

Original Article

Effect of stepwise psychological intervention on improving adverse mood and quality of life after colon cancer surgery

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Abstract: Objective: To explore the effect of stepwise psychological intervention on adverse mood and quality of life of patients after colon cancer surgery. Methods: The clinical data from 102 patients with colon cancer admitted to the Second Hospital of Baoding from January 2018 to June 2022 were collected and analyzed retrospectively. Based on the intervention measures, 51 patients with the general intervention were regarded as the general group, and 51 patients with the stepwise psychological intervention were considered as the intervention group. Piper Fatigue Scale (PFS) was used to scale the degree of Cancer-related fatigue (CRF); Self-rating anxiety scale (SAS) and Self-rating depression scale (SDS) were applied to measure the negative emotion; Positive and negative emotion scale (PANAS) was used to evaluate the degree of positive negative emotions. In addition, Symptom Checklist 90 (SCL-90), Connor-Davidson Resilience Scale (CD-RISC) self-assessment scale, and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) were applied to evaluate the mental state, mental resilience, and quality of life, respectively. The adverse reactions, prognosis, and intervention satisfaction after intervention were compared between the two groups. Results: After intervention, the PFS scores, SAS score, SDS score, and PANAS score in the general group and intervention groups were decreased (all $P < 0.05$), and these scores decreased more obviously in the intervention group compared with the general group (all $P < 0.05$); The scores of each dimension in SCL-90 scale were decreased in both groups ($P < 0.05$), and the SCL-90 scores in the intervention group were lower than those in the general group ($P < 0.05$); The scores of each dimension in CD-RISC scale improved in both groups ($P < 0.05$), and the scores were higher in the intervention group compared with the general group ($P < 0.05$); The scores of EORTC QLQ-C30 scale improved in both groups ($P < 0.05$), and these scores were higher in the intervention groups compared with the general group ($P < 0.05$). In addition, the adverse reaction rate was lower, while the prognosis and nursing satisfaction were better in the intervention group than those in the general group (all $P < 0.05$). Logistic regression analysis showed that the poor emotion and poor life quality were the risk factors of the poor prognosis (all $P < 0.05$). Conclusions: The stepwise psychological intervention can improve the psychological wellbeing and quality of life in the patients after colon cancer surgery.

Keywords: Stepwise psychological intervention, colon cancer surgery, adverse mood, quality of life

Introduction

Colon cancer is a kind of digestive tract malignancy with a very high clinical incidence, ranking in the forefront of gastrointestinal tumors [1]. Colon cancer is often seen in middle-aged patients, manifested with abdominal distension, abdominal pain, dyspepsia, mucus or bloody stool [2]. According to its morphology, it can be divided into infiltration type, uplift type and ulcer type [3]. Although the pathogenesis

of this disease is not clear, it is directly related to the changes in diet and living habits. The disease is not only increasing year by year, but also developing in a younger age, which has attracted great attention from the clinic [4].

Operation is currently the mainstream treatment for colon cancer. Radical resection can remove the lesion [5], but there are individual differences in the post-operative recovery of patients, and those with multiple basic diseases

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es and poor physical resistance have poor recovery and high recurrence rate as well as many post-operative complications, which seriously affect the recovery effect [5]. How to ensure the recovery effect after surgery and keep the patients' physical and mental state stable is the focus of clinical research [6]. Intervention and treatment are equally important, which is a link that cannot be ignored in clinical practice. Clinical research shows that psychological state has a great impact on the recovery progress of patients [7]. Early continuous functional exercise and psychological intervention can alleviate the impact of psychological stress on the condition and promote patients to obtain good recovery results.

Therefore, giving postoperative nursing intervention to patients with colon cancer is an effective way to improve their negative psychology after medical treatment [8]. The clinical routine nursing pays attention to improving the patient's pain, but rarely focuses on the negative psychological intervention after operation, so the clinical effect is not ideal [9]. The stepwise psychological intervention is a new type of mental health care service that provides patients with varying degrees of psychological intervention. It strengthens the nursing intensity and the patients' trust in the medical staff through the way of stepwise intervention, which is conducive to the development of nursing work [10]. Stepwise psychological intervention has been applied to the care of diseases and has achieved good results. The objective of this study is to investigate the application effect of stepwise psychological intervention in elderly patients with colon cancer after surgery based on real-world patient data.

Materials and methods

The general data

The clinical data of 102 patients with colon cancer admitted to the Second Hospital of Baoding from January 2018 to June 2022 were collected and analyzed retrospectively. The inclusion criteria: ① Patients who met the diagnostic criteria of colon cancer [11]; ② Patients who received surgical treatment for the first time; ③ Patients with normal cognition and understanding; ④ Patients with complete clinical data. Exclusion criteria: ① Patients with severe central nervous system disease; ②

Patients combined with other serious physical diseases; ③ Patients with metastatic colorectal cancer; ④ Patients with esophageal perforation, intestinal perforation or acute intestinal obstruction; ⑤ Patients combined with myocardial infarction or cerebral infarction. Based on the intervention measures, 51 patients received general intervention were regarded as the general group, while the other 51 patients with stepwise psychological intervention were considered as the intervention group. This study was approved by the Ethics Committee of the Second Hospital of Baoding.

Intervention measures

Routine intervention: The operation precautions were explained to the patients, health education was strengthened, and the patients were routinely guided in diet, exercise, functional exercise, and prevention and treatment of complications. The intervention continued for 4 weeks.

Stepwise psychological intervention includes the following three steps: ① Through communication with the patients, the medical staff evaluated their compliance behavior and cognition of disease, understood their psychological status and actual needs, expressed understanding of the patients' postoperative adverse emotions, and encouraged the patients with positive words to gain the trust of the patients. By listening and being affirming, the medical staff encouraged patients to actively participate in disease treatment and development of nursing plan. ② Through one-to-one communication, video interpretation, and distribution of health manuals, medical staff explained the cause, development, treatment and prognosis of rectal cancer and informed the patients to follow treatment and improve their awareness of disease. The purpose is to make patients understand that the disease is not terrible through health education, improve their compliance with medical treatment, and tell patients to pay attention to rest and strengthen nutrition. Medical staff need to master relevant knowledge, and help patients to establish confidence in overcoming the disease with exquisite skills and sincere attitude. At the same time, medical staff should actively contact their family members and encourage them to give more care and warmth to patients. ③ After discharge,

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medical staff should strengthen the communication with the patients and their family members, record patients' contact information and home address in detail, formulate targeted plans, and carry out continuous care based on the network platform. The patient's compliance behavior was monitored by telephone follow-up, family follow-up and other methods, and the patient's condition and psychological changes were observed in time. A WeChat group was established to regularly answer questions and doubts to relieve their negative emotions. The intervention continued for 4 weeks.

Observation indicators and evaluation methods

① Before and after the intervention, Piper Fatigue Scale (PFS) [12] were used to measure the degree of Cancer-related fatigue (CRF), including feeling, behavior, emotion, and cognitive. The higher the score of the patient, the higher the degree of CRF.

② Before and after the intervention, self-rating anxiety scale (SAS) and self-rating depression scale (SDS) [13] were applied to measure the negative emotion. The higher the score of patients, the more serious their anxiety or depression.

③ Before and after the intervention, positive and negative emotion scale (PANAS) [14] was used to evaluate the degree of positive or negative emotions. The total score is 50 points, and the higher the score, the greater the negative emotion of the patient.

④ Before and after the intervention, symptom checklist 90 (SC-90) [15] was used to evaluate the psychological status, including anxiety, depression, terror, antagonism, obsessive-compulsive symptoms, and psychoticism. Each dimension was scored with five grades.

⑤ Before and after the intervention, the Connor-Davidson Resilience Scale (CD-RISC) [16] was used to evaluate the psychological resilience of the patients, including three dimensions with a total score of 5 points in each dimension.

⑥ Before and after the intervention, the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire

Core 30 (EORTC QLQ-C30) [17] was used to evaluate the quality of life, including material life, social function, emotional function, cognitive function, mental health, and physiological function with a total score of 100 points in each dimension.

⑦ The postoperative complications, including atelectasis, arrhythmia and respiratory tract infection were compared between the two groups

⑧ The patients' prognosis was compared between the two groups.

⑨ Comparison of nursing satisfaction: a nursing satisfaction evaluation questionnaire, including patient comfort, rehabilitation after treatment, evaluation of nursing staff's service attitude, professional knowledge and skills, and understanding of health education related knowledge, was designed to evaluate the nursing satisfaction of patients. The full score of the questionnaire is 100 points, with a score of ≥ 80 indicating very satisfied, ≥ 60 indicating basically satisfied, and < 60 indicating dissatisfied. Nursing satisfaction rate = (cases of very satisfied + cases of basically satisfied)/total number of cases $\times 100\%$.

⑩ The risk factors for poor prognosis were analyzed.

Statistical analysis

SPSS 26.0 software was applied for statistical analysis. The counting data were described in the number of cases and rate (%) and were compared with χ^2 test. The measurement data were represented as mean \pm SEM, and the inter-group comparison was conducted by T-test. Multivariate logistic regression analysis was used to analyze the risk factors for poor prognosis in colon cancer patients. $P < 0.05$ represented significant difference.

Results

Clinical data

There was no significant difference in the clinical data including gender, age, BMI (body mass index), course of disease, education level, and income level between the general and intervention groups (all $P > 0.05$) (**Table 1**).

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Table 1. The comparison of clinical data between the two groups

Index	Intervention group (n = 51)	General group (n = 51)	t/ χ^2	P
Gender (male, %)	35 (68.63%)	34 (66.67%)	0.045	0.832
Age (year)	51.82±8.74	52.22±10.18	-0.209	0.835
BMI (kg/m ²)	20.42±0.57	20.41±0.63	0.137	0.981
Course of disease (month)	4.37±1.37	4.49±1.43	-0.424	0.673
Education level (Bachelor's degree or above)	29 (56.86%)	28 (54.90%)	0.04	0.842
Income level (> 8000 Yuan)	22 (43.14%)	23 (45.10%)	0.04	0.842

Note: BMI, body mass index.

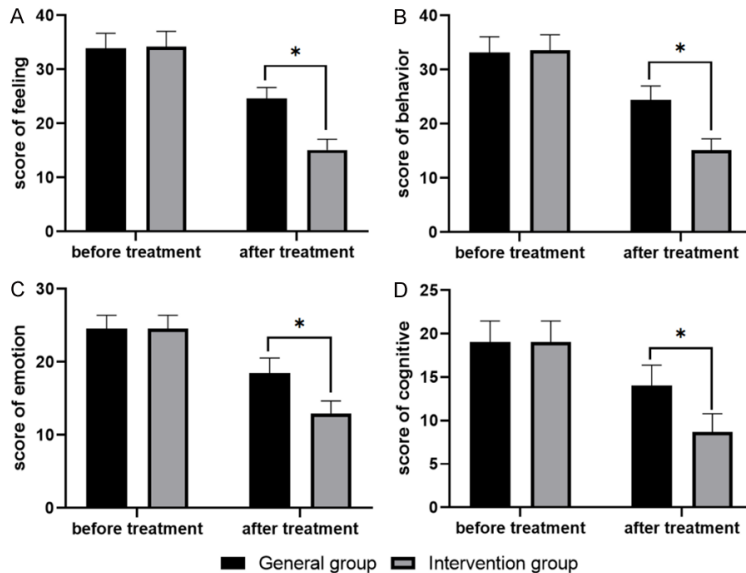


Figure 1. The comparison of PFS between the two groups. Note: A. Feeling; B. Behavior; C. Emotion; D. Cognitive; PFS: Piper Fatigue Scale; *, $P < 0.05$.

Degree of CRF evaluated by PFS

Before intervention, there was no difference in the PFS score between the two groups ($P > 0.05$). After intervention, the scores of four dimensions in PFS, including feeling, behavior, emotion, and cognition in the general group and intervention group decreased (all $P < 0.05$), and these scores in the intervention group were significantly lower than those in the general group (all $P < 0.05$) (Figure 1).

Negative emotions measured by SAS and SDS

Before intervention, there was no difference in the SAS and SDS scores between the two groups ($P > 0.05$). After intervention, SAS score and SDS score in the general group and intervention group decreased (both $P < 0.05$), and these scores in the intervention group were significantly lower than those in the general group (both $P < 0.05$) (Figure 2).

Positive - negative emotions scaled by PANAS

Before intervention, there was no difference in the PANAS score between the two groups ($P > 0.05$). After intervention, PANAS score in the general group and intervention group decreased ($P < 0.05$), and PANAS score in the intervention group was significantly lower than that in the general group ($P < 0.05$) (Figure 3).

Mental state evaluated with SCL-90

The SCL-90 scale contains six dimensions, namely, anxiety, depression, terror, antagonism, obsessive-compulsive symptoms, and psychoticism. Before

intervention, there were no differences in the six dimensions of SCL-90 between the two groups (all $P > 0.05$). After intervention, the scores of six dimensions in the SCL-90 scale in the general group and intervention group decreased (all $P < 0.05$), and the scores in the intervention group were significantly lower than those in the general group (all $P < 0.05$) (Figure 4).

Mental resilience scaled by CD-RISC

CD-RISC includes three dimensions, namely, tenacity, self-improvement and optimism. Before intervention, there was no difference in the mental resilience between the two groups (all $P > 0.05$). After intervention, the scores of the three dimensions in the general group and intervention group improved (all $P < 0.05$), and these scores were significantly higher in the intervention group than those in the general group (all $P < 0.05$) (Figure 5).

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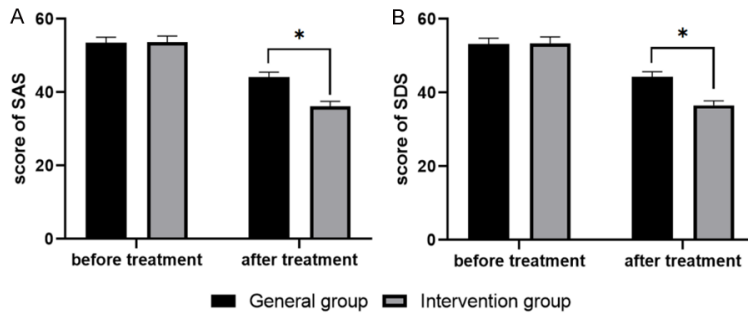


Figure 2. The comparison of SAS (A) and SDS (B) between the two groups. Notes: SAS: self-rating anxiety scale; SDS: self-rating depression scale; *, $P < 0.05$.

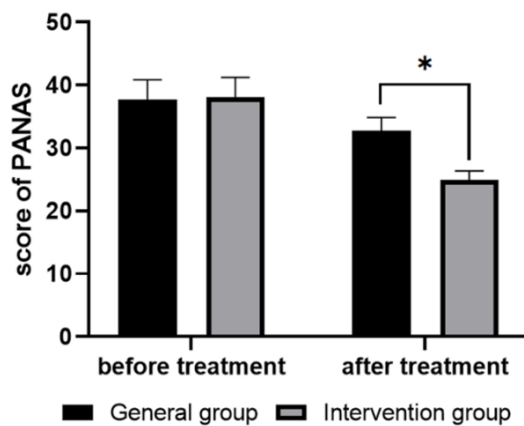


Figure 3. The comparison of PANAS between the two groups. Note: PANAS: positive and negative emotion scale; *, $P < 0.05$.

Quality of life evaluated by EORTC QLQ-C30

EORTC QLQ-C30 includes six dimensions, namely material life, social function, emotional function, cognitive function, mental health, and physiological function. Before intervention, there was no difference in the six dimensions of EORTC QLQ-C30 between the two groups (all $P > 0.05$). After intervention, the scores of the six dimensions of EORTC QLQ-C30 improved obviously (all $P < 0.05$), and these scores were significantly higher in the intervention group than those in the general group ($P < 0.05$) (Figure 6).

Adverse reactions in the two groups

In the intervention group, arrhythmia occurred in 3 cases and respiratory tract infection in 3 cases. There were 7 cases of arrhythmia, 5 case of atelectasis and 6 cases of respiratory

tract infection in the general group. The total incidence in the intervention group was significantly lower than that in the general group ($\chi^2 = 7.846$, $P < 0.05$) (Table 2).

Prognosis in the two groups

As shown in Table 3, the incidences of postoperative complications, local recurrence, and distant metastasis in the intervention group were lower than those in the general group

(all $P < 0.05$), indicating that the prognosis was better in the intervention group than the general group.

Satisfaction in the two groups

As shown in Table 4, the nursing satisfaction rate in the intervention group was higher than that in the general group ($P < 0.05$).

Risk factors of prognosis

Based on the occurrence of adverse reactions, 78 patients without adverse reactions were classified into the good prognosis group, while the other 24 patients with adverse reactions were classified into the poor prognosis group. Table 5 shows that the anxiety emotion, depression emotion, negative emotion, and poor quality of life were risk factors for poor prognosis of colon cancer patients (all $P < 0.05$).

Discussion

Surgery is the mainstream means for the treatment of rectal cancer, which is useful in reducing the degree of pain to a certain extent [18]. However, due to the particularity of the tumor, postoperative pain of rectal cancer, artificial anus and other factors, patients are prone to having negative emotions after surgery, affecting the effect of surgical treatment [19, 20]. Severe mood fluctuations can cause neuroimmune endocrine disorders, reduce immunity, induce tumor cell metastasis or aggravate disease [21]. A stable psychological state enables patients to maintain a high level of hope and better manage their emotions [22]. Therefore, good psychological intervention is an important

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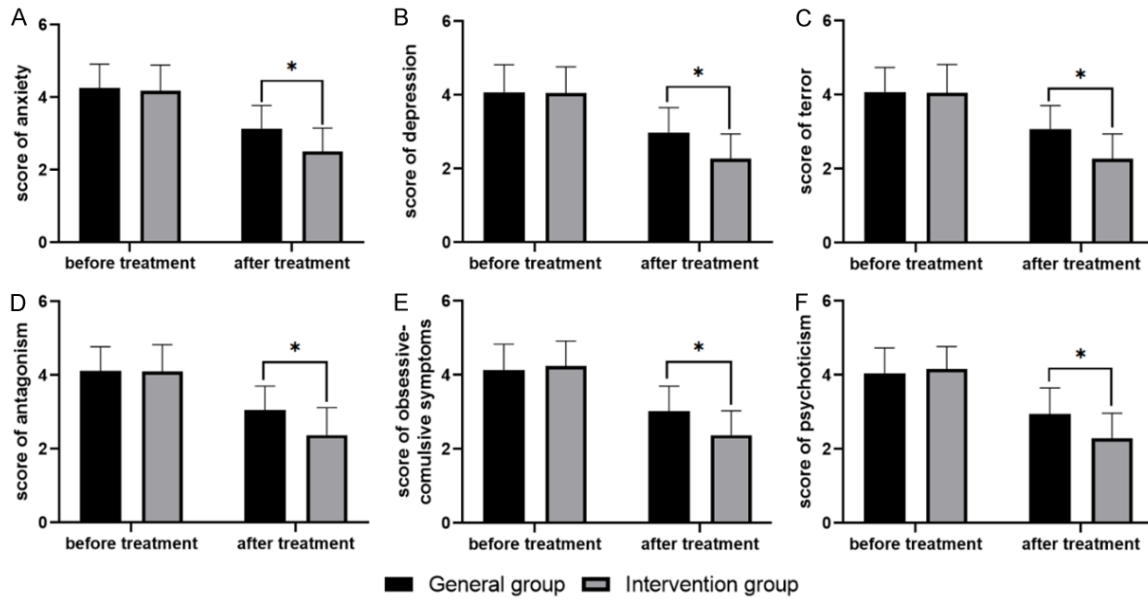


Figure 4. The comparison of SCL-90 between the two groups. Note: A. Anxiety; B. Depression; C. Terror; D. Antagonism; E. Obsessive-compulsive symptoms; F. Psychoticism; SCL-90: symptom checklist 90; *, $P < 0.05$.

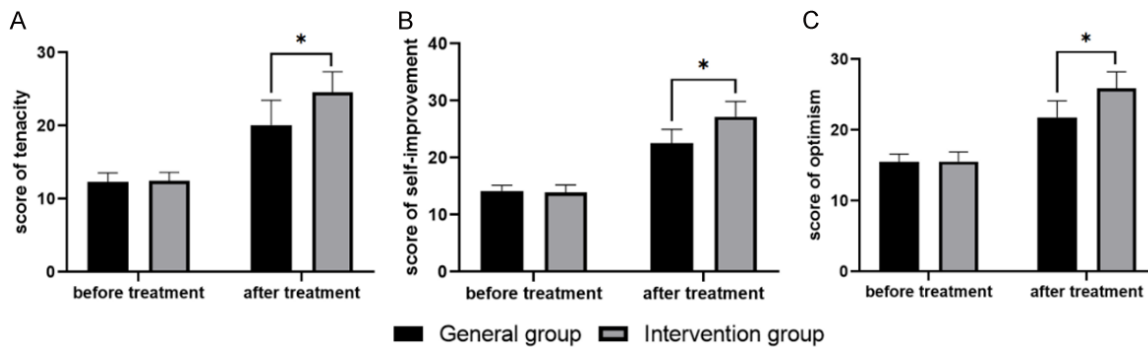


Figure 5. The comparison of CD-RISC self-assessment scale between the two groups. Notes: A. Tenacity; B. Self-improvement; C. Optimism; CD-RISC: Connor-Davidson Resilience Scale; *, $P < 0.05$.

measure to alleviate the negative emotions of rectal cancer patients after surgery.

The conventional intervention mode pays attention to improving the treatment effect and survival rate, but often neglects the psychological state of patients and therefore affects the compliance of patients to a certain extent, which is not conducive to postoperative recovery [23]. Stepwise psychological intervention can maximize the allocation of resources, gradually enhance the intensity of nursing and maximize the therapeutic effect of the nursing [24]. Results showed that after the intervention, the PFS score, SAS score, SDS score, and PANAS score in the general group and intervention

groups were all decreased, and these scores decreased more significantly in the intervention group compared with the general group; the scores of all dimensions in the SCL-90 scale decreased and reduced more in the intervention group. The scores of all dimensions in the CD-RISC and EORTC QLQ-C30 scale improved after intervention, and the scores improved more significantly in the intervention group. The adverse reaction rate was lower, while the prognosis and nursing satisfaction were better in the intervention group than those in the general group.

The first step of the stepwise psychological intervention is to gain the trust of patients to

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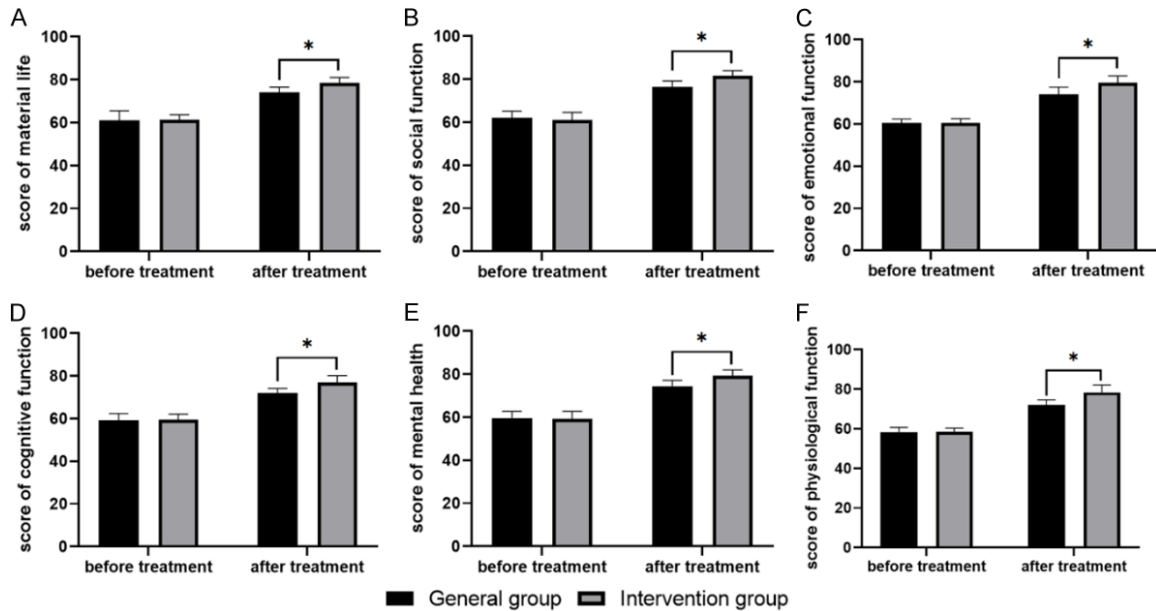


Figure 6. The comparison of EORTC QLQ-C30 between the two groups. Notes: A. Material life; B. Social function; C. Emotional function; D. Cognitive function; E. Mental health; F. Physiological function; EORTC QLQ-C30: European organization for research and treatment of cancer quality of life questionnaire core 30; *, $P < 0.05$.

Table 2. The comparison of adverse reactions between the two groups

	Arrhythmia	Atelectasis	Respiratory tract infection	Sum
General group	7 (13.73%)	5 (9.80%)	6 (11.76%)	18 (35.29%)
Intervention group	3 (5.88%)	0 (0%)	3 (5.88%)	6 (11.76%)
χ^2				7.846
P				0.05

Table 3. The comparison of prognosis between the two groups

	Postoperative complications	Local recurrence	Distant metastasis
General group	19 (38%)	12 (23.53%)	10 (19.61%)
Intervention group	7 (13.73%)	3 (5.77%)	2 (3.92%)
χ^2	7.433	6.331	6.044
P	0.006	0.012	0.014

Table 4. The comparison of nursing satisfaction between the two groups

	Very satisfied	Basically satisfied	Unsatisfied	Total satisfaction rate
General group	20 (39.22%)	15 (29.41%)	16 (31.37%)	35 (68.63%)
Intervention group	30 (58.82%)	16 (31.37%)	5 (9.80%)	46 (90.20%)
χ^2				7.256
P				0.007

smoothly carry out nursing work [25]. According to the different psychological states of patients, different levels of nursing intervention can effectively alleviate the negative psychology of

patients. Family support is very important for cancer patients. Good family support can improve patients' confidence in treatment, and thus improve prognosis [26, 27]. The second

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Table 5. Multivariate logistic regression analysis of risk factors for poor prognosis of colon cancer patients

Index	β	SE	Wald	P	EXP (B)	95% CI
Anxiety emotion	2.456	0.574	18.307	0.000	11.658	3.785~35.911
Depression emotion	1.329	0.571	5.413	0.020	3.776	1.233~11.586
Negative emotion	1.707	0.569	8.985	0.003	5.510	1.805~16.819
Poor life quality	2.955	0.610	23.491	0.000	19.196	5.812~63.404
Constant	-4.484	0.722	38.542	0.000	0.011	

step of the intervention focuses on improving the patients' awareness of the disease through one-to-one communication, video explanation, distribution of health manuals and other ways, alleviating patients' fear and improving their compliance to the treatment [28]. In addition, while strengthening the training of professional knowledge, medical staff also continuously learn the knowledge of medical psychology and medical ethics, improve their own quality, think from the perspective of patients, and improve the treatment compliance of patients [29]. The third step of the intervention focuses on follow-up care after discharge. Medical staff assisted patients in formulating post-operative treatment plans, monitored patients' behaviors through various ways to timely detect both the physical and psychological changes in patients and give effective intervention [30]. The development of medical technology can prolong the survival period of cancer patients. Active and effective psychological intervention can improve the psychological wellbeing of patients, improve self-efficacy, and increase the quality of life [31]. However, the number of patients selected in our study was not big and the research time interval was short, and further in-depth research with multi-center, large sample and long-time span or multiple time periods is required.

Conclusion

To sum up, stepwise psychological intervention can improve the psychological wellbeing of rectal cancer patients after operation, improve psychological resilience and quality of life of patients, and reduce the occurrence of complications.

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Disclosure of conflict of interest

None.

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