Role of clinical oncology pharmacist in determination of pharmaceutical care needs in patients with colorectal cancer

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ABSTRACT

Objective To determine and evaluate the pharmaceutical care needs and quality of life of patients with colorectal cancer.

Methods 36 Patients with colorectal cancer eligible for chemotherapy after surgery were included in the study. The patients were followed up during 3 courses of chemotherapy and individual pharmaceutical care plans were developed. The quality of life of patients was evaluated before and after the third course of chemotherapy.

Results The incidence of drug-related problems (DRPs) in chemotherapy-treated patients was reduced in the 3rd course as compared with 1st course (63.9% vs 75%, respectively; n=36; p>0.05). The clinical oncology pharmacist gave 147 recommendations to patients, which were followed in 98% (n=144) of cases. 91.7% (n=132) of the recommendations of clinical oncology pharmacists solved the drug-related problems; however, the remaining 8.3% (n=12) did not solve the problems and the patients were referred to a doctor for further investigations. The symptom-related quality of life of patients related to anaemia, diarrhoea and neurotoxicity was reduced after the third course of chemotherapy (p<0.05).

Conclusions The pharmaceutical care provided by the clinical oncology pharmacist has an important role in the identification and resolution of DRPs. Evaluation of symptom-related quality of life is important for the monitoring of patients receiving chemotherapy.

What this paper adds

What is already known on this subject?

- Pharmaceutical care aims to determine and solve drug-related problems (DRPs) in cooperation with physicians, nurses and other health professionals.
- Newly diagnosed cases of cancer worldwide occur in people aged ≥65 years who have comorbid disease which can cause DRPs.
- During care at chemotherapy units, patient counselling about chemotherapy-related adverse effects provides a real benefit for patients with solid tumours.

What this study adds

- This study is the first to describe the provision of pharmaceutical care by a clinical oncology pharmacist to patients with colon cancer in Turkey.
- This study emphasises that a multidisciplinary approach in oncology has a positive impact on patient care and help to resolve DRPs in patients with cancer.

INTRODUCTION

Colorectal cancer is the most common type of gastrointestinal cancer.[1] Treatment of colorectal cancer includes chemotherapy, radiotherapy and surgery. Both disease- and chemotherapy-related side effects reduce the quality of life in patients with colorectal cancer.[2–5]

Pharmaceutical care aims to determine and solve drug-related problems (DRPs) in cooperation with physicians, nurses and other health professionals.[6 7] During care at chemotherapy units, patient counselling about chemotherapy-related adverse effects provides a real benefit for better pharmaceutical care in patients with solid tumours.[8 9] The aim of this study was to determine and evaluate the pharmaceutical care needs and quality of life of patients with colon cancer who receive chemotherapy for the first time after surgical treatment.

METHODS

Study population

This is a prospective study in which 36 patients newly diagnosed with colon cancer had surgery and were eligible for chemotherapy at the outpatient chemotherapy unit of Marmara University Pendik Training and Research Hospital between April and August 2013.

Data collection

A patient's history was recorded before administration of the first chemotherapy course and patients were monitored during three courses. Written and verbal information about chemotherapy and treatment of comorbid diseases was given by the clinical oncology pharmacist to all patients and/or patient's relatives in a face-to-face interview or by telephone before starting chemotherapy. At the first interview at least one of following answers was accepted as 'yes' to the question 'Did you receive any education about the chemotherapy plan?' on the information form.

1. Patient received a handout on chemotherapy
2. Patient was informed about any potential side effects

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3. Patient received a chemotherapy plan (informed about chemotherapy courses)
4. Patients receiving capecitabine treatment were informed that it should be taken twice a day.

Measurements

Potential DRPs were recorded and suitable pharmaceutical care plans were created for each patient during three courses of chemotherapy. The clinical oncology pharmacist worked in cooperation with oncologists to resolve patients' DRPs by suggesting pharmacological and/or non-pharmacological treatments. Patients' acceptance and application of recommendations and outcomes were recorded.

The symptom-based quality-of-life questionnaires were administered before the first and after the third course of chemotherapy.[10] The questionnaires were: Functional Assessment of Cancer Therapy-General (FACT-G), Functional Assessment of Chronic Illness Therapy-Diarrhoea (FACIT-D), Functional Assessment of Cancer Therapy-Anaemia (FACT-AN), Functional Assessment of Cancer Therapy-Neurotoxicity (FACT-GOG-NTX). Quality of life was evaluated by calculating total scores according to the 'scoring guidelines' (available by online registration). According to these guidelines, a higher score indicates a better quality of life.[11]

Laboratory parameters of patients were evaluated before each course and include haemoglobin (Hb), haematocrit, neutrophil, absolute neutrophil count, platelets, white blood cell, alanine aminotransferase, aspartate aminotransferase values. Additionally, carcinoembryonic antigen and carbohydrate antigen 19–9 19–9 values were evaluated before the first and after the third course of chemotherapy.

Statistical analysis

SPSS 15.0 software package was used for statistical analysis. $p<0.05$ was considered statistically significant. Sociodemographic characteristics and DRPs were determined as percentages.

Normality of data was assessed with the Kolmogorov–Smirnov test. Quality-of-life results and laboratory parameters before the first course and after the third course were evaluated by paired t test for normally distributed data; otherwise, Wilcoxon matched pair tests were used. The change in frequency of DRPs during three cycles was analysed by analysis of variance repeated-measures test.

Ethical approval

Our study was approved by Marmara University Institute of Health Sciences Non-invasive Clinical Research Ethics Committee. All patients who agreed to participate in the study signed a 'patient information form' and a 'patient consent form'.

RESULTS

Patients' characteristics

Table 1 presents patients sociodemographic characteristics, 63.9% (n=23) of patients were male and 36.1% (n=13) female. The median age was 59.5. Half of the patients had no comorbidities, 33.3% of patients had one comorbid disease and 16.7% of patients had at least two comorbid diseases. Sixty-seven per cent of patients (n=12) had an education about the treatment plan as illustrated in figure 1.

A total of 370 interviews were conducted by a clinical oncology pharmacist with a mean of 10.27±2.93 interviews for each patient as presented in table 2. Our data indicate that 'XELOX*: capecitabine (XELODA)-oxaliplatin*' was the most common chemotherapy regimen administered during this study as shown in table 3.

Table 1 Patient's sociodemographic characteristics

Sex	
Female	36.1% (n*=13)
Male	63.9% (n*=23)
Age	57.89±12.86 (30–79)
Education status	
Illiterate	11.1% (n*=4)
Primary school	69.4% (n*=25)
High school	16.7% (n*=6)
University	2.8 % (n* = 1)
Second disease	
None	50% (n*=18)
Hypertension	36.8% (n*=7)
Diabetes mellitus	26.3% (n*=5)
Asthma	26.3% (n*=5)
Coronary artery disease	21.5% (n*=4)
Depression	10.5% (n*=2)
Chronic obstructive pulmonary disease	5.3% (n*=1)
Hypothyroidism	5.3% (n*=1)
Benign prostate hypertrophy	5.3% (n*=1)
Anaemia	5.3% (n*=1)
Peripheral artery disease	5.3% (n*=1)

n*, number of patients.

DRPs were assessed after each chemotherapy course and most were seen within the first chemotherapy course. However, DRPs decreased within the third course of chemotherapy compared with the first course after intervention by the clinical oncology pharmacist, as presented in online Supplementary Table 4.

The most common DRPs during the three courses of chemotherapy (shown in online Supplementary Table 5) were as follows: nausea-vomiting [20.4% (n=10); 26.4% (n=9); 27.5% (n=11)], diarrhoea [14.3% (n=7); 14.7% (n=5); 10% (n=4)], constipation [12.3% (n=6); 8.8% (n=3); 15% (n=6)] and neuropathy [10.2% (n=5); 11.7% (n=4); 10% (n=4)]. Although there was no statistically ($p>0.05$) significant difference between the incidence of DRPs and chemotherapy regimens; most DRPs were determined with XELOX regimen.

As mentioned in the 'Methods' section, during interviews with patients, DRPs were determined and pharmaceutical care plans were applied. Pharmacological and/or non-pharmacological recommendations were made by the clinical oncology pharmacist and patients were followed up for 2–3 days after the recommendations to measure outcomes. The average time for determining the DRPs, making recommendations and measuring

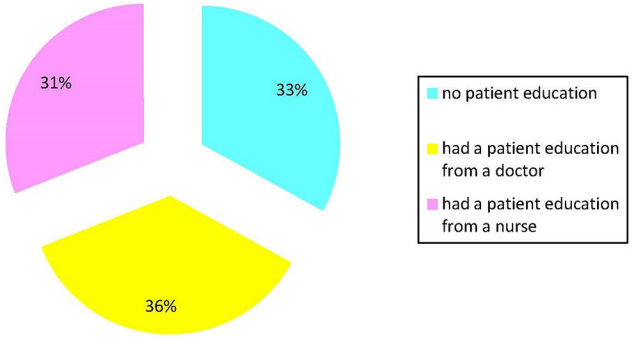

Figure 1 Patient education status on the chemotherapy plan.

Table 2 Clinical oncology pharmacist–patients' interviews

	n *	%
Clinical oncology pharmacist calling patients	215	58.1
Patients calling the clinical oncology pharmacist	155	41.9
Total interview number (during three courses)	370	100

n*, number of interviews.

outcomes for each patient was approximately 25–30 min. Some examples of the intervention of the clinical oncology pharmacist on commonly seen DRPs, and related care problems, are given as short cases and summarised in online Supplementary Table 6.

A total of 147 recommendations were given—52.4% (n=77) non-pharmacological and 47.6% (n=70) pharmacological . Types of recommendation are illustrated in figure 2 and figure 3. All pharmacological recommendations were accepted by the physicians and prescribed after the patients' referral.

One hundred and forty-four (98%) recommendations were followed by patients. Of the recommendations followed, 91.7% (n=132) helped to solve the DRP, while 8.3% (n=12) failed to solve the problem. Patients with unsolved DRPs were referred to physicians for further diagnosis and treatment.

Evaluation of laboratory parameters as presented in online Supplementary Table 7 shows a statistically ($p<0.05$) significant decrease in serum haemoglobin, haematocrit, neutrophil, white blood cell and platelets after the third course of chemotherapy compared with first course, while liver function tests were found to be statistically non-significantly ($p>0.05$) increased after the third course of chemotherapy.

Online Supplementary Table 8 shows a statistically ($p<0.05$) significant decrease in the patients' symptoms-based quality of life and disease after the third course of chemotherapy.

DISCUSSION

DRPs are commonly encountered in patients with colorectal cancers, especially in older people and patients with comorbid diseases. In our study, the median age of patients was 59.5 years and the most common comorbidities were hypertension (36.8%; n=7) and diabetes mellitus (26.3%; n=5). These results are in agreement with a recent study[12] which evaluated the occurrence of DRPs in 294 older patients with a mean age of 71.8 years at an outpatient chemotherapy unit. They found the most common comorbidities to be hypertension (87.4%; n=257), hyperlipidaemia (69.7%; n=205) and diabetes mellitus (43.9%; n=129).

In our study, DRPs were identified as chemotherapy-related adverse effects (86.9%), drug-use problem (4.1%) and inappropriate drug use (0.8%). The adverse effects commonly seen

Table 3 Types of chemotherapy regimens that patients received during three courses

Chemotherapy regimens	1st Course % (n*)	2nd Course % (n*)%	3rd Course % (n*)
XELOX	63.9 (23)	61.1 (22)	50 (18)
XELOX-B	30.6 (11)	33.3 (12)	41.7 (15)
FOLFIRI	2.8 (1)	-	-
FOLFOX	2.8 (1)	2.8 (1)	5.6 (2)
FOLFIRI-CET	-	2.8 (1)	2.8 (1)

FOLFIRI, folinic acid-5-fluorouracil-irinotecan; FOLFIRI-CET, folinic acid-5 fluorouracil-irinotecan-cetuximab; FOLFOX, folinic acid-5 fluorouracil-oxaliplatin; n*, number of patients; XELOX, *capecitabine (XELODA)-oxaliplatin*; XELOX-B, *capecitabine (XELODA)-oxaliplatin-bevacizumab*.

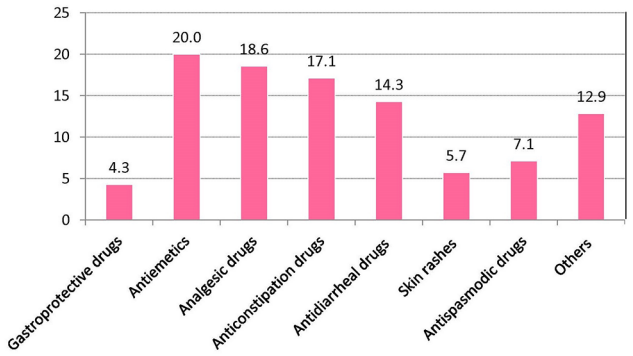

Figure 2 Percentage of pharmacological recommendations for patients.

were nausea-vomiting (28%), diarrhoea (14.9%), constipation (14%), neuropathy (12.1%) and fatigue (12.1%). During three courses the incidence of DRPs was found to be reduced, but this finding was not statistically significant ($p>0.05$). Our results are in accordance with the results of a study by Sisay *et al*.[13] They demonstrated DRPs as chemotherapy-related adverse effects (35.2%), and inappropriate drug use (13.7%). In the same study, the most common adverse effect was nausea-vomiting (43.9%).

Delpeuch *et al*[14] conducted a study on 489 patients with cancer with an average age of 63 years and determined a total of 552 DRPs. In their study 96% of the interventions were accepted by the physicians.[14] Pharmacological recommendations accepted by physicians in our study included; antiemetics in 20%, analgesic drugs in 18.6%, constipation-relieving drugs in 17.1% and antidiarrhoeal drugs in 14.3%. Total number of non-pharmacological recommendations (n=77) included diet advice (n=39), lifestyle modifications (n=26), patient education (n=7) and compliance (n=5).

Ninety-eight per cent of the recommendations were accepted and followed by the patients. Ninety-two per cent of the recommendations by the clinical oncology pharmacist help to solve the DRP. Twelve recommendations failed to solve the problem and these patients were referred to a doctor for further investigations. DRPs in chemotherapy patients were reduced in the third course as compared with first course (63.9% vs 75%, respectively; n=36; $p>0.05$). These results show that pharmaceutical care performed by the clinical oncology pharmacist has an important role in the identification and resolution of DRPs.

Chemotherapy side effects can negatively affect patients' quality of life. Therefore, many quality-of-life scales have been established depending on side effects. In our study at the end of the third course, a statistically significant decrease ($p<0.05$)

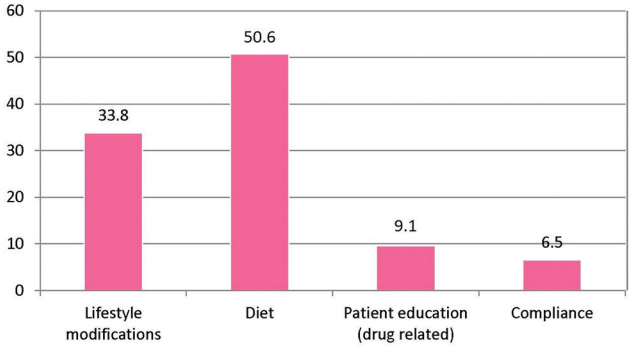

Figure 3 Percentage of non-pharmacological recommendations for patients.

in FACT-G questionnaire (physical condition-related scale and social situation) was observed. Chemotherapy-related side effects (mainly nausea, vomiting, diarrhoea, constipation and neuropathy) were considered to affect the patients' quality of life. There was no significant change ($p>0.05$) in emotional situations and activities. No statistically significant correlation was found between patients' demographic characteristics and treatment protocols and quality of life. These results are supported by other studies, which also reported no correlation between quality of life and demographic features.[15–17]

Although grade 3 (Hb 6.5–7.9 g/dL) and grade 4 anaemia (Hb <6.5 g/dL) were evaluated as anaemia side effect in clinical trials,[18] a study by Cella[19] showed that grade 1 anaemia can affect the functional results and the FACT-AN questionnaire can be used in the studies.[19] The mean haemoglobin level of our patients was grade 1, which indicates the presence of anaemia. Symptom-based quality of life (FACT-AN) was significantly reduced ($p<0.001$). According to these results, the presence of grade 1 anaemia can affect patients' quality of life and may need to be monitored for further treatment options.

Oxaliplatin is an important drug for colon cancer treatment; however, one of its side effects is dose-limiting neurotoxicity. Studies found that administration of Ca/Mg infusions (1/1 gram dose) after oxaliplatin infusion can prevent this side effect.[20 21] In our study, oxaliplatin-based treatment was administered during 97.2% of the first and second courses and during 91.7% of the third course to patients with colon cancer. The FACT-GOG-NTX life scale was applied to assess neurotoxicity side effects and showed a reduction of 12.2% ($p=0.004$) in the patients' quality of life at the end of the third course compared with the first course. These findings are consistent with a recently published study which found that chemotherapy-induced neurotoxicity reduces quality of life by 15–20%.[22]

Chemotherapy-induced diarrhoea can negatively affect the quality of life of patients and treatment process. A chemotherapeutic treatment for colon cancer consisting of fluorouracil and capecitabine is associated with 50%, and irinotecan with 80% occurrence of diarrhoeal symptoms.[23] In our study, patients took at least one of these agents. A study by Keefe *et al*,[24] which evaluated chemotherapy-induced diarrhoea in patients with colon cancer, found that most of the diarrhoeal symptoms occurred in the 35% of the patients within the first course. In our study, 19.4% of patients were had diarrhoeal symptoms during the first course and 13% during the third. Results of a FACIT-D quality-of-life evaluation during the third course found that diarrhoeal symptoms lead to a significant reduction of 14.2% in quality of life ($p<0.0001$).

CONCLUSION

Provision of pharmaceutical care for patients with colon cancer was shown to help in identification and resolution of DRPs. In addition, a multidisciplinary approach in oncology was shown to have a positive impact on patient care and help to resolve DRPs in these patients. We believe that the establishment of a cancer 'Pharmaceutical Care Unit' in hospitals will help to improve patient care.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

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