continuous measurements in hospital conditions, and the results were calculated by calculating the weight of the patients 3-6 months ago. In the third stage, if there was an acute illness, the presence of a lack of food intake for longer than 5 days was assessed at 2 points. By combining the scores given in three steps, a value of between 0 and 6 points was determined.

Quality of life was measured using the visual analog scale (EQ-5D-VAS) instrument (9). The EQ-5D is a widely used, validated questionnaire that includes five health dimensions (mobility, self-care, daily activities, pain/discomfort, and anxiety/depression); and each dimension contains three levels: no difficulty, some difficulties, and extreme difficulties. The Visual Analogue Scale (VAS) is a

tool that allows respondents to assess their own health status using a vertical scale of 20 cm. The health status with the top 100 points is the best, and the health status with the bottom zero points is the worst.

### Statistical Analysis

The demographic data obtained from the study are presented with frequency and percentage distributions. In addition, an independent samples t-test was used to compare numerical variables obtained from patients according to study groups, and chi-square analysis was used to compare categorical variables. Analyses were carried out using the SPSS 22.0 program. A significance level of  $p < 0.05$  was selected.

### Ethics

Ethics committee approval for the study was received from the Gaziantep University Clinical Research Ethics Committee (05.02.2020, no: 2020/22).

## RESULTS

### Demographic Characteristics

The female to male ratio in the CD group was 24/56 and the mean age was  $38.28 \pm 12.74$  years. The UC group had a female-male ratio of 42/40 and a mean age of  $35.66 \pm 13.38$  years. Smoking was 65.9% in the CD group and 34.1% in the UC group. There was a statistically significant difference between Crohn's patients and UC patients with a history of appendectomy, with a difference of 25% and 2.49%, respectively ( $p < 0.05$ ). The average number of GI operations in the last 2 years was  $0.64 \pm 0.89$  in the CD group, and  $0.21 \pm 0.58$  in the UC group and

there was a statistically significant difference between the two groups ( $p = 0.001$ ) (Table 1).

### Disease Location and Severity

Laboratory data of the patients are shown in Table 2. Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels were found higher in CD group than UC group, and there was a statistically significant difference between the two groups ( $24.44 \pm 27.03$  mm/h vs  $16.54 \pm 15.17$  mm/h,  $p = 0.023$ ;  $17.79 \pm 38.56$  mg/dl vs  $8.12 \pm 13.32$  mg/dl,  $p = 0.034$ , respectively). The groups had no statistically significant differences in other parameters (Table 2).

**Table 1** Demographic characteristics of patients.

	CD Group (n=80) n (%)	UC Group (n=82) n (%)	p
Smoking use	27 (65.9)	14 (34.1)	0.015
Alcohol use	8 (80)	2 (20)	0.046
Appendectomy	20 (%25)	2 (%2.4)	0.001
Number of GI operations	$0.64 \pm 0.89$	$0.21 \pm 0.58$	0.001
Disease age (years)	$6.19 \pm 3.89$	$6.04 \pm 4.23$	0.814
Number of polyclinic visits in the last 2 years	$9.49 \pm 4.82$	$8.95 \pm 5.60$	0.515
Number of disease activations in the last 2 years	$0.51 \pm 0.97$	$0.80 \pm 1.05$	0.067
Number of hospitalizations in the last 2 years	$0.35 \pm 0.76$	$0.34 \pm 0.63$	0.938

CD: Chron's disease; UC: Ulcerative colitis; GI: Gastrointestinal.

**Table 2** Laboratory parameters in both groups.

	CD (n = 80)	UC (n = 82)	p
WBC ( $\mu$ L)	$7221 \pm 2516$	$7849 \pm 3011$	0.152
Hemoglobin (g/dl)	$13.67 \pm 1.92$	$14.01 \pm 1.66$	0.423
Platelets ( $\mu$ L)	$307202 \pm 104723$	$278109 \pm 92537$	0.063
ESR (mm/s)	$24.44 \pm 27.03$	$16.54 \pm 15.17$	0.023
CRP (mg/dl)	$17.79 \pm 38.56$	$8.12 \pm 13.32$	0.034
Prealbumin (mg/dl)	$26.20 \pm 8.29$	$26.46 \pm 8.00$	0.842
Vitamin B12 (pg/ml)	$234 \pm 141$	$253 \pm 108$	0.334
Ferritin (ng/ml)	$71.7 \pm 174.6$	$76.9 \pm 116.1$	0.821
Vitamin D (ng/ml)	$15.39 \pm 8.69$	$16.04 \pm 9.03$	0.642

CD: Chron's disease; UC: Ulcerative colitis; WBC: White blood cells; ESR: Erythrocyte sedimentation rate; CRP: C-reactive protein.

Ileocolonic involvement was the majority of the cases in the CD group, with 17.5% ileal involvement, 11.2% colonic involvement, and 1.3 cases of upper GI involvement. Perianal disease was found in three patients with ileocolonic involvement and two patients with colonic involvement. According to the HBI score, 82.5% of Crohn's patients were in remission, while 17.5% had active disease. Left-sided UC was the most common form of disease among patients in the UC group, with 45.2% having it, followed by ulcerative proctitis at 28%, and extensive colitis at 26.8%. Remission was found to be in 78.05% of patients in the UC group by the Mayo score. Mild disease was prevalent among patients, with 12.20% having mild disease, 6.10% having moderate disease, and 3.65% having severe disease (Table 3).

### Malnutrition and Quality of Life

The risk of malnutrition was high in 11% of the patients in the CD group and in 10% of the pa-

tients in the UC group. In general quality of life evaluation, EQ-5D index was  $0.83 \pm 0.16$  and EQ-5D VAS score was  $63.75 \pm 19.88$  in the CD group; in the UC group, the EQ-5D index was  $0.81 \pm 0.19$  and the EQ-5D VAS score was  $67.99 \pm 22.09$ , and when both groups were compared in terms of general quality of life, no statistically significant difference was observed. ( $p = 0.355$ ,  $p = 0.202$ , respectively) (Table 4). The comparison of malnutrition and general quality of life between the remission and activation groups of patients diagnosed with Crohn's and UC showed no statistically significant difference. Since MUST score values were always zero in patients diagnosed with UC in remission, a correlation calculation was not possible with this value, along with other data.

### DISCUSSION

The relationship between nutrition and IBD is quite complex. Although diet, which is the source of antigens in the intestinal lumen, is thought to play

**Table 3** Disease location and severity in both groups.

	CD (n = 80)	n (%)	UC (n = 82)	n (%)
Disease location	Upper GI	1 (1.3)	Ulcerative proctitis	23 (28)
	Ileal	14 (17.5)	Left-sided UC	37 (45.2)
	Ileocolonic	56 (70)	Extensive	22 (26.8)
	Colonic	9 (11.2)		
Disease severity	Remission	66 (82.5)	Remission	64 (78.05)
	Active disease	14 (17.5)	Mild disease	10 (12.20)
			Mild-moderate disease	5 (6.10)
			Severe disease	3 (3.65)

CD: Chron's disease; UC: Ulcerative colitis; GI: Gastrointestinal.

**Table 4** Malnutrition and quality of life measure results.

	CD (n = 80)	UC (n = 82)	P
EQ-5D index	$0.83 \pm 0.16$	$0.81 \pm 0.19$	0.355
EQ-5D VAS score	$63.75 \pm 19.88$	$67.99 \pm 22.09$	0.202
MUST score, n (%)	Low risk	64 (%78)	0.900
	Moderate risk	11 (%14)	10 (%12)
	High risk	9 (%11)	8 (%10)

CD: Chron's disease; UC: Ulcerative colitis.

an important role in the immunopathogenesis of IBD, it is not clear whether the primary effect in the etiology of IBD is caused by antibodies against antigens in the diet or whether it occurs secondary to intestinal inflammation. Another important point is that malnutrition or deficiency of certain nutrients is frequently observed in these patients. Therefore, while the nutritional regimen plays a role in the normalization of the patient with malnutrition and the treatment of active disease, on the other hand, it may be a risk factor in the etiology of IBD (10,11).

The aim of our study was to highlight the prevalence of malnutrition among IBD patients and how it affects their quality of life. In our study, we aimed to determine the prevalence of IBD patients at risk of malnutrition. We found that 10.5% of all our patients were at high risk. Csontos AA et al., in their study with 173 outpatient IBD patients, found a high risk of malnutrition in 21.4% of the patients (12). In the study of Rahman et al., 154 IBD patients were evaluated and a high malnutrition risk of 29.9% was detected (13). In our study, we found that this rate was relatively lower. We think that the reason why malnutrition is less common in our patients is because they regularly follow-up and receive the necessary treatment and nutritional support quickly in case of any clinical deterioration. Additionally, the low number of active patients included in our study may have contributed to this outcome.

The EQ-5D index was used to investigate the impact of patients' malnutrition status on their quality of life in our study. In this evaluation, no significant effect was detected between the patient groups (UC, CD) or the activation status of these patients on the quality of life. In the study conducted by Valentini L et al., although a significant relationship was found between quality of life and disease activation, no relationship was found with malnutrition (14).

A significant difference was detected between the CD and UC groups in the GI surgery history of our patient groups. According to literature, 50% of Crohn's patients may require surgical intervention within the first 10 years of their disease. Depending on the location of the disease, the lifetime risk of undergoing surgery is reported to be approximately 70-80% (15). When we look at the number of attacks in the last 2 years, Crohn's patients were significantly more prevalent. According to this data, Crohn's patients tend to have a more noisy clinical course than UC patients.

According to the patients' GI surgery history, it was determined that a significant portion of Crohn's patients had undergone an appendectomy. While 20 percent of the 80 Crohn's patients had a history of appendectomy, only two out of the 82 UC patients had a history of appendectomy. In a study by Roland E et al. on 212,218 appendectomy patients, the risk of Crohn's disease was increased in patients who underwent appendectomy. This risk persists even 20 years after an appendectomy. According to this relationship, the mechanism behind the development of appendicitis and Crohn's disease is similar (16). Previous studies have shown that appendectomy has a protective effect on UC patients. In the cohort study conducted by Andersson et al., including 212 693 cases, the risk of developing UC was reported to be reduced by 55% (17). In our study, we found that the significant difference between appendectomy history and patient groups was consistent with those observed in the aforementioned studies.

The study has some limitations. The MUST score, which we used in our study to determine the risk of malnutrition, is a screening test recommended by ESPEN, but it is not a diagnostic test. The MUST score is lacking in certain areas. For example, the presence of a prediction that food intake will not be possible for the next 5 days due to acute illness puts the patient in the high-risk group with a score

of 2. Another limitation of the study is the lack of a control group.

Evaluating the weight status, nutritional status and general quality of life of IBD patients in outpatient clinics gives us the chance to prevent possible malnutrition and deterioration in the general quality of life that may occur in these patients during the course of the disease with prophylactic measures. Malnutrition may be a disease-triggering factor in IBD patients. Affecting the general quality of life could lead to a decrease of patients' belief in recovery and compliance with medical treatment. This study may give physicians an idea in terms of timely detecting the level of malnutrition and its effects on quality of life in IBD patients in the

future, and providing prophylactic measures and nutritional support.

**Ethics:** *Ethics committee approval for the study was received from the Gaziantep University Clinical Research Ethics Committee (05.02.2020, no: 2020/22).*

**Conflicts of Interest:** *In compliance with the ICMJE uniform disclosure form, all authors declare the following: The authors declare no conflicts of interest.*

**Financial Relationships:** *All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.*

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