

Analysis of Supportive Care Needs and Related Factors of Colorectal Cancer Patients in China

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Abstract

Background: This study aimed to clarify the supportive care needs and related factors of colorectal cancer (CRC) patients in China through investigation and study, and then provide a reference for the formulation of relevant interventions and ultimately improve their quality of life.

Methods: A cross-sectional survey was conducted in the oncology and radiotherapy departments of four first-class hospitals in Suzhou from January 2020 to September 2020. The survey tools included the general information questionnaire, Comprehensive Needs Assessment Tool in cancer for patients, M.D. Anderson Symptom Inventory, Hospital Anxiety Depression Scale, and Social Support Rating Scale. Spearman correlation analysis, univariate analysis, and multiple stepwise linear regression analysis were adopted to explore the influencing factors of supportive care needs.

Results: A total of 403 CRC patients were included, with an average age of 58.83 ± 10.86 years, including 257 males (63.77%); the average score of supportive care needs was 39.56 ± 18.58 , the scores of health care staff need and information needs ranked the top two. Spearman correlation analysis showed that the supportive care needs were positively correlated with symptom severity, symptom interference, anxiety, and depression. Univariate analysis displayed higher levels of supportive care needs among female, single/divorced/widowed, rectal cancer, and palliative care patients. Multiple stepwise regression analysis combining the results of correlation analysis and univariate analysis found that anxiety, symptom interference, symptom severity, and cancer type all affected the supportive care needs of CRC patients. The differences were significant, which can explain 35% of the variation.

Conclusions: In the supportive care needs management of colorectal cancer patients, it is necessary to attach great importance to health care staff and information needs, focus on female, single/divorced/widowed, rectal cancer, and palliative care patients, and pay great attention to reducing the symptom burden, anxiety, and depression when formulating intervention strategies.

Introduction

The latest global cancer data demonstrated that colorectal cancer (CRC) was the third most common cancer (1 931 590 cases, 10% of the total), and the number of deaths caused by CRC ranked second (935 173 cases, 9.4% of the total) [1]. In 2020, The number of new CRC cases in China was 555 477, and the number of deaths reached 286 162, ranking the second and fifth in China respectively, and accounting for one-third of the global CRC [1]. Meanwhile, the development of medical treatment has tremendously improved the survival rate of CRC patients; the five-year survival rate of CRC in China is about 58% at present. Thus, Chinese CRC survivors have increased significantly, ensuring their quality of life is an urgent problem to be solved [2].

Supportive care is defined as "a series of measures taken to prevent or reduce patients' adverse reactions and complications, aimed at improving patients' comfort and quality of life"; the scope of supportive care needs is "needs beyond surgery, radiotherapy, chemotherapy, medicine, and other treatments" [3]. Previous

studies have shown that the quality of life of cancer patients is negatively correlated with their supportive care needs. The more needs, the worse the quality of life [4]. In other words, maximizing the patient's supportive care needs improves the patient's quality of life. Therefore, meeting the needs of patients is the premise to achieve the patient-centered goal, the primary task of cancer care, and an important strategy to improve the quality of life of patients [5, 6]. In order to maximize the satisfaction of patients' supportive care needs, it is necessary to evaluate the status quo of patients' supportive care needs, analyze the factors influencing their supportive care needs, and then provide a reference for the formulation of relevant intervention strategies accurately and comprehensively.

Currently, the research on supportive care needs mainly focuses on breast cancer, lung cancer, esophageal cancer, and hematological tumors, and less attention is paid to CRC patients. Considering the particularity of CRC patients, this study aims to clarify the supportive care needs and influencing factors of CRC patients to provide the basis for formulating relevant intervention strategies in the future.

Subjects And Methods

This study was approved by the Ethics Committee of Soochow University (No. SUDA 20200225H08). Before the survey, patients were required to sign an informed consent.

Study Subjects

From January to September 2020, CRC patients were recruited from the Oncology and Radiotherapy Departments of four hospitals (the First Affiliated Hospital of Soochow University, the Second Affiliated Hospital of Soochow University, Soochow Municipal Hospital, and Soochow Hospital of Traditional Chinese Medicine) to participate in the survey. The inclusion criteria are as follows: (i) over 18 years old; (ii) diagnosed with colorectal cancer; (iii) currently receiving treatment or follow-up, (iv) agree to participate in this study. The exclusion criteria were as follows: (i) unable to communicate; (ii) unaware of their disease diagnoses; (iii) with other severe physical diseases, mental or mental disorders; (iv) participating in other studies.

Tools

General information questionnaire

The general information questionnaire is developed upon reviewing the literature on supportive care needs for cancer patients, consulting professors with relevant research experience and oncology specialists, and research group discussion. It mainly includes age, gender, nation, marital status, education, occupation, religious belief, per capita monthly income of family, payment method of medical expenses, CRC family history, CRC cognition, cancer types, metastasis, current treatment, and other diseases.

Comprehensive Needs Assessment Tool in cancer for patients, CNAT

CNAT was constructed by Korean scholars in 2011[7], which contains 59 items and seven dimensions (physical symptoms, psychological problems, health care staff, information, social/religious/spiritual support, hospital facilities and services, and practical support). The four-point scoring method is adopted: 0 (no need) ~3 (high need). It was introduced into China by Zhao in 2017[8], and the domain scores were calculated by averaging the score for each domain with subsequent linear transformation to a scale of 0-100 based on the European Organization for Research and Treatment of Cancer (EORTC) scoring guideline [9]. The specific scoring method is the score of each dimension= (actual score of each dimension ×100) / (number of items×3). Cronbach's α coefficient of the total scale was 0.95 (each dimension: 0.82~0.95), the split-half coefficient was 0.81 (each dimension: 0.73~0.84), and the test-retest reliability was 0.82 (each dimension: 0.79~0.90); eight factors were extracted, and could explain 70.33% of the total variance (The health care staff need was divided into the need for doctors and the need for nurses. For statistical convenience, this study still makes statistics according to seven dimensions of the original scale).

M.D. Anderson Symptom Inventory, MDASI

MDASI is a multi-symptom assessment scale, which was developed by Anderson Cancer Center in 2000[10], including two parts: symptom severity and symptom interference. There were 13 items of symptom severity to evaluate cancer patients' symptoms in the past 24 hours, including fatigue, numbness, nausea, disturbed sleep, forgetfulness, sadness, and the like. Symptom interference involves six aspects: general activity, emotion, and working, and the like. The score of each item is 0~10. The higher the score, the more serious the symptoms or symptom distress. The scale was translated into Chinese in 2004[11], Cronbach's α coefficient of the Chinese version scale is 0.82 ~ 0.94[12].

Hospital Anxiety Depression scale, HADs

Zigmond and Snaith formulated HADs in 1983[13], mainly used to screen anxiety and depression of hospital patients. There are 14 items on the scale, odd items are used to evaluate anxiety, and even items are used to evaluate depression. The score of each item is 0~3. The lower the score, the lighter the anxiety and depression. The scale's internal consistency is good; Cronbach's α coefficient of the total scale and two subscales are higher than 0.82[14].

Social Support Rating Scale, SSRS

SSRS was developed by Chinese researcher Xiao Shuiyuan in 1986[15]. The scale has ten items, covering three dimensions: subjective support (items 1, 3, 4, and 5), objective support (items 2, 6, and 7), and utilization of social support (items 8, 9, and 10); except for items 6 and 7, which are scored according to the number of supported sources, the scores of other items are 1~4. The higher the score, the higher the social support. The total score ≤ 22 is low level, 23~44 is medium level, and 45~66 is high level; Cronbach's α coefficient of the scale is 0.89~0.94, and the test-retest reliability coefficient is 0.92[16].

Statistical analyses

Epidata 3.1 software was used for data input by two researchers, and SPSS 21 software was used to complete data analysis. Patients' general information was described by frequency, rate, mean and standard deviation, and the supportive care needs were described by mean, standard deviation, percentile.

The correlation between supportive care needs and symptom burden, anxiety, depression, and social support was analyzed by Spearman correlation analysis. Univariate analysis and multiple stepwise linear regression analysis were used to explore the influencing factors of supportive care needs. In univariate analysis, T-test or analysis of variance were used for normal distribution, and Mann-Whitney U test or Kruskal-Wallis H test was used for non-normal distribution data [17]. The variables with statistical differences in correlation analysis and univariate analysis were used as independent variables in multiple stepwise linear regression analysis, $\alpha=0.05$ and $\alpha=0.10$ were entry and exclusion criteria, respectively. The inspection level is bilateral inspection, $p<0.05$ was statistically significant.

Results

In this study, a total of 416 questionnaires were distributed, and 410 questionnaires were recovered, including 403 valid questionnaires, with an effective recovery rate of 96.9 %.

Participant characteristics

The age range of 403 subjects was 29~87 years old, with an average age of 58.83 ± 10.86 years old, including 257 males (63.77%) and 146 females (36.23%); 381 (94.54%) were married, and 22 (5.46%) were single, divorced, and widowed; there were 256 patients with colon cancer (63.52%) and 147 patients with rectal cancer (36.48%). 59 (14.64%) patients had CRC family history, while 344 (85.36%) did not; other patient characteristics are shown in Table 1.

The supportive care needs of CRC patients

The total CNAT score of CRC patients was 39.56 ± 18.58 , which was normally distributed. The scores of each dimension did not accord with the normal distribution. The scores of health care staff and information demand dimension were 71.75 ± 31.65 and 67.07 ± 26.54 , respectively, ranking the top two. Specific scores are shown in Table 2. The need selection rate of each item (probability of item score ≥ 1) ranged from 5.96% to 93.55%, and the top 10 items were mainly from the items of the medical staff demand and the information demand dimension.

Correlation between supportive care needs and symptom burden, anxiety, depression, and social support

The supportive care needs of CRC patients were positively correlated with symptom severity, symptom interference, anxiety, and depression ($r=0.36\sim 0.46$, $p<0.01$). The needs of physical symptoms, psychological problems, and practical support were negatively correlated with social support ($r=-0.19\sim -0.13$, $p<0.05$), and the health care staff needs were positively correlated with social support ($r=0.13$, $p<0.05$) (Table 3).

Univariate analysis of supportive care needs

The overall CNAT score of CRC patients followed a normal distribution, so the overall score of their supportive care needs was analyzed by univariate analysis using T-test or ANOVA. The results showed that female, single/divorced/widowed, rectal cancer, and palliative care patients had higher supportive care needs. Scores of each dimension do not obey normal distribution, and the Mann-Whitney U test or Kruskal-Wallis H test is adopted. Specific results are shown in Table 4.

Multiple stepwise linear regression analysis of supportive care needs

Taking the supportive care needs of CRC patients as the dependent variable, the variables with significant differences in correlation analysis and univariate analysis were used as independent variables for multiple stepwise regression analysis. See table 5 for specific independent variable names and assignments. The results of multiple stepwise regression analysis demonstrated that anxiety, symptom interference, symptom severity, and cancer type could affect the supportive care needs of CRC patients. The difference was statistically significant, which could explain 35% of the variation. The specific results of each dimension need are shown in Table 6.

Discussion

This study shows that among the seven dimensions of CNAT, the needs of health care staff of CRC patients score the highest, followed by information needs. A systematic review in 2017 also showed that of the top ten most prominent needs of CRC patients, five were classified as information/education needs and three as health system/doctor-patient communication needs [18]. Therefore, in managing supportive care needs for CRC patients, close attention should be paid to these two needs, timely assessment and full support should be given.

The need rate of all items in the health care staff dimension is more than 75%, of which "sincere interest and empathy from my nurse" "nurses to explain treatment or care that was being given to me" and "my doctor to be easy, specific, and honest in his/her explanation" ranking among the top three. During hospitalization, CRC inpatients have more contact and communication with nurses than doctors; and nurses provide more care to them, which may be why their needs for nurses rank above those of doctors.

In the dimension of information need, except for "guidelines or information about complementary and alternative medicine" and "information about hospice service", the selection rate of other needs is more than 75%, which may be due to Chinese patients with low cognition and acceptance of complementary and alternative medicine and hospice service. Some CRC patients distrust complementary alternative therapy because they do not understand the relevant mechanism of action, implementation methods, and efficacy, so their demand for such therapy is generally low. Due to China's traditional culture and concepts, patients are reluctant to mention palliative care, death, and other related topics, considering them too negative and unfortunate. In addition, hospice care in China started relatively late and is still in the stage of development [19], and many concepts have not been widely understood and accepted. Given

the importance of complementary and alternative therapy and hospice care in cancer patient care, in future work, close attention should be paid to strengthen health education to the patients and their families, improve the cognitive level of patients and their families, to supplement popularization and application of complementary and alternative therapies, and hospice care. Ultimately, the discomfort symptoms of CRC patients can be improved to the greatest extent, and the patient's quality of life can be improved.

In addition, as the primary source for patients to obtain knowledge and information [20], health care staff should take the initiative to provide patients with scientific and practical information. Furthermore, they also should comply with the trend of the times, make rational use of modern technology, combine smartphones and wireless networks to build a mobile information platform. Therefore, health care staff could provide professional and multi-form information for CRC patients to better satisfy the information needs of patients, promote patients to form correct cognition, and avoid being misled by wrong information.

This study indicated that the symptom burden was positively correlated with the supportive care needs of CRC patients, which is similar to a previous study on lung cancer [21]. However, some studies suggest that if the medical system can effectively address the needs of patients for support, care, and information, patients with severe symptoms and poor function may not show high needs for supportive care [22]. Uncomfortable symptoms caused by cancer or anti-cancer treatment can cause significant disruption to the patient's daily life, work, and emotions. Therefore, patients with heavy symptom burdens should not only eliminate their symptoms in time but also satisfy their other needs as soon as possible, to reduce the need level of patients and improve the satisfaction of medical services.

Anxiety and depression were positively correlated with CRC patients' supportive care needs in this research, like a Japanese study [23]. Anxiety and depression are closely related to CRC patients' supportive care needs, and there is an interaction between them; satisfying patients' needs can improve the psychological status of patients, and psychological intervention can also reduce the need level of patients.

This study showed that social support is negatively correlated with physical symptoms, psychological problems, and practical support needs, while it is positively correlated with health care staff needs. This may be because patients with higher social support have higher emotional or service requirements for health care staff; therefore, health care staff should give cancer patients sufficient solicitude to achieve patients' psychological expectations as far as possible.

The outcome also demonstrated that female, single/divorced/widowed, rectal cancer, and palliative care patients had higher supportive care needs, which was like the results of previous studies on other kinds of cancer patients [24–27]. Female patients are more vulnerable and express their needs more frequently, and the difference in social roles between males and females also makes female patients pay more attention to the care and economic burden caused by illness [28, 29]. Compared with single/divorced/widowed patients, married patients have more emotional support and a more integral

social support system, and their needs are more likely to be satisfied [26]. Patients with rectal cancer, especially patients without anal sphincter preservation, have a heavier physical and mental burden, their daily lives are more vulnerable than other types of CRC patients, and they may have many difficulties in stoma nursing, so they need more practical support [30]. Most of the palliative care patients involved in this study were in serious condition. Their physiological and psychological conditions were poor, which may be why they had higher needs than other CRC patients.

Limitations

This study had some limitations: first, the survey did not cross regions, the sample may be lack representativeness; second, there were some biases in sampling, and the number of patients with some characteristics varied greatly, which may affect the statistical results and should be treated with caution; thirdly, only a cross-sectional survey was conducted without considering the dynamic changes in the needs of CRC patients.

Conclusions

The two primary demand dimensions of CRC patients are medical staff and information needs. The supportive care needs of CRC patients with different demographic, sociological characteristics (such as gender, marital status, etc.), and biological characteristics (such as disease status, treatment status, etc.) are different. Therefore, in the management of CRC patients' supportive care needs, great attention should be paid to the needs of medical staff and information, and to women, single/divorced/widowed, rectal cancer, and palliative care patients, and to reduce the symptom burden, anxiety and depression of patients when developing intervention strategies.

Abbreviations

CRC: colorectal cancer; EORTC: European Organization for Research and Treatment of Cancer; MDASI: M.D. Anderson Symptom Inventory; HADs: Hospital Anxiety Depression scale; SSRS: Social Support Rating Scale; CNAT: Comprehensive Needs Assessment Tool in cancer for patients.

Declarations

Ethics approval and Consent to participate

This study was approved by the Medical Ethics Committee of Soochow University (No. SUDA20200225H08), Suzhou, China. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from each participant in this study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no conflicts of interest.

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Author contributions

B.D. and L.T. designed the study and were the major contributors in writing the manuscript. B.D., Y.S.Q, and C.Y.X collected the data, B.D. and Y.Y. analyzed and interpreted the data. L.L. and D.X.G contributed to the quality control of data and algorithms. All authors reviewed the manuscript.

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Tables

Table 1 The characteristics of CRC patients participating in the study(n=403)

Characteristics	n (%)	Characteristics	n (%)
Age(years) ($\bar{x}\pm s$)	58.83±10.86	Per capita monthly income of family (RMB)	
Gender		<1000	32(7.94)
Male	257(63.77)	1000-1999	62(15.38)
Female	146(36.23)	2000-2999	107(26.55)
Nationality		3000-4000	98(24.32)
Han nationality	401(99.50)	>4000	104(25.81)
Others	2(0.50)	Cancer type	
Marital status		Colon cancer	256(63.52)
Married	381(94.54)	Rectal cancer	147(36.48)
Single/Divorced/Widowed	22(5.46)	Metastasis	
Occupation		Yes	328(81.39)
Farmer/Worker	188(46.65)	No	50(12.41)
Cadre/Teacher	20(4.96)	Unclear	25(6.20)
Self-employed laborer	34(8.44)	Current treatment	
Retired	161(39.95)	Chemotherapy	378(93.80)
Religious belief		Chemotherapy+Radiotherapy	16(3.97)
Yes	45(11.17)	Palliative treatment	9(2.23)
No	358(88.83)	CRC family history	
Education		Have	59(14.64)
≤Primary school	71(17.62)	Not have	344(85.36)
Junior high school	143(35.48)	CRC cognition	
Senior high school and technical secondary school	118(29.28)	Fully understand	110(27.30)
Junior college	48(11.91)	Partial understand	248(61.54)
≥Bachelor	23(5.71)	Do not understand	45(11.17)
Payment method of medical expenses		Other diseases	
At one's own expense	19(4.71)	Yes	192(52.36)
At public expense	6(1.49)	No	211(37.47)
Urban medical insurance	378(93.80)		

Table 2 The need scores of each dimension in CRC patients (n=403)

Need dimension	Number of items	$\bar{x}\pm s$	P ₅₀ (P ₂₅ , P ₇₅)	Z	p
Physical symptoms	12	15.78±18.69	8.33 (2.78, 25.00)	0.20	<0.01
Psychological problems	10	18.12±24.27	6.67 (0.00, 26.67)	0.23	<0.01
Health care staff	8	71.75±31.65	87.50 (45.83, 100.00)	0.20	<0.01
Information	10	67.07±26.54	76.67 (50.00, 90.00)	0.16	<0.01
Social/Religious/Spiritual support	5	26.91±26.78	20.00 (6.67, 40.00)	0.22	<0.01
Hospital facilities and services	8	48.34±29.80	50.00 (25.00, 70.83)	0.07	<0.01
Practical support	6	32.95±27.35	27.78(16.67, 50.00)	0.14	<0.01
Total*	59	39.56±18.58	38.98 (27.12, 50.85)	0.03	0.20*

Note: *, normal distribution; the scores of each dimension need and total need range from 0 to 100.

Table 3 Correlation between supportive care needs and symptom burden, anxiety and depression, social support (n=403)

Need dimension	Symptom burden		Anxiety and depression		Social support
	Symptom severity	Symptom interference	Anxiety	Depression	
Physical symptoms	0.67**	0.64**	0.51**	0.45**	-0.19**
Psychological problems	0.58**	0.63**	0.64**	0.56**	-0.19**
Health care staff	0.10*	0.08	0.03	-0.01	0.13*
Information	0.20**	0.19**	0.17**	0.10*	0.01
Social/Religious/Spiritual support	0.38**	0.34**	0.44**	0.37**	-0.09
Hospital facilities and services	0.26**	0.28**	0.34**	0.25**	-0.04
Practical support	0.29**	0.29**	0.34**	0.29**	-0.13*
Total	0.46**	0.45**	0.45**	0.36**	-0.08

Note: **, $p < 0.01$; *, $p < 0.05$.

Table 4 Univariate analysis results of supportive care needs for CRC patients(n=403, rank mean/mean \pm standard deviation)

Items	Physical symptoms	Psychological problem	Health care staff	Information	Social/Religious /Spiritual support	Hospital facilities and services	Practical support	Total
Gender								
Male	191.14	192.27	193.46	194.73	188.88	198.77	196.75	37.86 \pm 18.39
Female	221.12	219.13	217.04	214.80	225.09	207.68	211.24	42.56 \pm 18.60
<i>p</i>	0.01*	0.02*	0.04*	0.10	<0.01*	0.46	0.23	0.01*
Age								
\leq 60	195.26	205.47	200.58	201.57	209.82	209.24	200.17	39.98 \pm 18.12
>60	209.05	198.37	203.49	202.45	193.82	194.43	203.92	39.13 \pm 19.08
<i>p</i>	0.23	0.53	0.80	0.94	0.16	0.20	0.75	0.65
Nationality								
Han nationality	202.10	201.89	201.38	201.62	202.25	201.45	201.38	39.49 \pm 18.57
Others	182.75	223.25	325.50	278.75	151.75	313.00	326.00	53.39 \pm 20.37
<i>p</i>	0.81	0.79	0.12	0.35	0.54	0.18	0.13	0.29
Marital status								
Married	200.45	199.00	201.88	199.63	197.38	198.81	197.64	38.85 \pm 18.12
Single/Divorced/Widowed	228.77	254.02	204.11	243.09	282.02	257.23	277.48	51.90 \pm 22.31
<i>p</i>	0.26	0.03*	0.93	0.09	<0.01*	0.02*	<0.01*	<0.01*
Education								
\leq Primary school	202.10	185.99	205.25	193.18	189.11	171.92	206.63	38.00 \pm 17.76
Junior high school	195.83	205.52	195.14	190.42	199.30	194.91	195.43	38.43 \pm 19.02
Senior high school and technical secondary school	189.77	190.58	206.18	210.14	198.11	210.93	196.56	38.89 \pm 17.78
Junior college	234.76	232.28	209.04	238.29	245.72	235.88	209.72	45.88 \pm 20.76
\geq Bachelor	234.76	224.96	198.52	183.74	187.26	222.41	240.35	41.73 \pm 16.05
<i>p</i>	0.12	0.13	0.92	0.11	0.08	0.03*	0.47	0.13
Occupation								
Farmer/Worker	207.94	207.40	191.91	198.72	217.44	207.54	220.67	40.21 \pm 19.01
Cadre/Teacher	209.05	222.15	188.68	203.50	187.08	218.40	182.58	42.43 \pm 19.76
Self-employed laborer	176.44	192.25	199.15	203.81	190.19	212.51	179.50	38.17 \pm 18.94
Retired	199.58	195.25	216.03	205.26	188.32	191.27	187.36	38.75 \pm 17.94
<i>p</i>	0.51	0.59	0.23	0.96	0.10	0.48	0.03*	0.75
Religious belief								
Yes	210.17	201.48	210.87	210.50	232.03	211.52	207.16	42.26 \pm 20.44
No	200.97	202.07	200.89	200.93	198.22	200.80	201.35	39.22 \pm 18.34
<i>p</i>	0.62	0.97	0.58	0.60	0.06	0.56	0.75	0.30
Per capita monthly income of family (RMB)								
<1000	170.73	187.84	210.89	189.34	182.98	185.39	217.73	37.59 \pm 20.31
1000-1999	216.64	223.98	196.99	184.65	199.45	187.61	207.41	38.90 \pm 18.25
2000-2999	206.94	206.71	212.58	217.15	213.93	197.73	212.24	41.17 \pm 16.99
3000-4000	197.93	193.36	196.36	212.41	197.88	217.97	208.81	40.33 \pm 19.65
>4000	201.64	196.55	196.68	190.83	200.98	205.03	176.98	38.20 \pm 18.94
<i>p</i>	0.45	0.43	0.79	0.26	0.70	0.45	0.15	0.74
Payment method of medical expenses								

At one's own expense	182.13	215.74	213.92	222.61	225.45	257.45	238.61	45.61±24.20
At public expense	216.25	208.25	257.33	270.08	207.42	206.17	223.00	46.23±16.18
Urban medical insurance	202.77	201.21	200.52	199.88	200.74	199.15	199.83	39.15±18.28
<i>p</i>	0.72	0.85	0.42	0.25	0.66	0.10	0.33	0.23
CRC family history								
Have	217.14	211.69	200.16	212.25	224.34	206.33	210.01	40.97±21.22
Not have	199.40	200.34	202.32	200.24	198.17	201.26	200.63	39.32±18.11
<i>p</i>	0.28	0.48	0.89	0.46	0.11	0.76	0.57	0.53
CRC cognition								
Fully understand	207.71	191.01	193.96	197.68	208.83	210.59	193.60	39.10±18.37
Partial understand	200.17	209.18	207.52	202.79	199.04	196.64	200.34	39.50±18.22
Do not understand	198.10	189.29	191.21	208.19	201.59	210.57	231.68	41.02±21.27
<i>p</i>	0.83	0.27	0.46	0.86	0.76	0.50	0.17	0.84
Other diseases								
Yes	218.30	207.81	201.51	203.52	205.87	195.78	197.00	40.02±19.26
No	187.16	196.71	202.45	200.62	198.48	207.66	206.55	39.15±17.98
<i>p</i>	<0.01*	0.32	0.93	0.80	0.52	0.31	0.41	0.64
Cancer type								
Colon cancer	202.18	202.78	188.50	188.24	192.85	191.00	189.57	37.74±19.00
Rectal cancer	201.69	200.64	225.51	225.96	217.94	221.16	223.65	42.74±17.43
<i>p</i>	0.97	0.86	<0.01*	<0.01*	0.04*	0.01*	<0.01*	<0.01*
Metastasis								
Yes	210.92	209.30	200.35	201.91	208.02	204.26	203.11	40.23±18.78
No	156.31	157.83	199.26	186.34	177.01	179.11	191.04	34.73±17.98
Unclear	176.34	194.58	229.08	234.54	172.96	218.12	209.36	40.52±16.18
<i>p</i>	<0.01*	0.01*	0.46	0.24	0.09	0.28	0.75	0.15
Current treatment								
Chemotherapy	197.03	196.67	200.58	200.00	198.44	200.43	197.99	38.94±18.46
Chemotherapy + Radiotherapy	252.66	265.63	217.97	228.31	256.03	212.81	252.63	45.76±15.72
Palliative treatment	320.56	312.94	233.11	239.33	255.28	248.83	280.50	54.93±21.47
<i>p</i>	<0.01*	<0.01*	0.59	0.39	0.06	0.44	0.02*	0.02*

Table 5 Independent variables and the assignment in multiple stepwise regression analysis

Independent variable	Assignment description
Gender	Male=0, Female=1
Marital status	Single/Divorced/Widowed=0, Married=1
Education	≤Primary school=1, Junior high school=2, Senior high school, and technical secondary school=3, Junior college=4, ≥Bachelor=5
Occupation	Refer to “Farmer/Worker” Farmer/Worker=0, Cadre/Teacher=1, Self-employed laborer=0, Retired=0 Farmer/Worker=0, Cadre/Teacher=0, Self-employed laborer=1, Retired=0 Farmer/Worker=0, Cadre/Teacher=0, Self-employed laborer=0, Retired=1
Other diseases	No=0, Yes=1
Cancer type	Colon cancer=0, Rectal cancer=1
Metastasis	Refer to “No” No=0, Yes=1, Unclear=0 No=0, Yes=0, Unclear=1
Current treatment	Refer to “Chemotherapy” Chemotherapy=0, Chemotherapy +Radiotherapy=1, Palliative treatment=0 Chemotherapy=0, Chemotherapy +Radiotherapy=0, Palliative treatment=1
Symptom burden/Anxiety and depression/Social support	Enter original value

Table 6 Results of multiple stepwise regression analysis (n=403)

Need dimension	R ²	Independent variable	Partial regression coefficient	SE	Standard regression coefficient	T	p	Tolerance	VIF
Total need	0.35	Constant	25.49	1.32	-	19.37	<0.01	-	-
		Anxiety	1.12	0.21	0.27	5.23	<0.01	0.62	1.62
		Symptom distress	0.32	0.08	0.22	4.00	<0.01	0.54	1.86
		Symptom severity	0.17	0.05	0.19	3.34	<0.01	0.52	1.93
Physical symptoms	0.54	Rectal cancer	3.89	1.56	0.10	2.48	0.01	1.00	1.00
		Constant	-1.69	1.16	-	-1.46	0.15	-	-
		Symptom severity	0.38	0.04	0.41	8.66	<0.01	0.51	1.95
		Anxiety	0.91	0.18	0.22	5.05	<0.01	0.62	1.63
		Symptom distress	0.32	0.07	0.22	4.74	<0.01	0.54	1.86
		Have other diseases	2.78	1.28	0.07	2.18	0.03	0.98	1.02
Psychological problems	0.51	Constant	-2.35	1.36	-	-1.73	0.09	-	-
		Anxiety	2.40	0.24	0.44	9.93	<0.01	0.62	1.62
		Symptom distress	0.47	0.09	0.25	5.14	<0.01	0.54	1.86
		Symptom severity	0.17	0.06	0.14	2.89	<0.01	0.52	1.92
Health care staff	0.06	Constant	26.92	11.77	-	2.29	0.02	-	-
		Symptom severity	0.26	0.08	0.17	3.31	<0.01	0.95	1.06
		Social support	0.83	0.26	0.16	3.24	<0.01	0.95	1.06
		Rectal cancer	7.67	3.20	0.12	2.40	0.02	0.99	1.01
Information	0.07	Constant	59.59	1.87	-	31.90	<0.01	-	-
		Symptom distress	0.46	0.10	0.22	4.55	<0.01	1.00	1.00
		Rectal cancer	7.81	2.66	0.14	2.94	<0.01	1.00	1.00
Social/Religious/Spiritual support	0.24	Constant	29.49	5.50	-	5.36	<0.01	-	-
		Anxiety	2.01	0.32	0.34	6.32	<0.01	0.68	1.47
		Married	-16.85	5.25	-0.14	-3.21	<0.01	0.97	1.04
		Symptom distress	0.33	0.11	0.16	2.97	<0.01	0.70	1.43
Hospital facilities and services	0.17	Constant	25.18	3.87	-	6.51	<0.01	-	-
		Anxiety	1.55	0.37	0.23	4.23	<0.01	0.70	1.44
		Symptom distress	0.38	0.13	0.16	2.98	<0.01	0.69	1.44
		Rectal cancer	7.85	2.85	0.13	2.76	<0.01	0.99	1.01
Practical support	0.18	Education	3.43	1.27	0.13	2.70	<0.01	0.98	1.03
		Constant	31.84	5.92	-	5.38	<0.01	-	-
		Anxiety	1.28	0.34	0.21	3.79	<0.01	0.68	1.47
		Symptom distress	0.46	0.12	0.21	3.91	<0.01	0.70	1.44
		Rectal cancer	6.45	2.58	0.11	2.50	0.01	1.00	1.00
		Married	-12.97	5.56	-0.11	-2.33	0.02	0.96	1.04

Note: SE, Standard error; VIF, variance inflation factor.