Original Article
Evidence based nursing intervention reduces incidence of postoperative complications and improves quality of life of patients with colorectal cancer

Mei Guo, Chuanli Luo, Xin Zheng

Department of General Surgery, Ankang Hospital of Traditional Chinese Medicine, Ankang, Shaanxi, China

Abstract: Objective: This study aimed to explore the application value of evidence-based nursing (EBN) in postoperative patients with colorectal cancer and its effect on complications and quality of life (QOL). Methods: In this prospective non-randomized clinical study, we recruited 176 patients with colorectal cancer admitted to our hospital from April 2016 to June 2017 and divided the patients into the routine group and study group according to their will. Hospital stay, nursing satisfaction, and incidence of complications were compared between the routine group (82 patients receiving routine nursing during treatment) and the study group (94 patients receiving EBN). Comfort status after operation and seven days of nursing was evaluated by the General Comfort Questionnaire (GCQ), whereas QOL was scored with the life quality measurement scale for cancer patients (EORTC-QLQ-C30) at hospital discharge. Results: The hospital stay of the study group was significantly shorter than that of the routine group (P<0.001). The nursing satisfaction of the study group was 90.43%, significantly higher than that of the routine group (71.95%, P<0.001). The complication rate of the study group was significantly lower than that of the routine group (P=0.002). The EORTC-QLQ-C30 score of the study group was higher than that of the routine group (P<0.001). Logistic regression analysis showed that EBN was a protective factor for postoperative complications. Conclusion: EBN enables effective reduction of the incidence of postoperative complications and improves QOL of patients with colorectal cancer and is thus worthy of promotion in clinical practice.

Keywords: Evidence-based nursing, colorectal cancer, quality of life, complication

Introduction

Colorectal cancer is currently the most common malignant tumor of the digestive tract. With the widespread use of laparoscopic surgery in recent years, the treatment of colorectal cancer has made a significant breakthrough. However, patients with colorectal cancer are prone to postoperative complications, such as intra-abdominal hemorrhage, intestinal obstruction, and anastomotic leakage which seriously affect the prognosis of patients, and the incidence of complications has exceeded 20% [1]. Therefore, scholars are working to explore how to reduce the risk of postoperative complications of colorectal cancer [2-4].

Nursing interventions can effectively reduce postoperative complications in patients with colorectal cancer [5-7], within which evidence-based nursing (EBN) is a type of nursing model that has emerged in recent years with the main purpose of using the latest, best, and well-founded scientific theories to provide care for patients [8]. EBN requires nursing professionals to conduct detailed and comprehensive investigations of patients, carry out customized and targeted nursing care, and pay close attention to and record the clinical indicators of patients during the nursing process, as well as develop more comprehensive nursing content in combination with the secondary analysis of scientific research results [9]. Our hospital has made significant breakthroughs since the popularization of EBN in 2016.

For this study, we retrospectively analyzed patients with colorectal cancer who received EBN in our hospital to provide reference and guidance for the diagnosis and treatment of colorectal cancer in the future.

Materials and methods

General information

In this prospective non-randomized clinical study, we recruited 176 patients with colorectal cancer who were admitted to our hospital from April 2016 to June 2017 and divided the patients into a routine group and a study group according to their will.

The inclusion criteria were as follows: the patients have clinical symptoms according to the 2016 guidelines on the diagnosis of colorectal cancer [10], be diagnosed with colorectal cancer by biopsy, have undergone laparoscopic resection in our hospital after definite diagnosis, be cooperative to the arrangement of the medical staff in our hospital, and be aged 30 to 70 years.

Patients were excluded if they had the following conditions: comorbid cardiovascular and cerebrovascular diseases, other tumors, severe organ failure, mental illness, physical disability, surgical intolerance, undergoing radiotherapy and chemotherapy, pregnant, immune infections, and transferred to another hospital. Finally, 176 cases were enrolled as the study subjects. There were 104 males and 72 females aged 42 to 65 years, with an average age of 53.27±8.67 years. All of the subjects in this study signed the informed consent form. The study was approved by the Ethics Committee of our hospital.

Methods

According to their will, 176 patients were divided into a routine group which contained 82 patients receiving routine care during treatment, and a study group which consisted of 94 patients receiving EBN. Routine care includes the following: teaching of basic tumor-related knowledge, basic life care, regular examination of symptoms and body signs, treatment via cooperative nursing, and necessary psychological interventions. EBN includes the following. First, EBN ensures the provision of specific nursing care based on all the factors that may affect the patient's emotion, physiology, and psychology, as indicated in available related research, with consideration for the blind zone of patients regarding their psychological needs and disease knowledge, as well as regular evaluation of the psychological state of the pa-

tient, analysis of the causes that may affect the prognosis, and treatment in a timely manner [11]. Second, EBN requires the development of a questionnaire for patients with colorectal cancer, including daily basic life and mental state. The survey results clarify the advantages and disadvantages in the nursing content, enabling corresponding improvement. Patients are given case-specific information which also incorporates their actual demands and disease conditions, to strengthen their medical knowledge [12]. Third, EBN pays attention to factors affecting the prognosis and quality of life (QOL) of patients. For example, medical information is explained, along with critical care methods, to the patient's family members. Patients are given guidance in relieving the negative emotions caused by the side effects of postoperative radiotherapy and chemotherapy. EBN practitioners consult studies related to the patient's condition after communicating with doctors in charge to improve the patient's hospitalization environment, dietary arrangements, and schedule of activities and rest [13]. Fourth, EBN practitioners assist and encourage the patients in excreting sputum by coughing, turning over and tapping the back every two hours, and administering drugs (gentamicin, dexamethasone, and saline) to dilute the sputum [14]. Fifth, EBN practitioners strictly monitor the infection of the patient's stoma, comprehensively disinfect the stoma, guide the patient to complete the levator ani exercise, remind the patient to maintain good hygienic habits, clean and disinfect the patient's stoma daily, perform gastrointestinal decompression, and adjust the pH balance of the water electrolyte. The patients are orally given gastric acid secretion inhibitor, and the stoma abnormalities are recorded and reported to the physician in charge [15]. Intervention time in both groups was from the completion of surgery to discharge.

Outcome measures

Primary outcome measures: The incidence of complications in the two groups includes: anastomotic leakage, abdominal bleeding, lung infection, etc. The incidence of complications = the number of patients with complications/ total ×100%. Quality of life score: assessed using the Cancer Patient Quality of Life Measurement Scale (EORTC-QLQ-C30) [16], the score includes the symptoms (tiredness, pain,

nausea, vomiting, loss of appetite, insomnia, dreams) and physiological functions (cognitive function, emotional function, physical function, social function, role function). The scores were converted into a standard score of 0-100 with the linear formula. The lower the score, the less obvious the symptom; the higher the scores, the better the functions. The patients were investigated before discharge.

Secondary outcome measures: Hospital stay referred to the total time from surgery completion to hospital discharge.

Nursing satisfaction was measured as follows: all of the patients completed an anonymous scoring survey upon hospital discharge. The total score was 100 points, and the survey included satisfaction with the nursing staff, nursing ability, and self-benefit. Scores >90 represented "very satisfactory"; scores between 80 and 90 represented "satisfactory"; scores between 60 and 79 implied "improvement needed"; and scores <60 were evaluated as "unsatisfactory".

Care satisfaction was calculated as care satisfaction = (very satisfactory cases + satisfactory cases)/total cases ×100%.

Comfort status was evaluated using the General Comfort Questionnaire (GCQ) [17]. The total score was 100; a higher score indicated better comfort status. The patients were assessed after surgery and on the seventh day of nursing care, respectively.

Incidence of complications covered anastomotic leakage, abdominal bleeding, lung infection, and etc. This index was calculated as incidence of complications = number of patients with complications/total number of patients ×100%.

QOL of the cancer patients was assessed by the Cancer Patient Quality of Life Measurement Scale (EORTC-QLQ-C30) [16]. The score included the symptom (sickness, pain, nausea, vomiting, loss of appetite, insomnia, and dreaminess) and function areas (recognition, emotion, physical, social, and role functions). The extreme difference linear formula was used to convert the score in each area to the standard score of 0-100. A lower score in the symptom area indicated a less obvious symptom, whereas a higher score in the functional area indicated better function. The questionnaire was completed by the patient after knowing clearly the meaning of each survey and before being discharge from the hospital.

Statistical method

The data were analyzed and processed using SPSS 24.0 (Beijing Strong-Vinda Information Technology Co., Ltd.). Count data, such as sex, pathological stage, and patients' nursing satisfaction, were expressed as rates. A chi-squared test was conducted to compare between groups. Measurement data, such as hospital stay, GCQ scores, and QLQ-C30 scores, were expressed as mean ± standard deviation. Independent paired *t*-test was used for comparison between groups. Logistic regression analysis was conducted to explore the relationship between various factors and complications. P<0.050 implied statistical significance.

Results

No difference in baseline data was found between groups

The age, course of disease, operation time, weight, sex, tumor type, tissue type, pathological stage, living environment, smoking and exercise habits were compared between the two groups. No significant differences were found (P>0.050), which proved that the two groups were comparable (**Table 1**).

Patients in the study group experienced shortened hospital stays

The hospital stay of the observation group was 27.62±3.87 days, which was significantly shorter than that of the routine group (35.76±5.57 days, P<0.001, **Figure 1**).

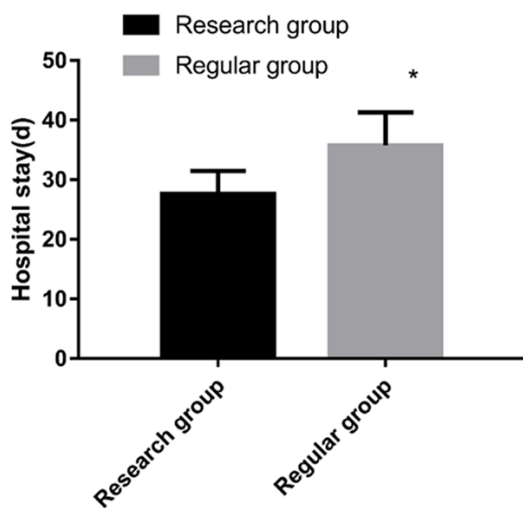*Patients in the study group showed lower nursing satisfaction*

The nursing satisfaction of the study group was significantly higher than that of the routine group (P=0.000). In both groups, the patients were predominantly satisfied (**Table 2**).

Patients in the study group showed higher GCQ score

There was no significant difference in the surgical GCQ scores between the two groups (P>0.050). The GCQ score of the study group

Table 1. General data comparison [n (%)]

	Research group (n=94)	Regular group (n=82)	X^2 or t	P
Age	51.69±10.24	52.64±9.68	0.630	0.530
Course of disease (day)	14.67±4.66	13.84±5.81	1.051	0.295
Operation time (hour)	2.47±0.42	2.54±0.53	0.977	0.330
Body weight (KG)	79.21±8.68	80.55±9.26	0.990	0.323
Gender			0.028	0.867
Male	55 (58.51)	49 (59.76)		
Female	39 (41.49)	33 (40.24)		
Type of disease			0.196	0.658
Colon cancer	49 (52.13)	40 (48.78)		
Rectal cancer	45 (47.87)	42 (51.22)		
Organizational classification			0.198	0.906
Adenocarcinoma	34 (36.17)	29 (35.37)		
Mucinous carcinoma	27 (28.72)	26 (31.71)		
Undifferentiated carcinoma	33 (35.11)	27 (32.93)		
Pathological staging			0.162	0.688
I~II	36 (38.30)	29 (35.37)		
III~IV	58 (61.70)	53 (64.63)		
Living environment			1.079	0.299
Town	72 (76.60)	68 (82.93)		
Rural	22 (23.40)	14 (17.07)		
Smoking			0.020	0.886
Yes	64 (68.09)	55 (67.07)		
No	30 (31.91)	27 (32.93)		
Sports habits			0.108	0.742
Yes	32 (34.04)	26 (31.71)		
No	62 (65.96)	56 (68.29)		

Figure 1. Hospital stay in both groups. *Representative vs. observation group hospital stay, P<0.001.

was 76.36±5.76 after seven days of nursing care, which was significantly higher than that of the routine group (62.24±7.18), P<0.001. The GCQ scores of the two groups after nursing care were higher than that after surgery (P< 0.001) (**Figure 2**).

Patients in the study group showed less complications

There were the comparative results of the complication rates of the two groups (**Table 3**). The incidence of complications in the study group was significantly lower than that in the routine group (P=0.002).

Patients in the study group showed lower QOL scores

The QOL scores of the study group were significantly different from those of the routine group (P=0.000, **Table 4**). The EORTC-QLQ-C30 score of the study group was significantly lower than that of the routine group for the symptom area (P=0.000). In terms of the functional area, only the cognitive function scores showed a significant difference between the two groups (P=0.618). The EORTC-QLQ-C30 score of the observation group in the functional area was significantly higher compared with the routine group (P=0.000).

Univariate analysis of postoperative complications

According to the incidence of complications, the patients were divided into the complication group (n=34) and the normal group (n=142). The clinical data of the two groups were collected for univariate analysis. The sex, cancer type and tissue classification of the two groups show no differences (P>0.050). There were differences in age, operation time, body weight, pathological stage and EBN between the two groups (P<0.050) (**Table 5**).

Table 2. Comparison of nursing satisfaction [n (%)]

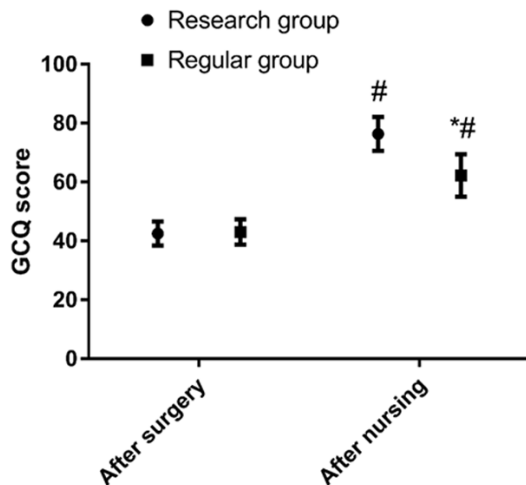|	Research group (n=94)	Regular group (n=82)	X^2	P
Very satisfied	67 (71.28)	18 (21.95)		
Satisfaction	20 (21.28)	33 (39.02)		
Needs improvement	8 (8.51)	23 (28.05)		
Not satisfied	1 (1.06)	8 (9.76)		
Nursing satisfaction (%)	90.43	71.95	21.264	<0.001

Figure 2. GCQ scores for both groups of patients. *Representative vs. post-treatment observation group GCQ score, P<0.001. #Represents comparison with the postoperative GCQ score of the same group, P<0.001.

Multivariate analysis of postoperative complications

The indicators with differences were transformed (**Table 6**). Logistic regression analysis showed that age and weight were not independent factors for patient's complications, but the longer operation time and advanced pathological stage were risk factors for the complications (OR>1), while EBN was an independent protective factor for complications (OR<1) (**Table 7**).

Discussion

The diagnosis, treatment, and postoperative care of colorectal cancer, one of the most common malignant tumors in the digestive tract, have been studied comprehensively. With the growing emphasis on the QOL of cancer patients in recent years, the effect of the mode of nursing intervention on patient prognosis is increasingly recognized [18]. Indeed, studies have confirmed that different nursing modes can cause differences in the prognosis of cancer patients [19-21]. As such, the application of the best nursing mode in clinical practice has become a major research focus.

EBN, now a widely used nursing model in the oncology field, aims to develop the best care content, solve problems encountered in the nursing process, and apply adjustments by summarizing the advantages and disadvantages of other nursing modes based on scientific principles so as to achieve the best care service [22]. In its application, EBN closely combines the professional skills of the nursing staff with scientific principles, and provides the patient with strict and objective guidance in completing postoperative rehabilitation. EBN is expected to become the mainstream mode of care, devoted to the care of various diseases [23].

In the present study, the differences of each index after application of EBN and routine nursing care in colorectal cancer patients were compared to demonstrate the application value of EBN in colorectal cancer treatment. The results of this study show that the patients in the study group, or those received EBN, fared significantly better compared with the patients in the routine group, in terms of hospital stay, nursing satisfaction, GCQ score, complication rate, and EORTC-QLQ-C30 score. This is consistent with the results of Meng et al [24] in the study of EBN in patients with ventilator-associated pneumonia. These findings suggest that EBN can improve the prognosis of patients with colorectal cancer, and is worthy of being promoted in clinical practice.

Based on various problems encountered after surgery in patients with colorectal cancer, the nursing staff needs to explain patiently the relevant knowledge and common problems of the disease so that the patient has a working understanding of the disease and avoids secondary injury after surgery. The care of the stoma is one of the critical points of treatment [25]. By explaining to the patient the possibility of infection at the stoma, the patient will

Table 3. Complication rate comparison [n (%)]

	Research group (n=94)	Regular group (n=82)	X^2	P
Anastomotic fistula	1 (1.06)	3 (3.66)	1.328	0.249
Abdominal hemorrhage	0 (0.00)	4 (4.88)	4.692	0.030
Urinary retention	1 (1.06)	3 (3.66)	1.328	0.249
lung infection	2 (2.13)	5 (6.10)	1.807	0.179
Incision infection	0 (0.00)	2 (2.44)	2.319	0.128
Fever	3 (3.19)	5 (6.10)	0.852	0.356
Vomiting	2 (2.13)	3 (3.66)	0.372	0.542
Complication rate (%)	9.57	28.05	10.052	0.002

Table 4. EORTC-QLQ-C30 score comparison

		Research group (n=94)	Regular group (n=82)	t	P
Symptom area	Exhausted	16.82±5.16	24.24±4.72	9.923	<0.001
	Pain	13.27±4.08	19.53±5.62	8.508	<0.001
	Nausea	20.14±3.68	25.66±5.17	8.213	<0.001
	Vomiting	9.68±3.24	15.34±4.86	9.162	<0.001
	Appetite	18.62±5.31	26.07±6.92	8.052	<0.001
	Insomnia	13.25±2.58	18.33±3.75	10.552	<0.001
	The average score	15.30±4.01	21.53±5.17	8.975	<0.001
Functional area	Cognition	67.82±7.24	67.24±8.15	0.500	0.618
	Mood	58.33±8.27	45.16±7.08	11.301	<0.001
	Body	68.51±6.67	56.24±8.94	10.382	<0.001
	Society	52.13±8.68	42.53±7.04	8.012	<0.001
	Character	49.83±7.61	41.25±5.63	8.437	<0.001
	The average score	59.32±7.69	50.48±7.37	7.770	<0.001

Throughout the care process, the impact of the patient's family is also a critical point [27]. EBN not only requires and teaches patients to cooperate actively with rehabilitation treatment but also urges family members to invest in nursing services. Disease-related explanations and simple nursing operations of patients' family members will make patients feel supported and confident in overcoming the disease. Meanwhile, communication with the patient strengthens the trust of the patients in the medical staff. As the relationship between the doctor and the patient is brought closer, the patient's compliance with the treatment is higher.

The improvement of postoperative complications in patients with colorectal cancer by EBN is also extremely significant. EBN measures require a comprehensive disinfection of the stoma, guiding the patient to complete the levator ani exercise, and reminding the patient to maintain good hygiene habits. The nurse regularly cleans and disinfects the patient's stoma, regulates patient's gastrointestinal decompression, balance of water and electrolyte pH, and gives the patient oral gastric acid secretion inhibitors [28]. Abnormalities in the vital signs of patients are be closely monitored so that patients in the early stages of peripheral dermatitis, infection, or ischemic necrosis, are given timely treatment. Gastrointestinal effusion, abdominal infection, and surgery-brought on stress injury can be reduced by gastrointestinal decompression and drug intervention, and the possibilities of complications associated with the patient will be reduced. In clinical practice EBN enables the patients to

fully understand the impact of the stoma on the prognosis, and nursing staff should urge the patient to develop a good rehabilitation habits to avoid secondary damage with improper behaviors during hospitalization.

In rehabilitation, patients often suffer from anxiety, uneasiness, fear, anger, and other negative emotions because of the uncertainty of the outcomes and the pain caused by the disease [26]. The medical staff regularly visits and gives condolences to the patients every day, keeps abreast of the changes in the patient's recovery, makes brochures with precautions during the recovery of colon cancer as well as successful cases for patients to read, and gives the patients hope through psychological suggestions. The patient participates in weekly tests for simple disease-related knowledge and regular one-on-one disease tutoring for patients who do not understand.

Table 5. Univariate analysis of postoperative complications

	Complication group (n=34)	Normal group (n=142)	X^2 or Z	P
Sex			0.550	0.459
Male	22 (64.71)	82 (57.75)		
Female	12 (35.29)	60 (42.25)		
Age			8.612	0.003
<53	6 (17.65)	64 (45.07)		
≥53	28 (82.35)	78 (54.93)		
Operation time (hour)			10.752	0.001
<2	9 (26.47)	82 (57.75)		
≥2	25 (73.53)	60 (42.25)		
Body weight (KG)			12.963	<0.001
≤80	7 (20.59)	78 (54.93)		
>80	27 (79.41)	64 (45.07)		
Type of disease			0.476	0.490
Colon cancer	19 (55.88)	70 (43.90)		
Rectal cancer	15 (44.12)	72 (50.70)		
Pathological stage			4.833	0.028
I~II	7 (20.59)	58 (40.85)		
III~IV	27 (79.41)	84 (59.15)		
Tissue classification			0.401	0.818
Adenocarcinoma	12 (35.29)	51 (35.91)		
Mucinous carcinoma	9 (26.47)	44 (30.99)		
Undifferentiated carcinoma	13 (38.24)	47 (33.10)		
Received EBN			21.663	<0.001
Yes	6 (17.65)	88 (61.97)		
No	28 (82.35)	54 (38.03)		

Table 6. Assignment table

Factor	Assignment
Age	Raw data
Operation time	Raw data
Body weight	Raw data
Pathological stage	I~II=0; III~IV = 1
Received EBN	Yes=0; No=1
Complication	Yes=0; No=1

Table 7. Multivariate analysis of postoperative complications

	Operation time	Pathological staging	Accept EBN
B	2.212	1.862	0.069
S.E.	0.72	0.800	0.019
Wals	12.851	5.418	6.858
Sig.	0.002	0.020	0.005
Exp (B)	6.921	4.435	0.624
95% CI	3.125~8.621	1.342~8.613	0.364~1.089

recover to the maximum extent during postoperative rehabilitation and improves their various physical functions effectively, by integrating scientific principles. Therefore, the QOL in the study group was significantly superior to that of the routine group.

This study has a number of limitations to be considered. For example, the population of the study subject was small and relatively simple. For patients with severe colon cancer or older patients, there may be situations in which EBN cannot communicate. At this time, we should pay more attention to patients and establish an EBN team to conduct one-on-one care for patients, which were not considered in the study; in other words, personalized interventions will be our next focus. We will conduct a longer follow-up to obtain the best experimental results.

In summary, EBN can effectively reduce the incidence of postoperative complications in patients with colorectal cancer, improve the QOL of patients, and is worthy of promotion in clinical application.

Disclosure of conflict of interest

None.

Address correspondence to: Xin Zheng, Department of General Surgery, Ankang Hospital of Traditional Chinese Medicine, No. 47, Bashan East Road, Hanbin District, Ankang 725000, Shaanxi, China. Tel: +86-0915-8183423; E-mail: wudmu4y @163.com

References

[1] Pędziwiatr M, Pisarska M, Kisielewski M, Matłok M, Major P, Wierdak M, Budzyński A and Ljungqvist O. Is ERAS in laparoscopic surgery for colorectal cancer changing risk factors for delayed recovery? Med Oncol 2016; 33: 25.

[2] Artinyan A, Orcutt ST, Anaya DA, Richardson P, Chen GJ and Berger DH. Infectious postoperative complications decrease long-term survival in patients undergoing curative surgery for colorectal cancer: a study of 12,075 patients. Ann Surg 2015; 261: 497-505.

[3] Tokunaga R, Sakamoto Y, Nakagawa S, Miyamoto Y, Yoshida N, Oki E, Watanabe M and Baba H. Prognostic nutritional index predicts severe complications, recurrence, and poor prognosis in patients with colorectal cancer undergoing primary tumor resection. Dis Colon Rectum 2015; 58: 1048-1057.

[4] McSorley ST, Watt DG, Horgan PG and McMillan DC. Postoperative systemic inflammatory response, complication severity, and survival following surgery for colorectal cancer. Ann Surg Oncol 2016; 23: 2832-2840.

[5] Beets G, Sebag-Montefiore D, Andritsch E, Arnold D, Beishon M, Crul M, Dekker JW, Delgado Bolton R, Fléjou JF, Grisold W, Henning G, Laghi A, Lovey J, Negrouk A, Pereira P, Roca P, Saarto T, Seufferlein T, Taylor C, Ugolini G, Velde CV, Herck BV, Yared W, Costa A and Naredi P. ECCO essential requirements for quality cancer care: colorectal cancer. A critical review. Crit Rev Oncol Hematol 2017; 110: 81-93.

[6] Mosher CE, Adams RN, Helft PR, O'Neil BH, Shahda S, Rattray NA and Champion VL. Family caregiving challenges in advanced colorectal cancer: patient and caregiver perspectives. Support Care Cancer 2016; 24: 2017-2024.

[7] Jefford M, Gough K, Drosdowsky A, Russell L, Aranda S, Butow P, Phipps-Nelson J, Young J, Krishnasamy M, Ugalde A, King D, Strickland A, Franco M, Blum R, Johnson C, Ganju V, Shapiro J, Chong G, Charlton J, Haydon A and Schofield P. A randomized controlled trial of a nurse-led supportive care package (SurvivorCare) for survivors of colorectal cancer. Oncologist 2016; 21: 1014-1023.

[8] Behrens J and Langer G. Evidence based nursing and caring. Verlag Hans Huber 2016.

[9] Dang D and Dearholt SL. Johns Hopkins nursing evidence-based practice: model and guidelines. Sigma Theta Tau 2017.

[10] US Preventive Services Task Force, Bibbins-Domingo K, Grossman DC, Curry SJ, Davidson KW, Epling JW Jr, García FAR, Gillman MW, Harper DM, Kemper AR, Krist AH, Kurth AE, Landefeld CS, Mangione CM, Owens DK, Phillips WR, Phipps MG, Pignone MP and Siu AL. Screening for colorectal cancer: US preventive services task force recommendation statement. JAMA 2016; 315: 2564-2575.

[11] Zhang M, Peng L, Liu W, Wen Y, Wu X, Zheng M, Zhu Y, Liu Q and Chan S. Physical and psychological predictors of quality of life in Chinese colorectal cancer patients during chemotherapy. Cancer Nurs 2015; 38: 312-321.

[12] Zhang MF, Zheng MC, Liu WY, Wen YS, Wu XD and Liu QW. The influence of demographics, psychological factors and self-efficacy on symptom distress in colorectal cancer patients undergoing post-surgical adjuvant chemotherapy. Eur J Oncol Nurs 2015; 19: 89-96.

[13] El-Shami K, Oeffinger KC, Erb NL, Willis A, Bretsch JK, Pratt-Chapman ML, Cannady RS, Wong SL, Rose J, Barbour AL, Stein KD, Sharpe KB, Brooks DD and Cowens-Alvarado RL. American Cancer Society colorectal cancer survivorship care guidelines. CA Cancer J Clin 2015; 65: 427-455.

[14] Chou YJ, Lai YH, Lin BR, Liang JT and Shun SC. Factors influencing amount of weekly exercise time in colorectal cancer survivors. Cancer Nurs 2017; 40: 201-208.

[15] McGrath C, Mihala G, Beesley VL, Lynch BM, Graves N and Gordon LG. "Cancer Put My Life on Hold": work-related challenges among middle-aged adults 12 months after a diagnosis of colorectal cancer. Cancer Nurs 2017; 40: 160-167.

[16] King MT, Costa DS, Aaronson NK, Brazier JE, Cella DF, Fayers PM, Grimison P, Janda M, Kemmler G, Norman R, Pickard AS, Rowen D, Velikova G, Young TA and Viney R. QLU-C10D: a health state classification system for a multi-attribute utility measure based on the EORTC QLQ-C30. Qual Life Res 2016; 25: 625-636.

[17] Yu Y, Hu L, Chen X, Ge M, Zhu H and Yan Y. The impact of the predictive nursing education process on degree of comfort and quality of life for patients in the oncology department. Iran J Public Health 2017; 46: 1231-1236.

[18] Newton S, Hickey M and Brant J. Mosby's oncology nursing advisor E-book: a comprehensive guide to clinical practice. Elsevier Health Sciences 2016.

[19] Xia C, Jiang Z, Wang G, Feng X, Yang Y, Xianghong Y, Huang Y and Peng N. Quantitative research and nursing effect of early ambulation in patients with gastrointestinal tumor after operation. J Med Postgrad 2016; 29: 411-415.

[20] Sun Y and Yan B. Experience of nursing cooperation in endoscopic radiofrequency ablation of skull base tumor; resection via nasal low temperature plasma radiofrequency. Chinese Journal of Practical Nursing 2016; 32: 2042-2045.

[21] Zhu Z, Fang B and Zhong Q. Clinical research of psychological nursing intervention on the compliance of pain medication in ederly patients with malignant tumor. Chin J Primary Med Pharm 2017; 24: 3794-3797.

[22] Kluger M. Evidence-based geriatric nursing protocols for best practice. Springer Publishing Company 2007.

[23] Häggman-Laitila A, Mattila LR and Melender HL. Educational interventions on evidence-based nursing in clinical practice: a systematic review with qualitative analysis. Nurse Educ Today 2016; 43: 50-59.

[24] Meng K, Li Y, Li S, Zhao H and Chen L. The survey on implementation of evidence-based nursing in preventing ventilator-associated pneumonia and the effect observation. Cell Biochem Biophys 2015; 71: 375-381.

[25] Feddern ML, Emmertsen KJ and Laurberg S. Life with a stoma after curative resection for rectal cancer: a population-based cross-sectional study. Colorectal Dis 2015; 17: 1011-1017.

[26] Hulbert-Williams NJ, Storey L and Wilson KG. Psychological interventions for patients with cancer: psychological flexibility and the potential utility of acceptance and commitment therapy. Eur J Cancer Care (Engl) 2015; 24: 15-27.

[27] Choi YS, Hwang SW, Hwang IC, Lee YJ, Kim YS, Kim HM, Youn CH, Ahn HY and Koh SJ. Factors associated with quality of life among family caregivers of terminally ill cancer patients. Psychooncology 2016; 25: 217-224.

[28] Stout NL, Silver JK, Raj VS, Rowland J, Gerber L, Cheville A, Ness KK, Radomski M, Nitkin R, Stubblefield MD, Morris GS, Acevedo A, Brandon Z, Braveman B, Cunningham S, Gilchrist L, Jones L, Padgett L, Wolf T, Winters-Stone K, Campbell G, Hendricks J, Perkin K and Chan L. Toward a national initiative in cancer rehabilitation: recommendations from a subject matter expert group. Arch Phys Med Rehabil 2016; 97: 2006-2015.