

Factors affecting depression, anxiety, and quality of life in patients receiving radiotherapy for gastric cancer

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Abstract

Aim: This study aimed to evaluate the quality of life, anxiety, and depression levels in gastric cancer patients receiving radiotherapy. We also investigated the impact of demographic, clinical, pathological, and laboratory data on the quality of life, anxiety, and depression levels.

Methods: We designed this prospective observational study that enrolled gastric cancer patients treated in the Radiation Oncology Department of Kayseri City Education and Research Hospital. Patients were requested to complete questionnaires on the first day of their adjuvant radiotherapy and six months after treatment completion. We utilized the clinical data collection form, the European Cancer Treatment and Organization Committee Quality of Life Questionnaire (EORTC QLQ-C30), and the Hospital Anxiety and Depression Scale (HADS) scale forms, and we analyzed statistically the data obtained.

Results: Fifty-one gastric cancer patients with a mean age of 67.1 years and 64 % males were included in the study. We found no statistically significant difference when comparing HADS scores with demographic, clinical, and pathological data. When we compared the mean scores of the EORTC QLQ-C30 with the clinicopathological characteristics of the patients, the difference was significant between gender, radiotherapy, and chemotherapy. When we performed subgroup analysis for the scales examined on the first day of radiotherapy and six months later, we found the results to be significant for fatigue, pain, financial difficulty, global health, and dyspnea for chemotherapy; role function, dyspnea, constipation, and financial situation for radiotherapy; and role function, pain, dyspnea, and insomnia for gender.

Conclusion: We demonstrated that gender, radiotherapy, and chemotherapy affected the quality of life in patients with gastric cancer, but we found no relationship between depression, anxiety, and quality of life. HIPPOKRATIA 2024, 28 (2):56-64.

Keywords: Radiotherapy, gastric cancer, quality of life, depression, anxiety

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Introduction

Gastric cancer (GC) rates fifth most common malignancy in the world, with 6.8 %¹. In clinical practice, many patients are diagnosed at an advanced stage due to generally non-specific symptoms². Surgical intervention can be curative in the early stages; however, more than two-thirds of patients present with a locally advanced or metastatic stage at initial diagnosis. In locally advanced diseases, a combined treatment modality utilizing surgery, chemotherapy, and radiotherapy is applied^{3,4}. The prognosis of GC is generally poor, and the five-year survival rate is quite low³.

The symptoms of GC, its treatment, and disease- or treatment-related complications may cause a decline in the individual's functional performance and work capa-

bility, inducing social isolation, negatively affecting family relationships, and causing undesirable lifestyle changes. These interactions negatively affect those individuals' quality of life (QoL)⁴⁻⁷. It is documented that improving the patient's QoL reduces hospitalizations and emergency visits. Thus, many scales have been developed to evaluate physical and mental problems; the most commonly used are the European Committee on the Treatment and Organization of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) and the Hospital Anxiety and Depression Scale (HADS).

Scales used to evaluate QoL consist of general and disease-specific scales. EORTC QLQ-C30 is a widely used scale that patients can apply on their own and, in a short time, allows them to evaluate concurrently the posi-

tive and negative aspects of their health status. The scale evaluates general health status, functionality (physical, role, cognitive, emotional, social, and global life), and detailed patient symptoms such as fatigue, nausea, vomiting, dyspnea, decreased appetite, constipation, and diarrhea⁴⁻¹⁰. Also, many scales have been developed to evaluate mental health, with one of the most utilized being the HADS. It was first developed in English by Zigmond and Snaith in 1983 and consists of 14 questions in total: seven questions about depression and seven questions about anxiety symptoms¹¹.

The goals of comprehensive care for cancer patients could only be achieved by ensuring people's physical, mental, and social well-being. Therefore, our study determined the GC patients' QoL levels and mental status utilizing the EORTC QLQ-C30 and HADS, respectively, aiming to investigate the relationship between the participants' QoL levels, anxiety and depression scores, and clinical and laboratory data.

Methods

We designed this prospective observational study that enrolled GC patients who received adjuvant radiotherapy in the Radiation Oncology Department of Kayseri City Education and Research Hospital after obtaining ethical approval from the Erciyes University Ethics Committee (No 2015/466). Fifty-one patients constituted the study's population after meeting the inclusion criteria: age over 18 years, gastric cancer diagnosis, Karnofsky Performance score ≥ 50 , ability to answer questions, no sensory loss, neurological/psychiatric disorders, or perception problems that could prevent filling out the survey, at least one of the patient's kins or carers to be literate, and to agree to participate in the study voluntarily.

Data Collection Forms

Patients were requested to complete questionnaire forms on the first day of their adjuvant radiotherapy and six months after treatment completion. We defined as dependent variables the EORTC QLQ-C30 and HADS scales and as independent variables age, gender, type of surgery, pathological diagnosis, surgical margin, depth of invasion, number of lymph nodes removed, presence of metastases, depth of tumor invasion, chemotherapy, and laboratory data.

EORTC QLQ-C30

This scale allows more objective data collection to evaluate individuals' symptoms, is widely used worldwide, and consists of three parts: functional scale, symptom scale, and general health status scale totaling 30 questions. The functional scale consists of 15 questions concerning physical, role, emotional, cognitive, and social functions. The symptom scale consists of 13 questions regarding specific symptoms affecting the patient's QoL (fatigue, nausea, vomiting, pain, dyspnea, insomnia, loss of appetite, constipation, diarrhea) and financial difficulties. The last two questions represent the general

health status and display the patients' evaluation of their own QoL. There are four possible answers for each question: not at all, a little, quite a bit, and a lot, accounting for 1-4 points, respectively⁶. Cankurtaran et al conducted the Turkish validity and reliability of the 3.0 version of the scale on 114 different types of cancer patients and reported the scale's Cronbach α coefficient to vary between 0.56 and 0.85, the overall QoL being 0.81, physical function 0.81, role function 0.83, emotional function 0.85, and social function 0.74¹².

HADS scale

HADS evaluates the patient's mental health status consisting of 14 items: seven questioning anxiety symptoms and seven depression symptoms. Scale's odd-numbered questions record anxiety, while even-numbered questions measure depression. Patient's responses are estimated in a four-point Likert format and score between 0-3. Patients are defined as not having anxiety when their anxiety score is 0-10 and having anxiety with 11 or more points. Similarly, they are defined as not having depression when scoring 0-7 points for depression and having depression when they get eight or more points. The Turkish HADS validity and reliability study was conducted by Aydemir et al, and it is widely used to screen for symptoms of anxiety and depression¹³.

Statistical Analysis

We used the independent sample t-test and Mann-Whitney U test to compare the means of quantitative variables in two groups, and the dependent sample t-test and Wilcoxon signed-rank test were used to compare the means of quantitative variables in groups. We analyzed the data using the statistical cloud software TURCOSA (Turcosa Statistical Solutions Ltd. Sti, www.turcosa.com.tr). We set the significance level at $p < 0.05$.

Results

Table 1 shows the demographic, clinical, and pathological data of the 51 evaluated patients. The average age of the participants was 67.1 years, and 64 % were male patients. The surveys conducted in the first and sixth months observed an increase in the anxiety rate. The anxiety scores of the cohort were 8.33 on average in the first survey and 8.96 six months after completion of radiotherapy, while the depression scores averaged 10.22 and 9.67 in the first and second measurements, respectively (Table 2). When the distribution of EORTC QLQ-C30 mean scores was examined, the highest score in the surveys conducted on the first day of radiotherapy was documented in social, cognitive, and role functions. In contrast, the lowest score was recorded in nausea, vomiting, loss of appetite, constipation, diarrhea, and financial difficulties. In the surveys conducted six months later, the highest score was recorded in physical, role, cognitive, and social functions, and the lowest score was documented in nausea and vomiting (Table 2).

When data regarding anxiety and depression obtained

Table 1: Descriptive statistics concerning demographic, clinical, and pathological data regarding the 51 gastric cancer patients included in this prospective observational study.

Variables		
Age		67.12 ± 11.8
Gender	female	18 (35.29)
	male	33 (64.71)
Tumor location	lesser curvature	19 (37.25)
	greater curvature	4 (7.84)
	antrum	16 (31.37)
	cardia	7 (13.73)
	pylorus	4 (7.84)
	corpus	1 (1.96)
Operation Type	total gastrectomy	30 (58.82)
	subtotal gastrectomy	21 (41.18)
Surgical margin	no positivity	38 (74.51)
	positivity	13 (25.49)
Dissection type	D1	45 (90)
	D2	6 (10)
Pathology	Adenocarcinoma	35 (68.63)
	stone ring cell	16 (31.77)
Depth of invasion	Serosa	44 (86.27)
	Subserosa	7 (13.72)
Chemotherapy	no	9 (17.65)
	yes	42 (82.35)
Number of lymph nodes removed		6.04 ± 8.31
Lymph node metastasis		13.04 ± 9.76
Depression (first day)	no	28 (54.90)
	yes	23 (45.09)
Depression (6 months)	no	32 (62.74)
	yes	19 (37.25)
Anxiety (first day)	no	38 (74.51)
	yes	13 (25.49)
Anxiety (6 months)	no	39 (76.47)
	yes	12 (23.52)
White blood cell (x10 ³ /μl)		9.96 ± 6.16
Neutrophil (x10 ³ /μl)		7.16 ± 6.11
Hemoglobin (g/dl)		12.74 ± 2.39
Platelet (x10 ³ /μl)		311 ± 144
BUN (mg/dL)		20.18 ± 14.5
Creatinine (mg/dL)		0.96 ± 0.35
AST (U/L)		23.6 ± 325
ALT (U/L)		28 ± 335
ALP (IU/L)		97 ± 105

Values are presented as number with percentage in brackets or as mean ± standard deviation. BUN: blood urea nitrogen, AST: aspartate transaminase, ALT: alanine transaminase, ALP: alkaline phosphatase.

through the HADS questionnaire scale conducted on the first day of radiotherapy and six months after completion of radiotherapy was compared between gender (Table 3) and variables regarding clinical and pathological data (Table 4), no significant differences were found (all $p > 0.05$).

Table 2: Clinical data obtained through the European Cancer Treatment and Organization Committee Quality of Life Questionnaire and the Hospital Anxiety and Depression scale on the first day of radiotherapy and 6 months after the end of radiotherapy.

EORTC QLQ-C30		
Physical Function	first day	66.93 ± 30.05
	6 months	60.26 ± 23.62
Role Function	first day	76.33 ± 28.76
	6 months	64.31 ± 23.06
Emotional Function	first day	67.15 ± 26.64
	6 months	64.12 ± 23.03
Cognitive Function	first day	79.7 ± 21.42
	6 months	72.29 ± 15.78
Social function	first day	80.06 ± 27.08
	6 months	76.2 ± 21.8
Fatigue	first day	33.15 ± 30.91
	6 months	38.3 ± 24.34
Nausea Vomiting	first day	19.93 ± 26.04
	6 months	17.71 ± 20.77
Pain	first day	23.53 ± 29.09
	6 months	30.46 ± 27.68
Dyspnea	first day	41.22 ± 12.3
	6 months	40.92 ± 27.78
Insomnia	first day	37.26 ± 36.29
	6 months	29.8 ± 31.19
Appetite Loss	first day	28.10 ± 35.51
	6 months	30.46 ± 29.43
Constipation	first day	23.52 ± 32.17
	6 months	38.3 ± 33.41
Diarrhea	first day	18.31 ± 29.29
	6 months	25.23 ± 25.09
Financial difficulty	first day	18.95 ± 32.15
	6 months	35.69 ± 38.04
Global Health	first day	40.69 ± 28.41
	6 months	30.78 ± 16.02
HADS scale		
Depression	first day	10.22 ± 3.62
	6 months	9.67 ± 3.63
Anxiety	first day	8.33 ± 3.06
	6 months	8.96 ± 2.77

Values are presented as mean ± standard deviation. EORTC QLQ-C30: European Cancer Treatment and Organization Committee Quality of Life Questionnaire, HADS: Hospital Anxiety and Depression Scale.

According to the Student-t test results, the scale average scores recorded on the first day of radiotherapy regarding patients who received chemotherapy were statistically significantly higher than those who did not receive chemotherapy in the variables fatigue ($p = 0.026$) and pain ($p = 0.020$) (Table 5). When comparing the first day and six months later (dependent Student-t test), the scale score averages were significantly higher after six months compared to the first day regarding fatigue ($p = 0.028$), financial difficulty ($p = 0.041$) for patients who did not receive chemotherapy, and dyspnea ($p = 0.020$) for patients who received chemotherapy. In addition, the

Table 3: Comparison between gender of data regarding anxiety and depression obtained through Hospital Anxiety and Depression scale on the first day of radiotherapy and 6 months after the end of radiotherapy.

Variables	Anxiety		p	Depression		p
	First day	6 months later		First day	6 months later	
Gender						
female (n=18)	7.83 ± 3.40	9 ± 1.46	0.179	10.17 ± 3.76	9.06 ± 3.38	0.268
male (n=33)	8.60 ± 2.88	8.94 ± 3.30	0.643	10.24 ± 3.61	10 ± 3.77	0.767
p	0.395	0.941		0.944	0.380	

Values are presented as mean ± standard deviation, n: number.

Table 4: Comparison between variables regarding clinical and pathological data with data regarding anxiety and depression obtained through Hospital Anxiety and Depression scale on the first day of radiotherapy and 6 months after the end of radiotherapy.

Variables	Anxiety		p*	Depression		p
	First day	6 months later		First day	6 months later	
Operation Type						
total gastrectomy(n=30)	8 (4-16)	9 (3-16)	0.828	10 (3-19)	9 (5-15)	0.134
subtotal gastrectomy(n=21)	7 (2-13)	9 (3-15)	0.079	9 (4-15)	10 (5-15)	0.831
p	0.218	0.528		0.765	0.197	
Surgical margin positivity						
No (n=38)	8 (2-16)	9 (3-15)	0.828	10 (3-19)	8 (5-15)	0.134
Yes (n=13)	7 (3-12)	10 (5-16)	0.079	10 (3-15)	10 (7-15)	0.831
p	0.181	0.241		0.378	0.734	
Dissection type						
D1 (n=45)	8 (2-16)	9 (3-16)	0.413	10 (3-19)	10 (5-15)	0.281
D2 (n=5)	8 (5-12)	8 (5-12)	0.581	9 (7-15)	8 (7.11)	0.279
p	0.708	0.634		0.819	0.682	
Pathology						
Adenocarcinoma (n=35)	8 (2-13)	8 (3-16)	0.646	10 (3-19)	10 (5-15)	0.499
Stone ring cell (n=16)	7 (3-16)	9 (5-12)	0.207	10 (3-15)	8 (5-15)	0.398
p	0.402	0.628		0.886	0.497	
Depth of invasion						
Serosa (n=44)	8 (2-16)	9 (5-16)	0.254	10 (3-19)	10 (5-15)	0.556
Subserosa (n=7)	8 (4-12)	8 (3-10)	1.000	13 (3-15)	8 (5-15)	0.140
p	0.601	0.291		0.659	0.405	
Chemotherapy						
No (n=9)	10 (5-16)	9 (8-12)	0.933	10 (7-15)	8 (5-15)	0.136
Yes (n=42)	8 (2-13)	8 (3-16)	0.284	10 (3-19)	10 (5-15)	0.555
p	0.200	0.210		0.618	0.871	

Values are presented as median with first (lower) and third (upper) quartiles in brackets, n: number.

global health scale averages were significantly lower after six months compared to the first day ($p=0.047$) for chemotherapy patients (Table 5).

Table 6 shows a comparison (dependent student-t test) of the measurements of the EORTC QLQ-C30 questionnaire scale on the first day and six months after completion of radiotherapy and found the difference between role function (decreased, $p=0.026$), dyspnea (increased, $p=0.016$), constipation (increased, $p=0.029$), and financial situation (deteriorated, $p=0.040$) to be significant. When the EORTC QLQ-C30 questionnaire scale results on the first day and six months were compared separately for each gender, a significant decrease in role function ($p=0.005$) and a significant increase in dyspnoea ($p=0.011$)

were found after six months for male and a significant increase in pain ($p=0.036$) for female patients (Table 7). When male and female were compared, there was only a difference in pain ($p=0.019$) and insomnia ($p=0.029$) on the first day of radiotherapy.

Discussion

We examined in this prospective study the effects of sociodemographic, clinical, and laboratory data on the QoL, anxiety, and depression of gastric cancer patients treated with adjuvant radiotherapy. The anxiety values measured on the first day of radiotherapy increased at the end of treatment, while there was no similar increase in the depression values. We observed that the QoL was

Table 5: Comparison between administering or not chemotherapy of data regarding functional status, symptoms, and general health status obtained through the European Cancer Treatment and Organization Committee Quality of Life Questionnaire on the first day of radiotherapy and 6 months after the end of radiotherapy.

Variables	Administering Chemotherapy		p
	No (n=9)	Yes (n=42)	
Physical Function			
First day	86.67 (43.33-100.0)	73.33 (40-86.67)	0.351
6 months later	66.67 (26.67-76.67)	66.67 (46.67-73.33)	0.679
p	0.172	0.152	
Role Function			
First day	100 (66.67-100.0)	83.33 (65.0-100.0)	0.389
6 months later	66.67 (41.67-83.33)	66.67 (33.33-83.33)	0.909
p	0.126	0.083	
Emotional Function			
First day	50 (29.17-95.83)	70.83 (50.-91.67)	0.350
6 months later	50 (20.83-83.33)	66.67 (57.08-75.0)	0.133
p	0.514	0.635	
Cognitive Function			
First day	83.33 (66.67-100.0)	83.33 (66.67-100.0)	0.509
6 months later	66.67 (58.33-75.0)	66.67 (66.67-83.33)	0.359
p	0.071	0.237	
Social Function			
First day	83.33 (75.0-100.0)	100 (50.0-100.0)	0.851
6 months later	66.67 (66.67-100.0)	66.67 (66.67-100.0)	0.696
p	0.281	0.900	
Fatigue			
First day	11.11 (0.0-27.78)	27.78 (11.11-66.67)	0.026
6 months later	33.33 (22.22-55.56)	33.33 (22.22-66.67)	0.860
p	0.028	0.833	
Nause Vomiting			
First day	0 (0.0-25.0)	16.67 (0.0-33.33)	0.440
6 months later	33.33 (0.0-41.67)	0 (0.0-33.33)	0.120
p	0.228	0.213	
Dyspnea			
First day	0 (0.0-50.0)	0 (0.0-33.33)	0.655
6 months later	33.33 (16.67-50.0)	33.33 (33.33-66.67)	0.347
p	0.493	0.020	
Pain			
First day	0 (0.0-16.67)	16.67 (0.0-37.5)	0.020
6 months later	16.67 (0.0-41.67)	25.0 (12.5-50.0)	0.503
p	0.890	0.456	
Insomnia			
First day	0.0 (0.0-66.67)	33.33 (0.0-66.67)	0.307
6 months later	33.33 (0.0-50.0)	33.33 (0.0-66.67)	0.749
p	0.190	0.074	
Appetite Loss			
First day	0.0 (0.0-33.33)	16.67 (0.0-66.67)	0.169
6 months later	33.33 (0.0-50.0)	33.33 (0.0-66.67)	0.784
p	0.109	0.818	

Constipation			
First day	0 (0.0-66.67)	0 (0.0-33.33)	0.761
6 months later	33.33 (33.33-83.33)	33.33 (0.0-66.67)	0.185
p	0.320	0.052	
Diarrhea			
First day	0 (0.0-0.0)	0 (0.0-33.33)	0.101
6 months later	0 (0.0-50.0)	33.33 (0.0-33.33)	0.623
p	0.129	0.767	
Financial difficulty			
First day	0 (0.0-0.0)	0 (0.0-33.33)	0.125
6 months later	33.33 (0.0-83.33)	33.33 (0.0-66.67)	0.640
p	0.041	0.193	
Global Health			
First day	33.33 (8.33-45.83)	50 (16.67-66.67)	0.132
6 months later	33.33 (16.67-37.5)	33.33 (16.67-41.67)	0.571
p	0.944	0.047	
Anxiety			
First day	10 (6.5-12.0)	8 (5.75-10.0)	0.200
6 months later	9 (8.5-11.5)	8 (6.75-10.0)	0.210
p	0.933	0.284	
Depression			
First day	10 (8.0-14.0)	10 (7.0-13.0)	0.618
6 months later	8 (7.0-12.0)	10 (7.0-13.5)	0.871
p	0.136	0.555	

Values are presented as median with first (lower) and third (upper) quartiles in brackets, n: number.

Table 6: Comparison between the first day of radiotherapy and 6 months after completion regarding each item of the European Cancer Treatment and Organization Committee Quality of Life Questionnaire.

Variables	When receiving radiotherapy		P
	First day	6 months later	
Physical function	73.33 (40.0-93.33)	66.67 (46.67-73.33)	0.056
Role Function	83.33 (66.67-83.33)	16.67 (0.0-50.0)	0.026
Emotional function	66.67 (50.0-91.67)	66.67 (50.0-75.0)	0.464
Cognitive function	83.33 (66.67-100.0)	66.67 (66.67-83.33)	0.073
Social function	100 (66.67-100.0)	66.67 (66.67-100.0)	0.528
Fatigue	22.22 (11.11-66.67)	33.33 (22.22-66.67)	0.312
Nausea vomiting	16.67 (0.0-33.33)	0 (0.0-33.33)	0.615
Pain	16.67 (0.0-33.33)	16.67 (0.0-50.0)	0.260
Dyspnea	0 (0.0-33.33)	33.33 (33.33-66.67)	0.016
Insomnia	33.33 (0.0-66.67)	33.33 (0.0-66.67)	0.415
Appetite loss	0 (0.0-66.67)	33.33 (0.0-66.67)	0.797
Constipation	0 (0.0-33.33)	33.33 (0.0-66.67)	0.029
Diarrhea	0 (0.0-33.33)	33.33 (0.0-33.33)	0.380
Financial difficulty	0 (0.0-33.33)	33.33 (0.0-66.67)	0.040
Global Health	33.33 (16.67-66.67)	33.33 (16.67-41.67)	0.068
Anxiety	8 (6.0-11.0)	9 (8.0-10.0)	0.308
Depression	10 (7.0-13.0)	10 (7.0-13.0)	0.284

Values are presented as median with first (lower) and third (upper) quartiles in brackets

negatively affected and improved after the treatment completion. It was considered that the effect on the QoL recorded on the first day of adjuvant radiotherapy could be due to earlier surgery and the side effects of the chemotherapy concurrently received. We also observed that the QoL tended to improve as soon as the treatment was completed. There are many studies in the literature investigating the relationship between chronic diseases and anxiety depression disorders, demonstrating that depres-

sion and anxiety disorders frequently accompany chronic diseases. This association is meaningful regarding individual and public health in terms of disrupting the course of the disease in individuals, increasing treatment costs, negatively affecting treatment compliance, and causing untimely deaths^{9,11,14,15}.

There are studies examining the relationship between patients' quality of life, depression status, and treatment compliance and its effects on disease mortality and mor-

Table 7: Comparison between gender of data regarding functional status, symptoms, and general health status obtained through the European Cancer Treatment and Organization Committee Quality of Life Questionnaire on the first day of radiotherapy and 6 months after the end of radiotherapy.

Variables	Gender		p
	Female (n =18)	Male (n =33)	
Physical Function			
First day	80 (65.0-88.33)	73.33 (33.33-93.33)	0.254
6 months later	66.67 (46.67-75.0)	66.67 (36.67-73.33)	0.575
p	0.103	0.247	
Role Function			
First day	100 (66.67-100.0)	83.33 (58.33-100.0)	0.173
6 months later	41.67 (33.33-83.33)	66.67 (56.67-83.33)	0.083
p	0.005	0.474	
Emotional Function			
First day	66.67 (47.92-93.75)	66.67 (50.0-91.67)	0.781
6 months later	66.67 (56.25-87.5)	66.67 (50.0-75.0)	0.460
p	0.944	0.442	
Cognitive Function			
First day	83.33 (66.67-100.0)	83.33 (66.67-100.0)	0.515
6 months later	66.67 (66.67-87.5)	66.67 (66.67-83.33)	0.991
p	0.077	0.357	
Social Function			
First day	100 (62.5-100.0)	83.33 (66.67-100.0)	0.256
6 months later	66.67 (66.67-87.5)	66.67 (66.67-100.0)	0.651
p	0.290	0.931	
Fatigue			
First day	11.11 (0.0-47.22)	33.33 (11.11-66.67)	0.100
6 months later	33.33 (11.11-50.0)	33.33 (27.78-66.67)	0.464
p	0.300	0.715	
Nausea Vomiting			
First day	16.67 (0.0-33.33)	0 (0.0-25.0)	0.210
6 months later	0 (0.0-33.33)	16.67 (0.0-33.33)	0.612
p	0.304	0.914	
Dyspnea			
First day	0 (0.0-16.67)	16.67 (0.0-50.0)	0.019
6 months later	33.33 (16.67-50.0)	16.67 (0.0-41.67)	0.155
p	0.011	0.580	
Pain			
First day	0 (0.0-41.67)	0 (0.0-33.33)	0.548
6 months later	33.33 (0.0-66.67)	33.33 (33.33-66.67)	0.317
p	0.245	0.036	
Insomnia			
First day	0 (0.0-33.33)	33.33 (0.0-66.67)	0.029
6 months later	0 (0.0-66.67)	33.33 (0.0-66.67)	0.457
p	0.620	0.195	
Appetite Loss			
First day	0 (0.0-33.33)	33.33 (0.0-66.67)	0.286
6 months later	33.33 (0.0-66.67)	33.33 (0.0-33.33)	0.453
p	0.224	0.523	

Constipation			
First day	33.33 (0.0-33.33)	0 (0.0-50.0)	0.316
6 months later	33.33 (0.0-66.67)	33.33 (16.67-66.67)	0.290
p	0.136	0.076	
Diarrhea			
First day	0 (0.0-33.33)	0 (0.0-33.33)	0.620
6 months later	33.33 (0.0-41.67)	33.33 (0.0-33.33)	0.603
p	0.408	0.571	
Financial difficulty			
First day	0 (0.0-33.33)	0 (0.0-33.33)	0.517
6 months later	33.33 (0.0-66.67)	33.33 (0.0-66.67)	0.893
p	0.101	0.172	
Global Health			
First day	45.83 (16.67-68.75)	33.33 (8.33-54.17)	0.230
6 months later	33.33 (14.58-41.67)	33.33 (16.67-41.67)	0.920
p	0.069	0.375	
Anxiety			
First day	7.5 (5.0-10.0)	8 (7.0-11.0)	0.280
6 months later	9 (8.0-10.0)	8 (5.5-12.0)	0.795
p	0.125	0.802	
Depression			
First day	9.5 (7.0-12.75)	10 (7.0-13.5)	0.812
6 months later	7.5 (7.0-13.0)	10 (7.0-15.0)	0.343
p	0.167	0.689	

Values are presented as median with first (lower) and third (upper) quartiles in brackets, n: number.

bidity¹⁶⁻¹⁸. In their study, Park et al investigated patients with advanced gastric cancer receiving second-line chemotherapy with the EORTC QLQ-C30 and HADS scales before, during, and after chemotherapy and reported that both QoL and anxiety depression disorder improved after treatment ended. Choi et al studied the quality of life and anxiety depression levels in 565 patients who underwent endoscopic submucosal dissection or surgery for early-stage gastric cancer and observed more symptoms affecting QoL, such as fatigue, nausea, vomiting, loss of appetite, diarrhea, and pain in the surgery group. They reported no difference between the groups in HADS results⁷. Matsushita et al examined the EORTC QLQ-C30 and HADS scales in patients with operated gastrointestinal tumors at different times (before surgery, before discharge, and six months after discharge) and found that both scales were affected in the presence of advanced cancer stages and postoperative complications. As a result, they reported that QoL varies over time and is affected by various clinical factors⁸. Hu et al found that QoL was worse in patients with locally advanced gastric cancer and in patients who underwent total gastrectomy. They reported that the QoL improved within the first year¹⁰. Baundry et al reported that anxiety, depression, and QoL are affected in esophagogastric cancer⁹. The findings obtained in our study are consistent with the above literature.

In our study, when we examined the distribution of

EORTC C-30 cancer QoL scale mean scores, the highest score in the first-day surveys was in social, cognitive, and role functions, while in the surveys conducted six months later, the highest score was in cognitive and social functions. Gender, chemotherapy, and radiotherapy were the factors affecting the QoL. There is no relationship between other clinical, pathological, and laboratory parameters. Guo et al looked at clinical conditions, symptoms, anthropometric parameters, and laboratory data that could affect the QoL in 2,322 stomach cancer patients and reported that only nutritional status affected the QoL¹⁹. Park et al examined the possible changes in EORTC QLQ-C30 for patients who underwent distal gastrectomy and total gastrectomy before and in the first, second, and third years after surgery. In the second and third postoperative years, physical functionality, role function, and fatigue were worse in the total gastrectomy group than in the distal gastrectomy group, emphasizing that the QoL should be improved in patients who undergo total gastrectomy²⁰.

Some side effects experienced by gastric cancer patients receiving radiotherapy and chemotherapy, such as nausea, vomiting, anorexia, fatigue, anorexia, and esophagitis, are seen during treatment. The surgical techniques applied, concurrent chemotherapy drugs, additional diseases in the patient, age, gender, etc., may cause an increase in the frequency and severity of these side ef-

fects. After treatment completion, side effects decrease or completely disappear²¹⁻²². In our study, a difference was detected between fatigue, pain, dyspnea, global health, and financial difficulty from the EORTC QLQ-C30 life scales with chemotherapy; a difference between role function, dyspnea, constipation, and financial situation with radiotherapy; and a difference between role function, pain, dyspnea, insomnia in gender. It was postulated that these symptoms (pain, dyspnea, anorexia, financial difficulty, general well-being, insomnia, dyspnea, and constipation) were attributed as a direct consequence of radiotherapy and chemotherapy. Cascinu et al reported in their study that QoL improved due to reduced symptoms in patients with gastric cancer who responded better to chemotherapy¹⁸.

Conclusion

Our study is one of the few studies examining QoL, depression, anxiety, and clinical and laboratory data in patients with gastric cancer. It was observed that gender, radiotherapy, and chemotherapy negatively affect the QoL in patients with stomach cancer. The study's limitations include that it was conducted with a particular patient group in a single center and the potential bias influencing the accuracy of information gathered via questionnaires. However, the fact that the patients filled out the questionnaires and were followed up by a single physician is a strong aspect of the study. In order to reach a clearer conclusion, more prospective, large-scale studies are needed.

Conflict of interest

The authors have no conflicts of interests to declare.

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