Effects of ESPCS mode nursing on the surgical tolerance, gastrointestinal tract recovery and self-management efficacy of patients with colon cancer

RUI YU[1], MEILING SUN[2], SHULI XIA[1] and LI ZHANG[1]

Departments of [1]General Surgery and [2]Nursing, The Second Affiliated Hospital of Harbin Medical University, Harbin, Heilongjiang 150086, P.R. China

Received May 18, 2023; Accepted February 28, 2024

DOI: 10.3892/ol.2024.14380

Abstract. Colon cancer is a common gastrointestinal malignant tumor. In addition to conventional treatment, thoughtful and comprehensive aftercare should be given to patients. The present study aimed to explore the effects of explain-simulate-practice-communication-support (ESPCS) model nursing on the surgical tolerance, gastrointestinal recovery and self-management efficacy of patients with colon cancer. The clinical data of 136 patients with colon cancer diagnosed and treated at the Second Affiliated Hospital of Harbin Medical University (Harbin, China) from June 2020 to April 2022 were retrospectively analyzed and a total of 84 patients met the inclusion criteria. A total of 42 patients who underwent conventional nursing were included in the conventional nursing group and 42 patients who underwent ESPCS model nursing were included in the ESPCS model nursing group. Surgical tolerance, gastrointestinal recovery, self-management efficacy (Cancer Self-Management Efficacy Scale), quality of life (Comprehensive Quality of Life Inventory-74) and nursing satisfaction were analyzed. Slightly higher proportions of excellent and good surgical tolerance were found in the ESPCS model nursing group (97.62%) compared with those in the conventional nursing group (85.71%); however, no significant difference was shown (P>0.05). Compared with the conventional nursing group, the time needed for gastric tube removal, bowel sound recovery, anal exhaust, first defecation, general food intake and the time until getting out of bed was significantly shorter in the ESPS model nursing group (all P<0.05). Before the intervention, no statistically significant difference was found between the indicators in the Cancer Self-Management Efficacy Scale of the two groups (all P>0.05). After the intervention, the ESPCS model nursing group had significantly higher scores for positive attitude, stress relief and self-determination than the conventional nursing group (all P<0.05). Before intervention, there was no statistically significant difference in the indicators of CQOLI-74 between the two groups (P>0.05). After the intervention, the ESPCS model nursing group also had significantly higher scores for social function, psychological function, life state and somatic function compared with the conventional nursing group (all P<0.05). Higher satisfaction of patients was found in the ESPCS mode group (95.24%) compared with that in the conventional nursing group (78.57%) (P<0.05). Overall, ESPCS mode nursing could effectively elevate the surgical tolerance of patients with colon cancer, promote the recovery of gastrointestinal function, increase self-management efficacy, and improve the quality of life and nursing satisfaction, which is certainly worthy of clinical promotion.

Correspondence to: Professor Rui Yu, Department of General Surgery, The Second Affiliated Hospital of Harbin Medical University, 246 Xuefu Road, Nangang, Harbin, Heilongjiang 150086, P.R. China
E-mail: yuruihmu@21cn.com

Key words: explain-simulate-practice-communication-support model, colon cancer, surgical tolerance, gastrointestinal recovery, self-management efficacy

Introduction

Colon cancer is a common malignant tumor occurring in the colon, which often occurs in men aged 40 to 50 years. According to the data from the International Agency for Research on Cancer of the World Health Organization, in 2020, the estimated number of new cases and deaths of colorectal cancer in China were ~592,000 and 309,000 respectively, ranking second in incidence and fifth in mortality, and there were ~550,000 new cases every year with a rising number of patients (1). However, the ratio of deaths to new cases of patients with colorectal cancer in China (52.2%) was significantly higher than that in Western countries (35.4%), indicating that there is still room for significant improvement in the standardization of diagnosis and treatment of colorectal cancer in China and the level of comprehensive treatment (2). The causes of colon cancer are complex, but are mainly related to an unhealthy diet, a history of colon diseases, hereditary familial colon diseases and other biochemical or environmental factors (3,4). Surgery is the main method for the treatment of early colon cancer. If diagnosis and treatment can be carried out at an early stage, patients usually get the expected cure. However,

the treatment of colon cancer usually depends on factors such as how far the disease has progressed and the patient's physical health. The degree of disease progression is often indicated by the stage of the cancer, which is important for developing treatment strategies for colon cancer (5). Stage 0 colon cancer treatment can be treated with a local excision or simple polypectomy. If the tumor tissue is too large to be removed locally, surgery is needed to remove part of the colon. The treatment of stage I-III colon cancer is mainly surgical, including traditional open surgery and laparoscopic surgery. For patients at high risk of recurrence, adjuvant chemotherapy is required postoperatively. As for the treatment of patients with stage IV colon cancer, a comprehensive treatment plan that combines surgery, radiotherapy, chemotherapy and targeted therapy is conducted. For patients with advanced colon cancer who cannot undergo surgery for various reasons, a comprehensive treatment model with chemotherapy as the core can improve the survival time of the patients (6).

However, in the presence of colon cancer, patients' psychological tolerance is often poor and surgery will cause some physical and mental damage to the patients. Most patients may experience poor gastrointestinal function recovery, as well as anxiety and depression, and even be unable to live and work normally, affecting recovery after surgery. Therefore, in addition to the treatment of patients, scientific and effective nursing intervention have an important role in improving a patient's self-care ability, enhancing self-management efficacy and promoting recovery (7).

Explain-simulate-practice-communication-support (ESPCS) is an intervention method to relieve psychological pressure that has been expanded from medical simulation education, which can present theoretical knowledge more concretely and visually, and then adjust the patients' psychological state accordingly (8,9). However, there are few theoretical studies on the application of nursing intervention in patients with colon cancer after surgery.

In the present study, the effects of ESPCS mode nursing on the surgical tolerance, gastrointestinal recovery and self-management efficacy of patients with colon cancer were explored, aiming to provide guidance for clinical nursing.

Patients and methods

Patients. The clinical data of 136 patients with colon cancer diagnosed and treated at the Second Affiliated Hospital of Harbin Medical University (Harbin, China) from June 2020 to April 2022 were retrospectively analyzed, and a total of 84 patients met the inclusion criteria. A total of 42 patients who underwent conventional nursing were included in the conventional nursing group and 42 patients who underwent ESPCS model nursing were included in the ESPCS model nursing group. The selection process was shown in Fig. 1. A total of 54 men and 30 women were included, with a mean age of 61.47±6.88 years. Inclusion criteria were as follows: i) All subjects met the diagnostic criteria for colon cancer (10), which was confirmed by pathological examination; ii) patients with normal autonomic consciousness and language function; and iii) patients with stable vital signs and expected survival was >6 months. The exclusion criteria were as follows: i) Patients with mental diseases; ii) patients with obvious abnormal liver, kidney or heart functions; and iii) patients with infectious diseases. This study was approved by the Ethics Committee of the Second Affiliated Hospital of Harbin Medical University (Harbin, China) and complied with the relevant principles of medical ethics (approval no. KY2020-017).

Methods. The patients in the control group were provided with a routine nursing intervention. Routine skin preparation, indwelling catheter and gastric tube insertion were performed before the operation. Disease-related knowledge was explained to the patients and psychological counseling was conducted. The patient's diet was amended after the operation following the doctor's advice. The patients were encouraged to get out of bed early and were guided to carry out rehabilitation activities. The patients in the study group were provided with the ESPCS nursing intervention consisting of five processes.

Explanation. The nursing staff learnt about the patient's physical condition, medical history and surgical history according to the examination results. Corresponding hypoglycemic and anti-hypertensive treatment was administered to patients with high blood sugar and hypertension before surgery. The medical staff carried out systematic health education and psychological counseling, and popularized the basic medical knowledge of colon cancer surgery for the patients and their families patiently to make them aware of the content. The nursing staff paid attention to the psychological state of patients and helped them eliminate negative emotions in a targeted way so as not to affect the quality of surgery. The nursing staff explained the importance of getting out of bed early after surgery to patients, and enhanced their self-confidence in rehabilitation.

Simulation. The nursing staff conducted on-site simulation training under the guidance of medical personnel or by watching videos, and emphasized to patients that rehabilitation training should be carried out according to tolerance. Patients were advised to get up slowly when simulating getting out of bed activities, thereby reducing the discomfort caused by a sudden rise. The patients and their families were invited to participate. The patients and their families were informed of relevant precautions to improve their proficiency.

Practice. At 6 h post-operation, the nurse raised the patient's bedside to help them find the most suitable half lying position. At the same time, the patients were instructed to undergo deep breathing training, aiming to resume free breathing as soon as possible, and exercise the diaphragm. After the patients had rested in bed for 24-48 h, they were assisted to perform early activities, including the regular massage of limbs, turning over and swinging limbs. At the same time, ~20 min of muscle massage should be supplemented, three times a day, each time from the farthest place to the nearest place to the heart. According to the patient's condition, the patients gradually started to get out of bed. The nurse helped the patient to get up, paying attention to protecting the closed incision, encouraged the patient to try to get out of bed and helped the patient stand up. After their condition was stable, the patients slowly walled around the room and gradually increased the amount of exercise performed. The family members were also encouraged to participate actively.

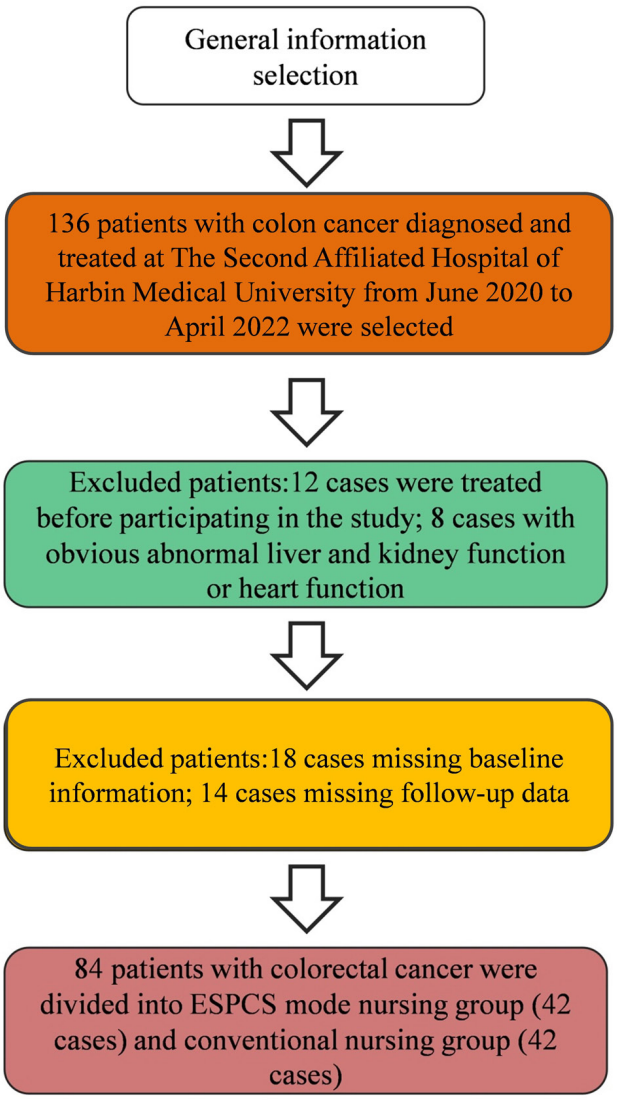

Figure 1. Patient selection process. ESPCS, explain-simulate-practice-communication-support.

Communication. Communication with patients was strengthened when conducting health education and rehabilitation training for patients. The patients were encouraged to actively express themselves, and the intervention plan was appropriately modified according to the patients' opinions. The nursing staff paid close attention to the patient's psychological condition, and timely counseling was conducted to help the patients establish good social relations. After discharge, patients were followed up 1-2 times a week for 15-30 min each time.

Support. When communicating with patients and their families, the nursing staff emphasized that the prognosis for the recovery of patients was not only related to the medical drugs taken, but was also related to a better material life, family companionship, support and encouragement, aiming to help patients build a sense of self existence and hope. In addition, patients were encouraged to join online groups of patients with colon cancer, such as QQ or WeChat groups, for information sharing and emotional venting, aiming to obtain support from other patients.

Outcome measures. The surgical tolerance of patients with ESPCS mode nursing was evaluated as excellent, good or poor. Patients who could actively cooperate during the operation and had good control of their blood pressure and blood sugar were considered excellent. A score of good was awarded if the patient had a high degree of cooperation with the operation and their blood pressure, blood sugar and other levels were well controlled. A score of poor was awarded if the patient could not actively cooperate during the operation and their blood pressure and blood sugar levels were not controlled enough. The total positive surgical tolerance was calculated as follows: The excellent and good rate of surgical tolerance=cases of (excellent + good)/total number of cases x100.

The effects of ESPCS mode nursing on the gastrointestinal tract recovery of patients were evaluated, including the time until gastric tube removal, bowel sound recovery, anal exhaust, first defecation, general food intake and the time until getting out of bed.

The Cancer Self-Management Efficacy Scale (11) was adopted to evaluate the patients' self-management efficacy, which included three efficacy measures: Positive attitude (9 items), stress relief (16 items) and self-determination (3 items). There were 28 items in total. Each item had a score of 1-5 points, with a total score of 28-140 points. A higher score represented greater self-management efficacy.

The quality of life of patients in the two groups was evaluated with the Comprehensive Quality of Life Rating Scale-74 (CQOLI-74) (12). The CQOLI-74 scale included four measures: Social function (F51-70), psychological function (F31-50), life status (F1-10), physical function (F2-30) and global quality of life (G1-4). There were 74 items in total. Each item had a score of 1-5 points, with a total score of 80-400 points. A higher score represented greater quality of life.

A self-made satisfaction scale was used to evaluate the patients' satisfaction as very satisfied, satisfied or dissatisfied. The total positive satisfaction was calculated as follows: Satisfaction=cases of (very satisfied + satisfied)/number of cases x100%. The scale included five measures: Environmental facilities (8 items), service attitude (8 items), health education (8 items), humanistic care (8 items) and postoperative recovery effect (8 items). There were 40 items in total, with 0-2 points for each item and 0-80 points for the total score. A total score of ≤50 points was considered unsatisfactory, 51-70 points were considered satisfactory and ≥71 points were considered very satisfactory.

Statistical analysis. In this study, the enumeration data of surgical tolerance rate and nursing satisfaction are expressed as n (%) and were compared using the χ^2 test or Fisher's exact tests. The Mann-Whitney U non-parametric test was used to compare the ordered categorical data (surgical tolerance and nursing satisfaction) between the two groups. Gastrointestinal recovery indicators, self-management efficacy indicators, quality of life indicators and other measurement data were all tested for normality of distribution by using the Shapiro-Wilk test, and all of them were in line with a normal distribution. Measurement data are expressed in the form of the mean ± SD. The measurement data between two groups were analyzed by independent sample t-test. SPSS 23.0 software (IBM Corp.) was used for the statistical data analysis in this study. $P<0.05$ was considered to indicate a statistically significant difference.

Table I. Effects of ESPCS mode nursing on the surgical tolerance of patients with colon cancer.

Surgical tolerance	ESPCS nursing group (n=42)	Conventional nursing group (n=42)	χ^2	P-value
Tolerance grade			-2.028	0.043[a]
Excellent	31 (73.81)	23 (54.76)		
Good	10 (23.81)	13 (30.95)		
Poor	1 (2.38)	6 (14.29)		
Total proportion of excellent and good	41 (97.62)	36 (85.71)	-	0.109[b]

[a]Mann-Whitney U non-parametric test; [b]Fisher's exact test. Data are presented as n (%). ESPCS, explain-simulate-practice-communication-support.

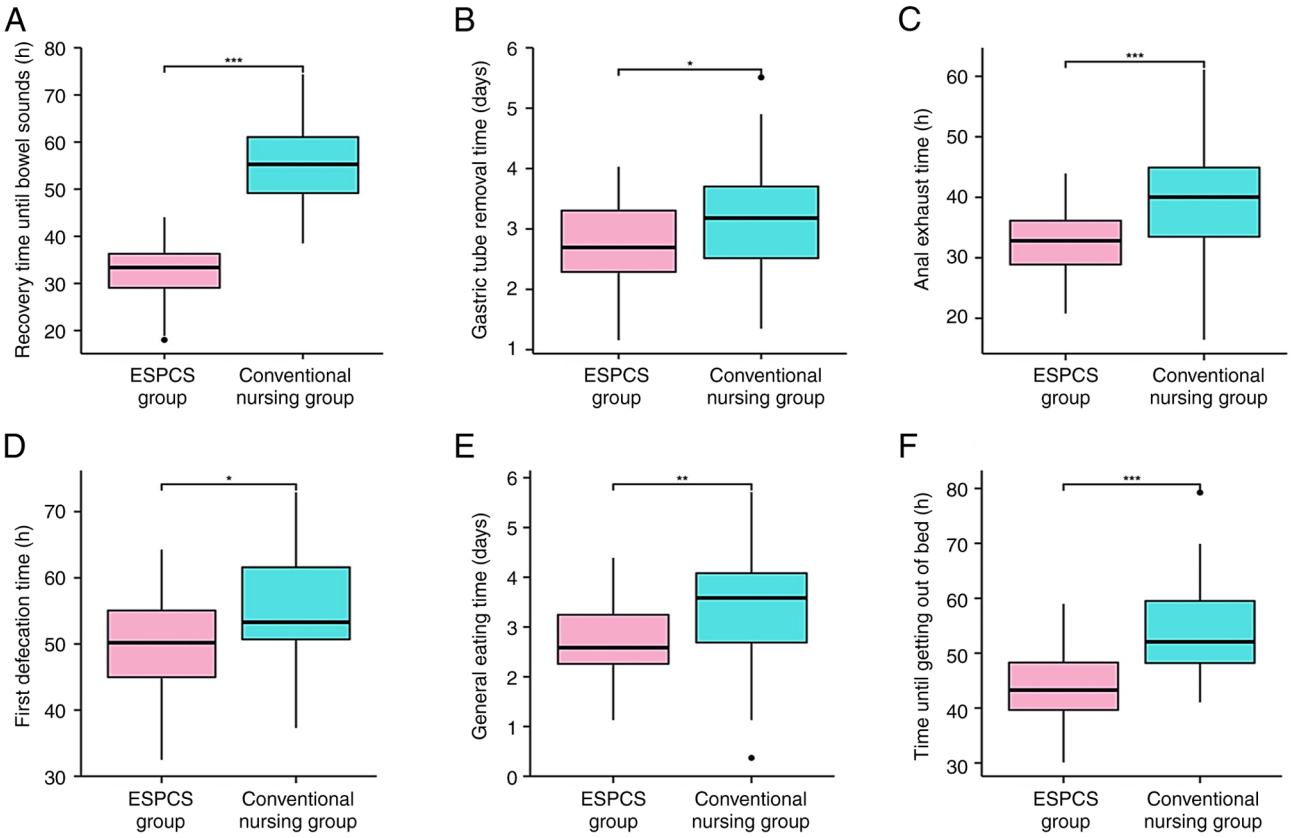

Figure 2. Comparison of gastrointestinal tract recovery between two groups of patients with colon cancer. Comparison of (A) gastric tube extraction time, (B) recovery time of bowel sounds, (C) anus exhaust time, (D) the first defecation time, (E) general eating time and (F) the time until getting out of bed between the ESPCS and conventional nursing groups. *P<0.05, **P<0.01 and ***P<0.001. ESPCS, explain-simulate-practice-communication-support.

Results

Effect of ESPCS mode nursing on the surgical tolerance of patients with colon cancer. There was a statistically significant difference in the average rank distribution of surgical tolerance grade between the ESPCS model nursing group and the conventional nursing group (P=0.043). Slightly higher proportions of excellent and good surgical tolerance were found in the ESPCS model nursing group (97.62%) compared with these in the conventional nursing group (85.71%); however, no significant difference was found (P=0.109; Table I).

Effects of ESPCS mode nursing on gastrointestinal tract recovery of patients with colon cancer. Compared with that in the conventional nursing group, the time needed for gastric tube removal, bowel sounds recovery, anal exhaust, first defecation, general food intake and the time until getting out of bed in the ESPCS model nursing group was significantly shorter (P<0.05; Table II; Fig. 2).

Effect of ESPCS mode nursing on the self-management efficacy of patients with colon cancer. Before the intervention, no statistically significant differences were found between the self-management efficacy indicators of the two groups

Table II. Effects of ESPCS mode nursing on the gastrointestinal tract recovery of patients with colon cancer.

Groups	ESPCS nursing group (n=42)	Conventional nursing group (n=42)	t	P-value
Gastric tube removal time, days	2.76±0.74	3.15±0.92	2.141	0.035
Recovery time of bowel sounds, h	32.53±5.85	54.94±7.96	4.822	<0.001
Anal exhaust time, h	32.59±6.27	39.16±8.16	4.138	<0.001
First defecation time, h	50.18±8.22	54.83±7.96	2.634	0.010
General eating time, days	2.75±0.87	3.45±1.08	3.271	0.002
Time until getting out of bed, h	44.39±7.61	54.32±8.69	5.571	<0.001

Data are presented as the mean ± SD. ESPCS, explain-simulate-practice-communication-support.

Table III. Effect of ESPCS mode nursing on the self-management efficacy scores of patients with colon cancer.

Efficacy measures	ESPCS nursing group (n=42)	Conventional nursing group (n=42)	t	P-value
Positive attitude				
Before the intervention	55.17±13.06	54.30±11.83	0.320	0.750
After the intervention	65.85±13.15	59.24±10.25	2.569	0.012
Stress relief				
Before the intervention	32.30±8.13	32.00±6.84	0.183	0.855
After the intervention	41.37±9.08	36.72±9.41	2.305	0.024
Self-determination				
Before the intervention	10.24±3.62	9.98±2.62	0.377	0.707
After the intervention	12.38±2.85	11.09±2.25	2.302	0.024
Total score				
Before the intervention	97.71±24.81	96.28±21.29	0.284	0.778
After the intervention	119.60±25.08	107.05±21.91	2.442	0.017

Data are presented as the mean ± SD. ESPCS, explain-simulate-practice-communication-support.

(all P>0.05). After the intervention, the ESPCS model nursing group had significantly higher scores for positive attitude, stress relief and self-determination compared with the conventional nursing group (all P<0.05) (Table III).

Effect of ESPCS mode nursing on the quality of life of patients with colon cancer. Before the intervention, no statistically significant differences were found between the quality of life indicators of the two groups (all P>0.05). After the intervention, the ESPCS model nursing group had significantly higher scores for social function, psychological function, life state and somatic function compared with the conventional nursing group (P<0.05) (Table IV).

Satisfaction of the colon cancer patients with ESPCS nursing. There was a statistically significant difference in the average rank distribution of satisfactory grade between the ESPCS model nursing group and the conventional nursing group (P=0.008). The total positive satisfaction of the patients in the ESPCS mode group and the conventional nursing group was 95.24 and 78.57%, respectively. This result was significantly higher in the ESPCS mode nursing group (P=0.048) (Table V).

Discussion

Colon cancer is a type of malignant tumor that often occurs at the junction of the sigmoid colon and rectum, and its incidence ranks third among malignant tumors, second only to lung cancer and gastric cancer (13). Surgery is an important method for the treatment of colon cancer, but it is traumatic and may confer a psychological and physiological burden on the patients (14). Therefore, nursing intervention for patients plays an important role in promoting their rehabilitation and improving the prognosis. ESPCS mode nursing is an intervention method developed from medical simulation education that includes five processes: Explanation, simulation, practice, communication and support. Through simulation, patients can experience realistic treatment and care scenarios, and patients' disease-related knowledge, self-care skills and attitude towards disease can be improved through ESPCS mode nursing (15). Some studies have suggested that simulation education could

Table IV. Effects of ESPCS mode nursing on the quality of life scores of patients with colon cancer.

Quality of life measures	ESPCS nursing group (n=42)	Conventional nursing group (n=42)	t	P-value
Social function				
Before the intervention	67.55±8.41	67.43±8.24	0.066	0.948
After the intervention	85.91±9.16	74.50±8.17	6.025	<0.001
Psychological function				
Before the intervention	71.24±8.94	71.32±8.90	0.041	0.967
After the intervention	86.06±7.58	81.63±7.63	2.669	0.009
Life state				
Before the intervention	74.14±8.34	74.83±6.42	0.425	0.672
After the intervention	88.36±9.24	81.47±8.69	3.520	0.001
Somatic function				
Before the intervention	73.75±8.63	74.74±9.63	0.496	0.621
After the intervention	89.25±10.03	82.41±9.79	3.163	0.002
Total score				
Before the intervention	286.68±34.32	288.32±33.19	0.223	0.824
After the intervention	349.58±36.01	320.01±24.49	4.401	<0.001

Data are presented as the mean ± SD. ESPCS, explain-simulate-practice-communication-support.

Table V. Satisfaction of colon cancer patients with ESPCS nursing.

Groups	ESPCS nursing group (n=42)	Conventional nursing group (n=42)	χ^2	P-value
Satisfaction grade			-2.664	0.008[a]
Very satisfied	32 (76.19)	21 (50.00)		
Satisfied	8 (19.05)	12 (28.57)		
Dissatisfied	2 (4.76)	9 (21.43)		
Total positive satisfaction	40 (95.24)	33 (78.57)	-	0.048[b]

[a]Mann-Whitney U non-parametric test; [b]Fisher's exact test. Data are presented as n (%). ESPCS, explain-simulate-practice-communication-support.

also be used as an alternative solution to solve the problem of a patient's lack of confidence in their own disease state or rehabilitation state, significantly reducing patient anxiety and depression, and increasing patient confidence in treatment (16,17). The results of the present study found that the excellent rate of surgical tolerance in the ESPCS mode nursing group was slightly higher than that in the conventional nursing group. It may be that a poor psychological state is a common consequence of the diagnosis and treatment of various diseases, which may further aggravate the side effects of treatment. Intervention measurements to increase treatment tolerance are of great importance for improving quality of life and treatment compliance (18). ESPCS mode nursing could be used to communicate with patients in a variety of ways to help them reduce or eliminate unnecessary fears and doubts, thereby improving a patient's surgical tolerance (19). In line with the research by Chirico *et al* (20), the present study considered that nursing interventions with distraction could effectively reduce anxiety and improve patients' emotional state during treatment. Therefore, ESPCS mode nursing for patients with colon cancer could improve their surgical tolerance and promote patient recovery.

Colon cancer is a common digestive system disease. During the treatment process, mechanical stimulation and severe pain at the end of anesthesia may cause sympathetic nervous system excitement, hinder gastrointestinal peristalsis, and affect the patient's normal exhaust and defecation. If timely intervention and treatment are not performed, adverse reactions such as flatulence, adhesions and even intestinal infarction may be induced, endangering the patient's life (21). One study found that comprehensive nursing for patients undergoing abdominal surgery could largely reduce their anxiety and depression levels, promote the recovery of gastrointestinal function and reduce the incidence of adverse reactions (22). The results of the present study found that the gastrointestinal tract recovery of patients in the ESPCS mode nursing group was greater than

that in the conventional nursing group, which may be due to the fact that the patients in the ESPCS mode nursing group had a certain understanding of the effectiveness and importance of performing early out of bed activities for their condition. Scientific early limb activities after surgery can markedly speed up the metabolism of patients, inhibit the excitement of the sympathetic nervous system and assist gastrointestinal peristalsis, thereby relieving the symptoms of flatulence, promoting the recovery of gastrointestinal function, helping patients recover appetite and promoting nutrition absorption (23).

Self-management efficacy refers to an individual's belief in completing a task or work behavior, and the degree of confidence that they can use their own skills to complete the work, which is also the basic factor of behavior change (24). It has been reported that self-management efficacy can be an important factor influencing the results in medical research, and that it can promote the recovery of body health through behavior, environment and personal changes (25). One study analyzed the impact of virtual reality education on self-management efficacy in patients with cancer and found that personalized education virtual reality videos could be used as an innovative nursing intervention to effectively improve self-management efficacy and patient satisfaction (26). Similarly, the results of the present study showed that ESPCS mode nursing could significantly improve the self-management efficacy of patients with colon cancer. In addition, the results of this study found that the ESPCS mode of nursing could strongly improve the quality of life of patients and their nursing satisfaction. ESPCS mode nursing can help patients learn about the disease and surgery-related knowledge through scientific and reasonable methods, encourage patients to get out of bed early and conduct exercise, help patients to establish healthy life behaviors, enhance confidence in recovery and improve rehabilitation compliance, therefore improve quality of life and enhancing their satisfaction with the nursing provided.

Overall, in the present study, ESPCS mode nursing elevated the surgical tolerance of patients with colon cancer, promoted the recovery of gastrointestinal function, increased patient self-management efficacy, and improved the quality of life and nursing satisfaction, which is certainly worthy of clinical promotion. However, due to the limited sample size, single source, short research time and lack of long-term laboratory observation indicators, the experimental results might contain bias. In subsequent research, the sample size will be expanded, the research time will be prolonged and long-term laboratory indicators will be included to make the research more convincing.

Acknowledgements

Not applicable.

Funding

No funding was received.

Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

Authors' contributions

RY and MS conceived and designed the project. RY and SX performed the experiments. RY and LZ analyzed the data. RY drafted the manuscript. RY and MS confirm the authenticity of all the raw data. All authors have read and approved the final version of the manuscript.

Ethics approval and consent to participate

This research was approved by the Ethics Review Committees of The Second Affiliated Hospital of Harbin Medical University (Harbin, China; approval no. KY2020-017). Written informed consent was obtained from all individual participants included in the study.

Patient consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A and Bray F: Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 71: 209-249, 2021.
2. Xia C, Dong X, Li H, Cao M, Sun D, He S, Yang F, Yan X, Zhang S, Li N and Chen W: Cancer statistics in China and United States, 2022: Profiles, trends, and determinants. Chin Med J (Engl) 135: 584-590, 2022.
3. Malla RR: Microbiome conundrum in colon cancer: Development, progression, and therapeutics. Crit Rev Oncog 25: 129-139, 2020.
4. Ahmed M: Colon cancer: A clinician's perspective in 2019. Gastroenterology Res 13: 1-10, 2020.
5. Shkurti J, van den Berg K, van Erning FN, Lahaye MJ, Beets-Tan RGH and Nederend J: Diagnostic accuracy of CT for local staging of colon cancer: A nationwide study in the Netherlands. Eur J Cancer 193: 113314, 2023.
6. Benson AB, Venook AP, Al-Hawary MM, Arain MA, Chen YJ, Ciombor KK, Cohen S, Cooper HS, Deming D, Farkas L, *et al*: Colon cancer, version 2.2021, NCCN clinical practice guidelines in oncology. J Natl Compr Canc Netw 19: 329-359, 2021.
7. Wang J and Qiao JH: Holistic conditions after colon cancer: A randomized controlled trial of systematic holistic care vs primary care. World J Gastrointest Surg 15: 2844-2854, 2023.
8. Hauze SW, Hoyt HH, Frazee JP, Greiner PA and Marshall JM: Enhancing nursing education through affordable and realistic holographic mixed Reality: The virtual standardized patient for clinical simulation. Adv Exp Med Biol 1120: 1-13, 2019.
9. Ye L, Wang L, Wang Y and Zhang L: The influence of ESPCS intervention on chronic heart failure in cardiac rehabilitation. J Wenzhou Med Univ 49: 614-618, 2019.
10. Smith RA, Andrews KS, Brooks D, Fedewa SA, Manassaram-Baptiste D, Saslow D and Wender RC: Cancer screening in the United States, 2019: A review of current American cancer society guidelines and current issues in cancer screening. CA Cancer J Clin 69: 184-210, 2019.
11. Kim SH, Lee BG, Lee JY, Kim SJ, Hur MH, Lee MH and Han MS: Psychometric evaluation of a Korean version of the cancer survivors' self-efficacy scale. Cancer Nurs 42: 509-514, 2019.
12. Gan GG and Yuen Ling H: Anxiety, depression and quality of life of medical students in Malaysia. Med J Malaysia 74: 57-61, 2019.
13. Argilés G, Tabernero J, Labianca R, Hochhauser D, Salazar R, Iveson T, Laurent-Puig P, Quirke P, Yoshino T, Taieb J, *et al*: Localised colon cancer: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. Ann Oncol 31: 1291-1305, 2020.

14. Verkuijl SJ, Jonker JE, Trzpis M, Burgerhof JGM, Broens PMA and Furnée EJB: Functional outcomes of surgery for colon cancer: A systematic review and meta-analysis. Eur J Surg Oncol 47: 960-969, 2021.
15. Chen G, Zhao Y, Xie F, Shi W, Yang Y, Yang A and Wu D: Educating outpatients for bowel preparation before colonoscopy using conventional methods vs virtual reality videos plus conventional methods: A randomized clinical trial. JAMA Netw Open 4: e2135576, 2021.
16. van Geelen S, Dekker M and van der Ent K: A new direction for simulation in healthcare education: Improving learners' insight into the perspectives of patients through lived experience. Med Teach 44: 221, 2022.
17. van der Kruk SR, Zielinski R, MacDougall H, Hughes-Barton D and Gunn KM: Virtual reality as a patient education tool in healthcare: A scoping review. Patient Educ Couns 105: 1928-1942, 2022.
18. Shi Y, Yu H, Miao J and Wang L: Application of the nursing model based on acceptance and commitment therapy (ACT) in improving mental health and quality of life after colorectal cancer drug chemotherapy. J Oncol 2021: 8142155, 2021.
19. Franchi C, Antoniazzi S, Ardoino I, Proietti M, Marcucci M, Santalucia P, Monzani V, Mannucci PM and Nobili A; SIM-AF Collaborators: Simulation-based education for physicians to increase oral anticoagulants in hospitalized elderly patients with atrial fibrillation. Am J Med 132: e634-e647, 2019.
20. Chirico A, Maiorano P, Indovina P, Milanese C, Giordano GG, Alivernini F, Iodice G, Gallo L, De Pietro G, Lucidi F, *et al*: Virtual reality and music therapy as distraction interventions to alleviate anxiety and improve mood states in breast cancer patients during chemotherapy. J Cell Physiol 235: 5353-5362, 2020.
21. Zhang L and Pan W: Effect of a nursing intervention strategy oriented by Orem's self-care theory on the recovery of gastrointestinal function in patients after colon cancer surgery. Am J Transl Res 13: 8010-8020, 2021.
22. Xiang L, Liu W and Jin Y: Effect of comprehensive nursing on the recovery of gastrointestinal function in patients undergoing abdominal operation. Comput Intell Neurosci 2022: 1179321, 2022.
23. Boitano TKL, Smith HJ, Rushton T, Johnston MC, Lawson P, Leath CA III, Xhaja A, Guthrie MP and Straughn JM Jr: Impact of enhanced recovery after surgery (ERAS) protocol on gastrointestinal function in gynecologic oncology patients undergoing laparotomy. Gynecol Oncol 151: 282-286, 2018.
24. Hamilton CB and Li LC: Measures of patient activation and self-efficacy. Arthritis Care Res (Hoboken) 72 (Suppl 10): S645-S659, 2020.
25. Thomas Hebdon MC, Coombs LA, Reed P, Crane TE and Badger TA: Self-efficacy in caregivers of adults diagnosed with cancer: An integrative review. Eur J Oncol Nurs 52: 101933, 2021.
26. Birkhoff SD, Waddington C, Williams J, Verucci L, Dominelli M and Caplan R: The effects of virtual reality on anxiety and self-efficacy among patients with cancer: A pilot study. Oncol Nurs Forum 48: 431-439, 2021.