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The Effectiveness of Nursing Education as an Intervention to Decrease Fatigue in Turkish Patients Receiving Chemotherapy

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Fatigue is a common symptom in patients with cancer (Piper et al., 1998); 90% experience fatigue at some point during the course of their illness and it has been noted to worsen when cancer treatment begins (Barnes & Bruera, 2002; Escalante et al., 2001). Diminished performance status and the presence of disease-related symptoms often cause fatigue before treatment with chemotherapy (Grant, Golant, Rivera, Dean, & Benjamin, 2000), but fatigue also can be worsened by pain, anemia, sleep disturbance, and nutritional, mood, and activity issues (National Comprehensive Cancer Network [NCCN], 2008). Satisfactory management of the issues may help reduce patients' subjective experience of fatigue that might otherwise have a negative effect on their desire to continue therapy (Curt et al., 2000), self-care skills (Curt et al.; Stone, Richards, & Hardy, 1998), or quality of life (QOL) (Curt et al.; de Jong, Candel, Schouten, Abu-Saad, & Courtens, 2005; Godino, Jodar, Duran, Martinez, & Schiaffino, 2006; Grant et al.; Stone et al.).

Tavio, Milan, and Tirelli (2002) argued that, although many oncologists regard pain as more clinically relevant than fatigue, the latter symptom may have a greater effect on patients' lives and restrict their activities of daily living to a greater extent than pain. Curt (2000) found that fatigue was the most prevalent symptom reported by patients receiving chemotherapy with or without radiation. Fatigue was reported to be more prevalent than other disease- or treatment-related side effects such as nausea, depression, and pain, with 76% of patients experiencing fatigue at least once a month. However, despite the fact that fatigue is an important and relatively common issue in patients with cancer, it still is underestimated by healthcare providers (van Weert et al., 2006). Reasons include oncologists' preoccupation with the assessment and management of cancer pain (Tavio et al.), a lack of scientific literature on fatigue

Purpose/Objectives: To determine whether a nurse-led educational intervention decreased the perception of fatigue in patients diagnosed with gastrointestinal (GI) cancers (colon, stomach, liver, rectum, pancreas) who were receiving chemotherapy for the first time.

Design: Quasi-experimental, descriptive.

Setting: Outpatient department in a large university hospital in Izmir, Turkey.

Sample: 35 patients receiving chemotherapy for GI cancers.

Methods: Baseline demographic data were collected using a personal information form developed by the researchers. Fatigue and quality of life (QOL) were then assessed using the Brief Fatigue Inventory, the Piper Fatigue Scale, and the European Organisation for Research and Treatment of Cancer Quality of Life (EORTC QLQ C-30) scale before their first cycle of chemotherapy, on the 10th day after (T1), and again 10 days after the second cycle of chemotherapy (T2). Patients received an individual educational intervention at baseline, T1, and T2 based on the results of their fatigue assessment in accordance with the National Comprehensive Cancer Network (NCCN) cancer-related fatigue guidelines. Patients were given an educational booklet on fatigue prior to treatment and symptom specific booklets as required at T1 and T2.

Main Research Variables: Subjective reports of patients' fatigue and QOL.

Findings: Patients' mean fatigue scores showed a statistically significant decrease and their EORTC QLQ C-30 scores were better at T1 and T2 compared with baseline.

Conclusions: Nurse-led educational interventions have the potential to reduce fatigue in patients with GI cancer receiving chemotherapy for the first time.

Implications for Nursing: The administration of chemotherapy should be preceded by a formal fatigue assessment and the provision of individually tailored educational interventions to reduce the severity of fatigue and improve QOL.

Quick Facts: Turkey

Geography: Three percent of the total area lies in southeastern Europe. The remainder is in southwestern Asia. The total area is 780,580 km², slightly larger than the state of Texas.

Population: Turkey is the most populous country in the Middle East. The population was 72 million in 2005 and is expected to reach 76 million in 2010 and 88 million in 2025.

Healthcare system priorities and programs: The Ministry of Health is officially responsible for designing and implementing nationwide health policies and delivering healthcare services. The ministry also regulates prices of medical drugs and controls drug production and pharmacy operations. Health institutions that provide medical care and preventive health services include inpatient institutions (hospitals and health centers) and outpatient institutions (health units, health houses, infirmaries, mother and child centers, and dispensaries). Services provided by the institutions include personal health cards which, along with information on health status, are sent to the ministry monthly.

Education: Formal education includes preschool, primary school, secondary school, and higher-education institutions. Eighty-seven percent of the population is literate.

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(Portenoy, 2000), and the fact that most patients do not complain of fatigue even when severe (Portenoy).

Portenoy (2000) suggested that one of the main challenges facing oncologists is to improve the recognition of fatigue as a major issue in cancer care and argued for the development of evidence-based guidelines for fatigue, such as those produced by NCCN (2008). The guidelines specify that healthcare professionals should screen for fatigue as a vital sign at every encounter. The severity scale runs 0 (no fatigue), 1–3 (mild), 4–6 (moderate), and 7–10 (severe). For patients experiencing mild fatigue, NCCN recommends education, common strategies to manage fatigue, and ongoing evaluation. For patients with moderate or severe fatigue, NCCN recommends evaluation of primary factors, including pain; anemia; sleep, nutrition, or emotional problems; activity status; and coexisting factors.

Ahlberg, Ekman, and Gaston-Johansson (2005) noted that past fatigue guidelines from NCCN provided a useful 10-point Likert scale by which patient fatigue can be assessed and a useful management algorithm. However, no outcome-based research had been undertaken to ascertain their effectiveness. The goal of NCCN guidelines has been to ensure that patients with cancer experiencing fatigue are identified and treated promptly and effectively (Mock, 2001). The guidelines recommend

that patients be screened for the presence and severity of fatigue on their first visit to an oncologist and at appropriate intervals thereafter.

Mock (2001) stated that patient education and counseling are crucial to the management of fatigue at all levels, suggesting that patients who know what to expect will be less distressed by its onset and better prepared to cope with it. Similarly, Grant et al. (2000) stressed that patient education programs are the cornerstone of effective symptom management and have the capacity to increase knowledge, alleviate uncertainty, and subsequently reduce helplessness by providing knowledge about the symptom, information on its assessment, and developing simple management strategies to alleviate its severity. Given et al. (2002) found that a supportive intervention delivered by nurses tailored toward the management of pain and cancer-related fatigue during chemotherapy was effective in reducing pain, fatigue, and patients' overall symptoms, whereas Allison et al. (2004) and Yates et al. (2005) reported improvements in cancer-related fatigue as a result of psychoeducational interventions. Kim, Roscoe, and Morrow (2002) found that patients provided with information prior to radiotherapy exhibited less fatigue than patients who were not provided with such information, a finding similar to that of Godino et al. (2006), whose nurse-led educational intervention decreased the level of fatigue in patients receiving chemotherapy for cancer.

In the current study, patient fatigue was assessed using the 10-point Likert scale recommended in the NCCN cancer-related fatigue guidelines and the treatment algorithm was used to identify the appropriate level of intervention required. No studies have been conducted to examine the effectiveness of the guidelines in Turkey, although few of the psychoeducational interventions recommended are routinely available within the country's hospitals. However, two descriptive studies have been published. Yurtsever (2007) found that 86% of patients (N = 100) experienced fatigue, but that the measures used to manage it were ineffective. As a consequence, fatigue had a negative effect on patients' lives and daily activities. In Can, Durna, and Aydinler (2004), 90 patients with breast cancer undergoing chemotherapy were found to experience moderate levels of fatigue influenced by income level, disease stage, and the prevalence of chemotherapy-related symptoms. Determining whether nurse-led educational interventions are effective in reducing self-reported fatigue severity in Turkish patients with cancer should be studied. The current study used two self-report fatigue scales as well as a QOL questionnaire to assess the efficacy of such an intervention in patients receiving chemotherapy for a variety of GI cancers prior to starting chemotherapy (baseline) and at two points thereafter.

Purpose

The study was designed to answer two questions: Can a nurse-led educational intervention reduce patients' subjective reports of fatigue while receiving chemotherapy for the first time? Can improvements in patients' fatigue result in a subsequent improvement in QOL?

Methods

Setting and Participants

The study was conducted in the outpatient chemotherapy unit of a large university hospital in Izmir, Turkey. Forty-four patients diagnosed with GI cancers who were about to start chemotherapy for the first time were approached to take part in the study. Nine patients declined to participate, leaving a sample of 35 patients. Patients were required to be aged 18 years or older; able to read, speak, and write in Turkish; have a diagnosis of GI cancer; and be about to start their first course of chemotherapy. In addition, they needed to have no visual or hearing impairments and no history of mental health issues.

The study was approved by the ethics committee of the university's school of nursing. Participants were given information about the study and their written consent was obtained.

Instruments

A personal information form developed by the researchers was used to collect demographic information about age, gender, and disease-related factors such as diagnosis, disease stage, duration of illness, treatment to date, and the chemotherapy regimen about to be initiated. Patients then completed three instruments at baseline and during subsequent evaluations of their fatigue.

The **Brief Fatigue Inventory (BFI)** was used to evaluate the severity of fatigue and its effect on activities of daily living. Each of the nine items on the BFI are given a value from 0–10. A score of 0 indicates that no fatigue was present, 1–3 indicates a mild level of fatigue, 4–6 indicates a moderate level of fatigue, and 7–10 indicates that the patients' fatigue is severe. This tool was found to be reliable and valid in assessing fatigue in Turkish populations (Cronbach alpha = 0.97) (Karasar, 1995).

The **Piper Fatigue Scale (PFS)** covers four subjective dimensions of fatigue (cognitive, behavioral, sensory, and affective) and includes three open-ended questions with respect to cause of fatigue, concurrent symptoms, and the relief measures used by patients to combat fatigue. Cronbach alpha coefficient was found to be 0.89 and the subscales' reliability coefficients varied from 0.92–0.96 (Piper et al., 1998). In the current study, the reliability coefficients varied from 0.85–0.96 for each

of the PFS subscales. Its reliability and validity in Turkish populations had already been evaluated as good by Can et al. (2004) with a Cronbach alpha value of 0.92.

The **European Organisation for Research and Treatment of Cancer Quality of Life (EORTC QLQ C-30) scale** (Aaronson et al., 1993) has functional and symptom subscales. The functional subscale has six dimensions (physical, role, cognitive, emotional, social, and global QOL), and the symptom subscale has nine symptoms (fatigue, nausea and vomiting, pain, dyspnea, sleep disorders, loss of appetite, constipation, diarrhea, and financial impact). The tool items are converted into scores from 0–100. The tool was adapted for use in Turkish populations by Güzelant et al. (2004) in a study on patients with lung cancer and was found to be a reliable and valid instrument with a Cronbach alpha of 0.7 or higher. A high score on the tool indicates a high functional level and high level of symptoms experienced. In the current study, the physical dimension from the QOL functional subscale was determined to have an alpha value of 0.78–0.94, and the symptom subscale was determined to have an alpha value of 0.88–0.91.

Intervention

The intervention consisted of a patient education program including one-to-one education, training, and counseling about fatigue assessment and management. It was delivered by the researcher in three sessions in the hospital: The first was given before the first cycle of chemotherapy commenced (baseline), the second on the 10th day after baseline was completed (T1), and the third 10 days after completion of the second cycle of chemotherapy (T2). The intervention was designed to improve patients' knowledge of the causes of fatigue and provide them with strategies to decrease its severity, including self-monitoring of fatigue levels, advice on energy conservation, distraction, increasing mobility and activity, stress management, relaxation methods, and the management of factors known to cause fatigue. Each session was tailored to the individual patient's needs. Visual and computerized written materials were used during the educational session. The intervention was supplemented by the provision of information booklets. The attendance of spouses or partners was encouraged for each session and each intervention lasted 90 minutes. The BFI, PSF, and EORTC QLQ C-30 instruments were completed by patients before each educational session and the educational program was implemented (see Figure 1).

First session (pretreatment baseline): The aim of the study was explained to patients. Patients willing to participate signed the consent form. Demographic data and information on the illness and its treatment were then collected from all patients. Patients completed the BFI, PFS, and EORTC QLQ C-30 scales. Patients reporting that they had no or very mild fatigue (scoring themselves

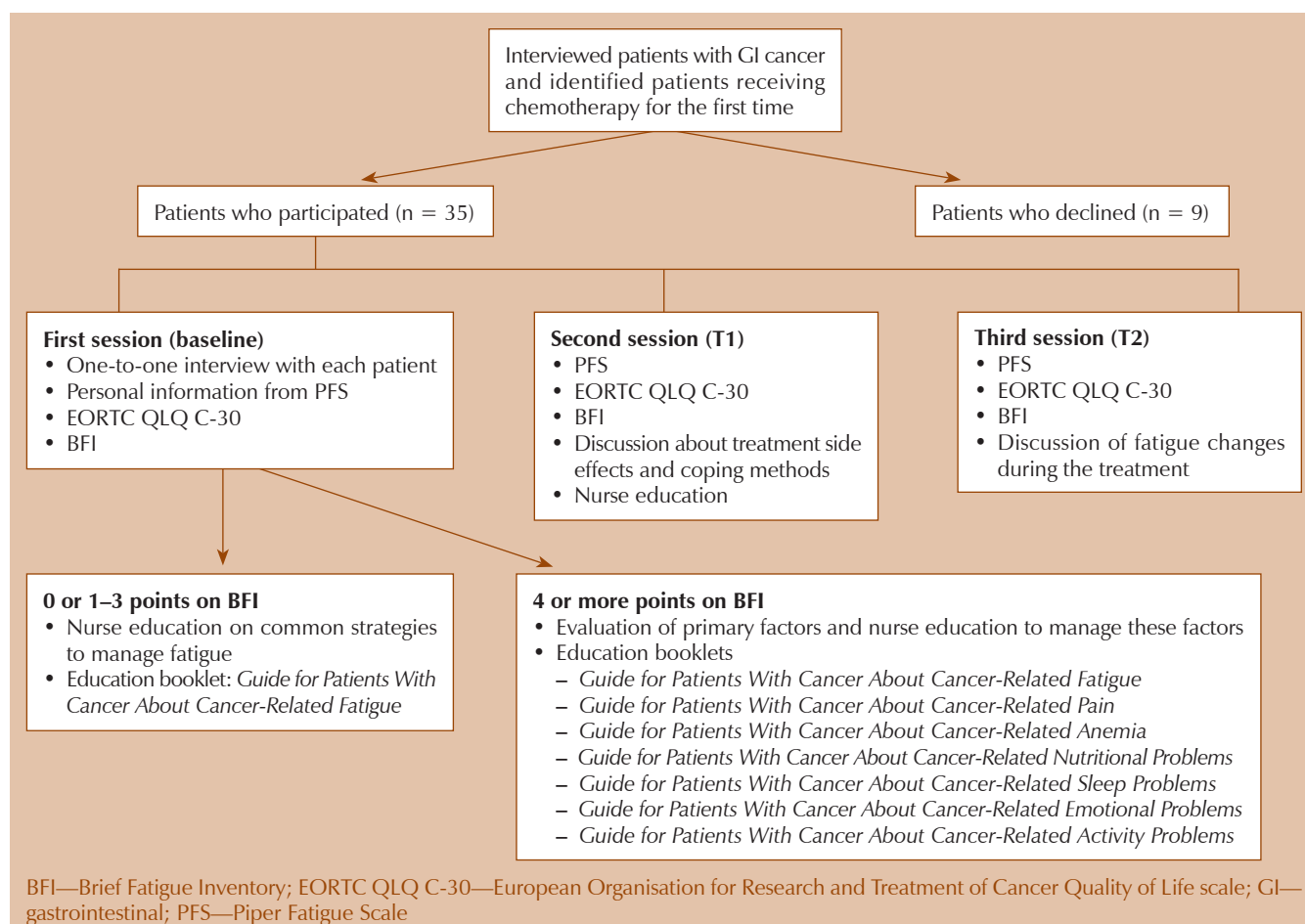


Figure 1. Flowchart Intervention Program

0–3 on the BFI) were informed about fatigue in general (what it is, what factors cause it, how fatigue is assessed) and given specific recommendations about how it could be managed. At the end of the session, patients were given an educational booklet prepared by the researchers entitled *Guide for Patients With Cancer About Cancer-Related Fatigue*. In addition, patients with moderate (4–6) or severe (7–10) scores on the BFI fatigue also were given education about the management of specific issues (pain, anemia, insomnia, nutrition, activity, and emotional problems) highlighted by the assessment, as specified in the NCCN guidelines, and additional relevant booklets were distributed. The booklets included *Guide for Patients with Cancer About Cancer-Related Pain*, *Guide for Patients With Cancer About Cancer-Related Anemia*, *Guide for Patients With Cancer About Cancer-Related Nutritional Problems*, *Guide for Patients With Cancer About Cancer-Related Sleep Problems*, *Guide for Patients With Cancer About Cancer-Related Emotional Problems*, and *Guide for Patients With Cancer About Cancer-Related Activity Problems*.

Second and third sessions (T1 and T2): In the second session (T1), the researcher discussed with the patient how the treatment went, what side effects from the

chemotherapy were experienced, and how the patient coped with these side effects. Patients completed the BFI, PFS, and EORTC QLQ C-30 instruments once again, and information in the educational booklet was then reviewed in accordance with the score derived from the BFI. In the third session (T2), patients completed the BFI, PFS, and EORTC QLQ C-30 instruments for the last time and changes in their perception of fatigue were then discussed.

Data Analysis

Data obtained from the study were analyzed using SPSS® 11.0. Patients' demographic information was calculated as a distribution in number and percentage. Between differences and pretest and post-test analyses were conducted using t tests. Relationships among variables were examined by calculating Pearson correlation coefficients with statistical significance set at $p = 0.05$.

Results

Sociodemographic data obtained from the personal information forms are presented in Table 1. The mean

Table 1. Personal Characteristics at Baseline

Characteristic	n	%
Age (years)^a		
29–39	4	11
40 or older	31	89
Gender		
Male	15	43
Female	20	57
Marital status		
Married	32	91
Divorced or widowed	3	9
Education level		
No formal education	1	2
Primary school	7	20
Secondary school	10	29
High school	7	20
University	10	29
Employment status		
Employed	7	20
Unemployed	28	80
Living situation		
Single	1	3
Spouse only	6	17
Children only	1	3
Spouse and children	27	77

N = 35

^a $\bar{X} = 49.11$, SD = 10.12

age of participants was 49 years (SD = 10.12). About 57% of the patients were women, and 91% were married. Eighty percent were unemployed at the time of the study (although whether this was a consequence of their cancer is unclear) and 77% were living with their spouse and children.

The distribution of the patients' disease-related characteristics is shown in Table 2. Colon cancer was the most common diagnosis (51%) followed by stomach cancer (17%) and liver cancer (11%). Almost 9% of patients had colon cancer together with liver metastases, although these patients were separated from patients with primary colon disease. Rectal cancer and pancreatic tumors each accounted for 6%. Fifty-seven percent of patients had been ill for three or fewer months, although 94% had been diagnosed with advanced disease (stages III–IV), and most were unaware of a history of cancer within their family. Seventy-four percent of patients were receiving 5-fluorouracil and leucovorin with or without irinotecan.

Table 3 presents changes in patients' fatigue perceptions throughout the treatment trajectory. At baseline, patients generally reported moderate levels of fatigue for each subscale of the PFS (behavioral, affective, sensory, and cognitive), but the levels decreased with each subsequent intervention (i.e., at T1 and T2). The difference between baseline and the later measurements were statistically significant with marked improvements for each, although one must consider the results with

caution because patients also were having their cancer treated at the same time.

Following the educational intervention, mean scores in the functional domain of the EORTC QLQ C-30 (physical, role, cognitive, emotional, social, and global QOL) were increased while symptoms (fatigue, pain, lack of appetite) were decreased at both T1 and T2, compared to baseline. These differences were also found to be statistically significant (see Table 4), particularly when considering that most other studies suggest that patients' QOL is negatively effected in the short term by chemotherapy (Efficace et al., 2004; Knobel et al., 2000; Nowak, Stockler, & Byrne, 2004; Saegrov, 2005).

Discussion

The study aimed to evaluate the effectiveness of a nurse-led educational intervention for improving the use of fatigue management strategies and minimizing the effect of fatigue for patients with GI cancer receiving their first chemotherapy. Importantly, the authors' findings suggest that patients receiving a one-to-one educational intervention about fatigue management during chemotherapy obtained short-term benefit in terms of minimization of the intensity of fatigue at T1 and T2 compared with the baseline. The patients all believed that they had benefited from the fatigue intervention and stated that the written material

Table 2. Illness-Related Characteristics at Baseline

Characteristic	n	%
Diagnosis		
Colon cancer	18	51
Stomach cancer	6	17
Liver cancer	4	11
Colon cancer and liver metastasis	3	9
Rectal cancer	2	6
Pancreatic cancer	2	6
Duration of disease (months)		
3 or less	20	57
4 or more	15	43
Stage of disease		
II	2	6
III	10	29
IV	23	65
Therapy protocol		
Irinotecan, 5-fluorouracil, and leucovorin	13	37
Leucovorin and 5-fluorouracil	13	37
Cisplatin and UFT	6	17
Gemcitabine	2	6
UFT and oxaliplatin	1	3
Family history of cancer		
Yes	10	29
No	25	71

N = 35

UFT—tegafur, 100 mg; urasil, 224 mg

about fatigue management was very helpful to them because they could more easily share concerns about the issues they were experiencing with their physician and nurses.

Holley and Borger (2001) reported reductions in fatigue in their pilot study investigating the effect of group education and support in managing cancer-related fatigue. Given et al. (2002) found that a supportive intervention delivered by nurses aimed at managing pain and fatigue during chemotherapy was effective in reducing these factors and their overall symptom scores.

In similar fashion, Ream, Richardson, and Alexander-Dann (2002) found that a four-part tailored intervention (consisting of assessment and monitoring, education, coaching in fatigue management, and the provision of emotional support) in a case series of eight patients lessened participants' self-reports of fatigue.

A larger, randomized controlled trial (N = 152) involving patients undergoing radiation therapy for prostate cancer found that an informational intervention at their first and fifth fractions of radiotherapy improved patient fatigue scores (Kim et al., 2002). The intervention was based on self-regulation theory and provided patients with specific objective information about what to expect during their radiotherapy, whereas the control group received only general information at the same time points. By the end of their radiotherapy, patients in the intervention group showed less fatigue in comparison to the control group, similar to results obtained in a pilot study by Allison et al. (2004) who assessed the effects of a psychoeducational intervention (coping skills training designed to enhance personal control and promote emotional and instrumental coping responses) in patients with head and neck cancer. Participants in the study reported similar improvements in fatigue to another evaluation of psychoeducational interventions by Yates et al. (2005) that suggested women with early-stage breast cancer received some short-term benefits, including a reduction in the intensity and effect of fatigue on daily life. Similarly, Godino et al. (2006) found that a structured, individualized educational intervention by nurses decreased the level of fatigue in patients with colon or gastric cancer, which was consistent with the findings of the current study.

The current study revealed that patients experienced a significant improvement in their QOL at T1 and T2, compared with their baseline measurements at a time when it might be expected that their QOL might be negatively effected by chemotherapy (Efficace et al., 2004; Knobel et al., 2000; Nowak et al., 2004; Saegrov, 2005), indicating that increased patient awareness of potential fatigue and the strategies for its management may reduce the debilitating effect of this symptom on QOL, which showed an improvement in all dimensions of the EORTC QLQ C-30 scale.

The study also provided a systematic evaluation of the NCCN fatigue algorithm in managing Turkish patients' fatigue, and supports the authors' perception that fatigue management can be undertaken in a more effective manner. The NCCN fatigue algorithm should be used in assessing and managing the fatigue of all patients with cancer and should direct the interventions of nurses, medical oncologists, psychologists, physical therapists, and social workers as they help patients manage their fatigue. The study also has revealed the need for more research into the management of cancer-related fatigue in Turkey and elsewhere.

Limitations

Exclusion criteria limited the number of patients participating in the study, and the sample only included patients with GI cancers in one facility in Turkey. In addition, no power calculation was carried out and an experimental control group design was not used. Finally, the study findings could be culturally specific. The study should, therefore, be replicated in different cultural settings for its external validity to be corroborated. These limitations prevent generalization of the study data and any future research should take them into consideration.

Conclusions

This was the first study to evaluate the effect of an educational intervention for the management of cancer-related fatigue and use of the NCCN fatigue guidelines in Turkey. The study suggests that nurse-led educational interventions for fatigue may benefit patients receiving

Table 3. Subjective Perception of Fatigue Using the Piper Fatigue Scale

Time	Behavioral or Severity			Affective Meaning			Sensory			Cognitive or Mood			Total Fatigue Score		
	\bar{X}	SD	t	\bar{X}	SD	t	\bar{X}	SD	t	\bar{X}	SD	t	\bar{X}	SD	t
Baseline	3.7	2.7	—	3.4	2.7	—	3.8	2.6	—	3	2.3	—	3.5	2.1	—
T1	1.4	1.6*	4.99	1.6	2.1*	4.85	1.9	1.8*	3.89	2	1.9*	2.46	1.7	1.6*	5.024
T2	1.1	1.5*	7.22	1.3	1.2*	5.65	1.5	1.4*	5.52	1.6	1.5**	3.78	1.4	1.8*	8.381

* p < 0.05; ** p < 0.0001

Table 4. Quality of Life in the European Organisation for Research and Treatment Scale

Characteristic	Baseline		T1				T2			
	\bar{X}	SD	\bar{X}	SD	t	p	\bar{X}	SD	t	p
Functional										
Physical	63.6	22	83	17.8	-4.653	0	88.95	12.8	-6.399	0
Role	67.1	34.6	82.8	21.5	-2.971	0.005	83.8	23	-2.156	0.038
Cognitive	77.6	22.4	88.5	19.2	-3.276	0.002	90.4	17.7	-3.916	0
Emotional	58.8	26.8	69.7	28.8	-3.022	0.005	74	25.6	-3.935	0
Social	53.8	32.6	70	27.9	-3.022	0.005	74.7	25.6	-4.365	0
Global quality of life	60.9	26.4	71.9	21.4	-2.63	0.013	74.4	23.3	-2.14	0.039
Symptom										
Fatigue	33.3	26.9	17.4	20.3	4.35	0	13	21.6	4.22	0
Nausea and vomiting	21.4	27.2	11.9	15.4	1.95	0.06	5.23	16	2.76	0.009
Pain	27.6	36.8	12.3	21.5	2.89	0.077*	9.06	20.3	3.35	0.002
Dyspnea	18	27.2	12.1	21.5	1.79	0.083	2.85	9.4	3.65	0.001
Sleeping problems	40	34.1	37.1	37.7	0.43	0.668	19	29.4	3.12	0.004
Lack of appetite	32.3	35.6	21.9	33.2	2.23	0.032*	6.66	17.7	4.5	0
Constipation	22.8	30	20.9	31.4	0.27	0.786	6.66	19.4	3.24	0.003
Diarrhea	11.4	22.7	15.2	28.4	-0.7	0.487	1.9	7.8	2.25	0.031
Financial effect	36.1	38.2	37.1	35	-0.18	0.86	31.4	37.8	0.68	0.5

* p < 0.05

chemotherapy for a variety of GI cancers. It also resulted in the creation of several useful educational booklets for oncology nurses in the country.

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