Research Article

Effects of Nutritious Meal Combined with Online Publicity and Education on Postoperative Nutrition and Psychological State in Patients with Low Rectal Cancer After Colostomy

Lijuan Qu,1 Mei Zhou,2 Yi Yu,3 and Kaili Li4

1Department of Gastrointestinal Surgery, The Affiliated Hospital of Qingdao University, Qingdao, 266000 Shandong, China
2Department of Wound Stoma Clinic, Laixi People’s Hospital, Qingdao, 266600 Shandong, China
3Department of Thoracic Surgery, The Affiliated Hospital of Qingdao University, Qingdao, 266000 Shandong, China
4Department of Gastrointestinal Surgery Ward, Jinan 4th People’s Hospital, Jinan, 250031 Shandong, China

Correspondence should be addressed to Kaili Li; likaili@jndsyy.com.cn

Received 9 March 2022; Revised 21 March 2022; Accepted 2 April 2022; Published 28 June 2022

Academic Editor: Deepika Koundal

Copyright © 2022 Lijuan Qu et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Objective. To investigate the effects of nutritious meal combined with online publicity and education on postoperative nutrition and psychological state in patients with low rectal cancer after colostomy. Methods. The clinic data of 88 patients with low rectal cancer who received the colostomy in our hospital (August 2020-August 2021) were retrospectively reviewed. Among them, 44 patients received nutritious meal combined with online publicity and education and they made up the study group, and the others were given conventional care and they made up the reference group. The nutrition indicators, scores of the World Health Organization Quality of Life (WHOQOL)-BREF, and other materials of the patients in the two groups were compared. Results. After intervention, the various nutrition indicators, immune indexes, and WHOQOL-BREF score of the study group were all prominently higher than those of the reference group (P < 0.001). Compared with the reference group, the study group after intervention achieved markedly lower self-rating anxiety scale (SAS) score and self-rating depression scale (SDS) score (P < 0.001) and obviously lower total incidence of complications (P < 0.05). Conclusion. Combining nutritious meal with online publicity and education can effectively improve the postoperative nutrition and immune function of the patients with low rectal cancer after colostomy, and this intervention contributes to releasing the patients’ adverse emotions. Further study helps to provide these patients with favorable solutions.

1. Introduction

Low rectal cancer, as a kind of common malignant tumor in clinic, refers to the rectal cancer occurring less than 8 centimeters from the anal verge [1, 2]. Colostomy is the common treatment for this cancer at present. It is difficult to preserve the anus and the function of anus during the surgery due to the anatomical location, so the permanent colon stoma is made on the abdominal wall to replace the anus to perform the defecate function [3]. However, the patients with the stoma cannot control the defecation at their willing, leaving inconvenience to their life and reducing their physiological and psychological adaptation. According to relevant studies [4], because of the particular structure of the rectum and the tumor consumption, as well as the surgical trauma, most patients suffer from nutrient intake disorder, which leads to the malnutrition, immunocompromise, and aggravated inflammation and is not conducive to the postoperative rehabilitation. In the past, parenteral nutrition treatment was mostly adopted in the clinic [5], but with the deepening of the studies on the clinical nutrition, it is found that parenteral nutrition treatment, with inadequate nutritional drugs, may lead to damages to the intestinal barrier and tissue atrophy of the intestinal mucosa in the long term. In recent years, the importance of nutritious meal in the comprehensive treatment during perioperative period has been gradually recognized [6]. Nutritious meal not only provides the nutrition support but also reduces the occurrence of
postoperative complications to a certain extent and can effectively promote the recovery of gastrointestinal tract and other organ functions and improve patients’ prognosis. Actually, its curative effects have been confirmed in the postoperative rehabilitation of the patients undergoing total resection of bladder tumor and oral cancer surgery[7, 8]. The patients with colostomy needs to experience a long rehabilitation period after the surgery, and the scientific publicity and education in clinic can provide guidance and assistance to the patients. As the intelligent publicity and education is continuously promoted, the online publicity and education have received more and more favor from the patients [9], and it has been applied to the breast cancer patients, the patients with osteoporotic lumbar compression fracture, and other patients. At present, there is no study reporting the value of nutritious meal combined with online publicity and education on the low rectal cancer. This study further summarizes the treatment methods in the clinic, so as to provide more theoretical and data support for the postoperative rehabilitation of the patients with low rectal cancer.

2. Materials and Methods

2.1. General Data. Eighty-eight patients with low rectal cancer who received the colostomy in our hospital (August 2020-August 2021) were selected as the research objects, and this study was conducted in accordance with Declaration of Helsinki (2013) [10]. The inclusion criteria were as follows. ① The patients met the diagnostic criteria in the National Comprehensive Cancer Network (NCCN) 2017 Version 1.0: Guideline for Colorectal Cancer [11], and their diagnoses were confirmed by proctoscopic examination and pathological biopsy. ② The Magnetic resonance imaging (MRI) and digital rectal examination indicated that the distance between the lower edge of the tumor and the anus was ≤8 centimeters. ③ The patients conformed to the treatment indication of the colostomy and were ≥18 years old. The exclusion criteria were as follows. ① The patients were complicated with severe cerebral, cardiac, liver, or renal dysfunction. ② The patients were complicated with other malignant tumor. ③ The patients suffered from the stenosis or perforation caused by the tumor, and they were under urgent need for surgical treatment. ④ The patients were in stage IV in term of the tumor staging before the surgery.

2.2. Methods. The reference group was given routine nursing after surgery. The primary nurses and the doctor jointly formulated nursing measures for the colon stoma and offered routine clinical education and publicity and nursing interventions. The clinical education and publicity included the following contents. The patients were informed of the causes and treatment of rectal cancer, the necessity of colostomy (in order to gain the patients’ understanding), self-care methods for the colon stoma (including correct replacement of the colostomy bag and regularly cleaning the skin around the colon stoma), and relevant matters needing attention after the surgery. Besides, the patients were guided to keep reasonable and balanced diet and were recommended to have multiple meals with small amount for each and take less gas-producing foods. Also, they were encouraged to communicate more with their families [12].

The study group received nutritious meal combined with online education and publicity after surgery. The nutritious meal was prepared as below. Nutritious meals were developed, because oral feeding in the early stage after surgery simply could not meet the nutritious demand of the patients’ body, so a nutritional supplement was given to the patients so as to increase the intake of protein and calories. Based on the specific situation, nutritious meals were prepared for the patients to supplement the energy needed, and normal oral feeding combined with oral nutritional supplement was adopted to meet the body’s demand for protein and other energy. A personalized nutritious diet plan was established by the nutritionists according to the patients’ clinical status to satisfy the nutritious supply. When preparing the nutritious meals, the nutritionists selected the most reasonable nutrient agents according to the patients’ individual differences. The patients received the online publicity and education during the perioperative period, specifically as follows. ① The online publicity and education team was formed by an international enterostomal therapist, a senior nurse, and three nurses, with the senior nurse as the team leader, who was responsible for the daily management and supervision of the other members. All the team members had good communication and consultation ability (those with clear thinking, and ability to express their main thoughts and understand others’ expressions), so as to enhance the strength of the whole team and provide adequate safeguard for the patients’ postoperative recovery. The team members received training in the methods of online publicity and education, as well as relevant professional knowledge, and needed to pass the assessment before they were allowed to begin their work. ② The team leader set up the WeChat groups in advance to communicate with the patients or their families and to spread the health knowledge about colostomy. ③ The team members should keep good communication with the patients, and the enterostomal therapist provides the patients with the whole-course nursing (including psychological guidance, stoma location, responsibility nursing, health publicity, and education and dietary intervention) during their treatment in the hospital. Therefore, the team members should get familiar with the patients’ condition and the local condition of the stoma and stress the importance and significance of the postoperative intervention. ④ Sending relevant contents to WeChat groups, the enterostomal therapist should find relevant knowledge of colon stoma and compose and timely send the message to the WeChat groups in the form of text, picture, audio, and video. On average, the enterostomal therapist sent the message two times a week for a month. The specific arrangements were as follows. In the first week, the patients were given psychological counseling and were informed of the correct methods for replacing the colostomy bag. In the second week, the patients were guided to pay attention to and prevent the complications of stoma, and to observe the defecation, the abdomen, the skin around stoma, and the local condition of stoma. Besides, they were instructed in the method of making appointments to recheck in stoma clinic.
All the contents were sent to the groups, and the same contents were sent circularly in second half of the month to repeatedly enhance the patients' understanding. The team members regularly viewed the chatting contents in the group every day and promptly answered the inquiries about the disease from the patients and their families. If some patient did not send message to the WeChat group for 1 week, the team members should promptly contact the patient by phone to inform him/her of the significance of participating in the group chats and encourage him/her to actively participate in the communication. The intervention cycles in both groups were 1 months.

2.3. Evaluation Indexes. After intervention, the fasting elbow vein blood (4 mL) was collected from every patient in the two groups and was put into the centrifuge tubes. The centrifuge tubes were placed at 37°C to promote the blood to coagulate. When being coagulated, the blood was centrifuged, and the clear supernatant was blood serum. The blood serum was drawn and subpackaged carefully for reservation. The automatic biochemical analyzer (manufacturer: Puyang City Hukang Medical Equipment Co., Ltd.; model: XR420A.) was adopted to detect the nutrition indicators, including the albumin (ALB), serum prealbumin (PA), and transferrin (TRF). The immunoturbidimetry was adopted to detect the levels of the immunoglobin A (IgA), immunoglobin M (IgM), and immunoglobin G (IgG) in the serum samples.

The World Health Organization Quality of Life (WHOQOL)-BREF [13] was adopted to assess the living condition of the patients in the two groups after intervention. This questionnaire was the simplified version of World Health Organization Quality of Life (WHOQOL)-100. WHOQOL-BREF was mainly used to see the research objects’ feelings about their own living condition, daily activities, and health status. This questionnaire included physiological dimension, psychological dimension, dimension of social relationship, and environment dimension, and the patients were given scores from the 4 dimensions with 5 grades. The total score (28-140 points) was the sum of all the items (28 items), and higher scores indicated better health conditions of the research objects.

The self-rating anxiety scale (SAS) [14] and the self-rating depression scale (SDS) [15] were used to evaluate the psychological state of the two groups after intervention. The cut-off value of SAS was 50 points. According to SAS, the patients with less than 50 points were considered normal, the patients with 50-59 points were considered to suffer from mild anxiety, the patients with 60-69 points moderate anxiety, and the patients with 70 points or more than 70 points severe anxiety. The cut-off value of SDS was 53 points. According to SDS, the patients with less than 53 points were considered normal, the patients with 53-62 points were considered to suffer from mild depression, the patients with 63-72 points moderate depression, and the patients with more than 72 points severe depression.

The complications of the patients in the two groups were recorded and counted. The complications included edema of stoma tissues, stoma stenosis, hernia around the stoma and prolapse of the stoma.

2.4. Statistical Treatment. The professional statistical software SPSS26.0 was adopted for data processing and GraphPad Prism 7 (GraphPad Software, San Diego, USA) was used to draw graphs of the data in this study. The count data were tested by \( \chi^2 \) and expressed by (n (%)). The measurement data were tested by \( t \) and expressed by mean ± SD. When \( P < 0.05 \), the differences were considered statistically significant.

3. Results

3.1. Clinic Data. There was no remarkable difference in the sex ratio, mean age, pathological type, education level, and other clinic data between the two groups (\( P > 0.05 \); Table 1).

3.2. Nutrition Indicators. After intervention, the various nutrition indicators of the study group were all higher than those of the reference group (\( P < 0.001 \); Table 2).

3.3. Immune Indexes. After intervention, the various immune indexes of the study group were all prominently higher than those of the reference group (\( P < 0.05 \); Table 3).

3.4. WHOQOL-BREF Score. After intervention, the WHOQOL-BREF score of the study group was prominently higher than that of the reference group (\( P < 0.001 \); Figure 1).

3.5. Psychological State. Compared with the reference group, the study group after intervention achieved markedly lower SAS score and SDS score (\( P < 0.001 \); Figure 2).

3.6. Complications. Compared with the reference group, the study group achieved obviously lower total incidence of complications (\( P < 0.05 \); Table 4).

4. Discussion

Rectal cancer is the general name for the malignant tumors occurring in the rectum, and it has multiple pathogenic factors, including environment, heredity, colorectal adenoma, and ulcerative colitis. Low rectal cancer is a common type of rectal cancer [16]. Most patients with low rectal cancer seek medical treatment for the severe ileus and inflammatory edema in the intestinal wall, and colostomy is needed to relieve their clinical symptoms before performing the radical resection of rectal cancer. However, clinical studies [17] have confirmed that the patients with low rectal cancer are likely to have multiple complications after colostomy, which affects patients’ postoperative recovery and prolongs their hospitalization time. As a result, their quality of life is greatly reduced. Therefore, it is of great clinical significance to provide good intervention for the patients with low rectal cancer after colostomy.

The growth of tumors often consumes a large amount of nutrients, so the patients’ nutritional status may deteriorate. Besides, the rectal cancer, as a common malignant tumor in the digestive system, affects the intake, digestion, and absorption of nutrients because the tumor occurs in the alimentary canal, so the incidence of nutritional risk is...
Table 1: Comparison of the clinic data.

| Item                                      | Study group | Reference group | $X^2/t$ | $P$  |
|-------------------------------------------|-------------|-----------------|---------|------|
| Sex (n (%))                               |             |                 |         |      |
| Male/female                               | 28/16       | 30/14           | 0.202   | 0.653|
| Mean age (mean ± SD, years old)           |             |                 | 0.158   | 0.875|
| BMI (body mass index, mean ± SD, kg/m²)   |             |                 | 0.363   | 0.717|
| Smoking history (n (%))                   |             |                 | 0.188   | 0.665|
| Yes                                       | 19 (43.18)  | 17 (38.64)      |         |      |
| No                                        | 25 (56.82)  | 27 (61.36)      |         |      |
| Drinking history (n (%))                  |             |                 | 0.182   | 0.669|
| Yes                                       | 22 (50.00)  | 20 (45.45)      |         |      |
| No                                        | 22 (50.00)  | 24 (55.5)       |         |      |
| Pathological type (n (%))                 |             |                 |         |      |
| Medium differentiated adenocarcinoma      | 31 (70.45)  | 31 (70.45)      | 0.000   | 1.000|
| Adenocarcinoma                            | 3 (6.82)    | 4 (9.09)        | 0.075   | 0.784|
| Medium-low differentiated adenocarcinoma  | 2 (4.55)    | 3 (6.82)        | 0.212   | 0.645|
| Mucinous cancer                           | 2 (4.55)    | 1 (2.27)        | 0.345   | 0.557|
| Highly differentiated adenocarcinoma      | 1 (2.27)    | 0 (0.00)        | 1.012   | 0.315|
| Signet-ring cell carcinoma                | 1 (2.27)    | 0 (0.00)        | 1.012   | 0.315|
| Poorly differentiated adenocarcinoma      | 1 (2.27)    | 1 (2.27)        | 0.000   | 1.000|
| Poorly differentiated squamous cell cancer| 0 (0.00)    | 1 (2.27)        | 1.012   | 0.315|
| Villous adenoma                           | 0 (0.00)    | 1 (2.27)        | 1.012   | 0.315|
| High-grade prostatic intraepithelial neoplasia | 1 (2.27) | 0 (0.00)      | 1.012   | 0.315|
| Highly differentiated adenocarcinoma      | 2 (4.55)    | 2 (4.55)        | 0.000   | 1.000|
| Underlying diseases (n (%))               |             |                 |         |      |
| Hypertension                              | 6 (13.64)   | 8 (18.18)       | 0.340   | 0.560|
| Diabetes                                  | 3 (6.82)    | 5 (11.36)       | 0.550   | 0.458|
| Atrial fibrillation                       | 4 (9.09)    | 3 (6.82)        | 0.155   | 0.694|
| Chronic gastritis                         | 5 (11.36)   | 4 (9.09)        | 0.124   | 0.725|
| Hyperthyroidism                           | 2 (4.55)    | 3 (6.82)        | 0.212   | 0.645|
| Nephrolithias                              | 3 (6.82)    | 2 (4.55)        | 0.212   | 0.645|
| Coronary atherosclerotic heart disease    | 1 (2.27)    | 0 (0.00)        | 1.012   | 0.315|
| Types of stoma (n (%))                    |             |                 |         |      |
| Transverse colostomy                      | 2 (4.55)    | 0 (0.00)        | 2.047   | 0.153|
| Colostomy of descending colon             | 12 (27.27)  | 9 (20.45)       | 0.563   | 0.453|
| Single-cavity sigmoidostomy               | 15 (34.09)  | 21 (47.73)      | 1.692   | 0.193|
| Proximal sigmoidostomy                    | 2 (4.55)    | 2 (4.55)        | 0.000   | 1.000|
| Sigmoidostomy                             | 13 (29.55)  | 11 (25.00)      | 0.229   | 0.632|
| Double-cavity sigmoidostomy               | 0 (0.00)    | 1 (2.27)        | 1.012   | 0.315|
| Education level (n (%))                   |             |                 |         |      |
| Bachelor degree and higher                | 2 (4.55)    | 3 (6.82)        | 0.212   | 0.645|
| Junior college                            | 3 (6.82)    | 2 (4.55)        | 0.212   | 0.645|
| Senior high school                        | 7 (15.91)   | 6 (13.64)       | 0.090   | 0.764|
| Middle school                             | 13 (29.55)  | 11 (25.00)      | 0.229   | 0.632|
| Primary school                            | 17 (38.64)  | 15 (34.09)      | 0.196   | 0.658|
| Illiteracy                                | 2 (4.55%)   | 7 (15.91%)      | 3.094   | 0.079|
| Place of residence (n (%))                |             |                 | 0.183   | 0.669|
| Urban areas                               | 19 (43.18%) | 21 (47.73%)     |         |      |
| Rural areas                               | 25 (56.82%) | 23 (52.27%)     |         |      |
significantly higher than that of other malignant tumors [18, 19]. In recent years, there have been more studies about the application of nutritious meal in the critically ill patients, and all the study results have shown that it can improve patients’ intestinal function, help the patients to better control their blood glucose, and reduce and prevent bacterial translocation [20]. Therefore, most hospitals take nutritious meal as the first choice of the nutritional support at present because it can reduce the patients’ postoperative complications and promote the recovery of the intestinal function and the scientific meal plan can further enhance the patients’ immune function and improve their intestinal barrier function which have been confirmed in the patients with bile duct cancer, colon cancer or other diseases [19, 21]. The Internet, with massive information, sharing characteristic, interactivity, promptness, and the hypertext, has been widely applied in the innovative mode of health education in hospitals. The clinical education and publicity based on the Internet effectively break through the obstacle of the information dissemination and make up for the shortcomings of the traditional health education mode in hospitals. Besides, the combination of the Internet and the clinical education and publicity develops new channels of postoperative health education for patients and improves the work enthusiasm of the medical workers, conducive to building harmonious doctor-patient relationship and enhancing the patients’ self-management ability, and the effect of online publicity and education has been confirmed in the application to AIDS patients [22].

However, there is no study on the intervention effects of nutritious meal combined with online publicity and education on the patients with low rectal cancer after colostomy. In this study, a controlled clinical trial was conducted, and 88 patients with low rectal cancer who received the colostomy in our hospital (August 2020-August 2021) were given different postoperative interventions, aiming at providing more evidence-based proofs for these patients. The sera ALB, PA, and TRF are the common indicators directly reflecting the nutritional status of the human body. According to the study results, the various nutrition indicators of the study group after intervention were prominently higher than those of the reference group (P < 0.001), indicating that the nutritious meal combined with online publicity and education can greatly promote the nutritional status of the patients with low rectal cancer after colostomy, protect their intestinal mucosa, and speed up the recovery of their intestinal function, so as to provide the nutritious substance the body needed. The reasons are speculated as follows. The various substances contained in the nutritious meal can be absorbed by the body through the venous system, which facilitates synthesizing protein in the digestive tract, regulating metabolism, and protecting liver and kidney function [23]. Besides, such intervention method can effectively improve the intestinal barrier function of the

| Group            | n  | ALB (g·L⁻¹) | PA (mg·L⁻¹) | TRF (g·L⁻¹) |
|------------------|----|------------|-------------|-------------|
| Study group      | 44 | 38.55 ± 4.22 | 153.19 ± 3.99 | 162.92 ± 6.88 |
| Reference group  | 44 | 35.24 ± 2.20 | 138.50 ± 1.95 | 138.45 ± 6.61 |
| \( t \)          |    | 4.614       | 21.941      | 17.013      |
| \( P \)          |    | <0.001      | <0.001      | <0.001      |

| Group            | n  | IgA     | IgM       | IgG       |
|------------------|----|---------|-----------|-----------|
| Study group      | 44 | 145.10 ± 6.27 | 158.38 ± 6.45 | 145.48 ± 4.06 |
| Reference group  | 44 | 140.66 ± 3.95 | 146.26 ± 4.04 | 132.92 ± 2.47 |
| \( t \)          |    | 3.974       | 10.563    | 17.531    |
| \( P \)          |    | <0.05       | <0.001    | <0.001    |

![Figure 1: Comparison of the WHOQOL-BREF score (mean ± SD).](image)
patients with gastrointestinal cancer, thus greatly reducing bacterial translocation and relieving the patients’ inflammatory response. In terms of the complication, the total incidence in the study group after intervention was markedly lower than that of the reference group. The reasons are as follows. Nutritious meal can promote the gallbladder contraction and gastrointestinal motility, increasing blood flow in the viscera and decreasing the burden of circulatory system and the complications in other systems. As a result, the patients’ metabolism is more suitable for the normal physiological process, which is conducive to their postoperative rehabilitation [24].

5. Conclusion

In conclusion, nutritious meal combined with online publicity and education is a reliable method of improving the postoperative nutrition and psychological state of the patients with low rectal cancer after colostomy and has clinical application value. The implementation of this method can reduce the incidence of complications and enhance the patients’ immune function. However, the samples selected in this study are too few to draw a conclusion, and it is necessary to conduct the multicenter controlled randomized clinical trial in future to verify the results in this study. Besides, in terms of the follow-up, the short-term follow-up is not enough to effectively evaluate the patients’ survival time, so it is necessary to do more high-quality and multicentric studies to confirm the effectiveness of nutritious meal combined with online publicity and education.

Data Availability

Data to support the findings of this study is available on reasonable request from the corresponding author.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Authors’ Contributions

Lijuan Qu and Mei Zhou contributed equally to this article.

References

[1] Z. Wang, Y. Yao, Y. Hu et al., "Extent of enhancement on multiphase contrast-enhanced CT images is a potential prognostic factor of stage I-III colon cancer," European Radiology, vol. 29, pp. 1114–1123, 2019.

[2] J. Ahra and O. Heeyoung, "Incidence of colon cancer related to cigarette smoking and alcohol consumption in adults with metabolic syndrome: prospective cohort study," Journal of Korean Academy of Nursing, vol. 49, pp. 713–723, 2019.
[3] S. Snahlata, M. S. Singh, C. Surbhi et al., “Role of TNFα and leptin signaling in colon cancer incidence and tumor growth under obese phenotype,” *Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease*, vol. 1866, no. 5, article 165660, 2020.

[4] N. Masakatsu, S. Sho, A. Toru et al., “Laparoscopic surgery in patients diagnosed with clinical N2 colon cancer,” *Surgery Today*, vol. 49, no. 6, pp. 507–512, 2019.

[5] S. Altieri Maria, T. Hannah, P. Aurora et al., “Incidence of colon resections is increasing in the younger populations: should an early initiation of colon cancer screening be implemented?,” *Surgical Endoscopy*, vol. 35, no. 7, pp. 3636–3641, 2021.

[6] F. Huolun, L. Zejian, Z. Jiabin et al., “Association of tumor size with prognosis in colon cancer: a Surveillance, Epidemiology, and End Results (SEER) database analysis,” *Surgery*, vol. 169, no. 5, pp. 1116–1123, 2021.

[7] M. Renninger, O. Fahmy, T. Schubert et al., “The prognostic impact of hexaminolevulinate-based bladder tumor resection in patients with primary non-muscle invasive bladder cancer treated with radical cystectomy,” *World Journal of Urology*, vol. 38, no. 2, pp. 397–406, 2020.

[8] L. Li, Y. Wu, A. Xia, and Z. Gao, “Application and effect of enhanced recovery after surgery in early rehabilitation of oral cancer patients after operation,” *Shanghai Journal of Stomatolgy*, vol. 27, no. 6, pp. 641–644, 2018.

[9] C. Hsu, C. Chuang, P. Hsu et al., “Lymphovascular invasion as the major prognostic factor in node-negative esophageal cancer after primary esophagectomy,” *Pediatric Nephrology*, vol. 24, no. 7, pp. 1459–1468, 2020.

[10] World Medical Association, “World medical association declaration of Helsinki: ethical principles for medical research involving human subjects,” *Journal of the American Medical Association*, vol. 310, no. 20, pp. 2191–2194, 2013.

[11] P. J. Pieter, C. Kwee Thomas, H. Sietze et al., “Clinical and radiologic predictors of parastomal hernia development after end colostomy,” *American Journal of Roentgenology*, vol. 216, no. 1, pp. 94–103, 2021.

[12] K. Nagayoshi, S. Nagai, K. Hisano, Y. Mizauchi, H. Fujita, and M. Nakamura, “Atrophic change of the abdominal rectus muscle significantly influences the onset of parastomal hernias beyond existing risk factors after end colostomy,” *Hernia*, vol. 25, no. 1, pp. 141–148, 2021.

[13] S. Vijay, R. Hasbani Natalie, M. Mehta Niles et al., “Early enteral nutrition is associated with improved clinical outcomes in critically ill children: a secondary analysis of nutrition support in the heart and lung failure-pediatric insulin titration trial,” *Pediatric Critical Care Medicine: A Journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies*, vol. 21, no. 3, pp. 213–221, 2020.

[14] H. Pham Christopher, F. Mike, Q. Vrouwe Sebastian, C. M. Kuza, H. A. Yenikomshian, and J. Gillenwater, “Evaluating the safety and efficacy of intraoperative enteral nutrition in critically ill burn patients: a systematic review and meta-analysis,” *Journal of Burn Care & Research*, vol. 41, no. 4, pp. 841–848, 2020.

[15] K. Kaźmierczak-Siedlecka, M. Folwarski, J. Ruszkowski, K. Skonieczna-Żydecka, W. Szafranski, and W. Makarewicz, “Effects of 4 weeks of Lactobacillus plantarum 299v supplementation on nutritional status, enteral nutrition tolerance, and quality of life in cancer patients receiving home enteral nutrition - a double-blind, randomized, and placebo-controlled trial,” *European Review for Medical and Pharmacological Sciences*, vol. 24, no. 18, pp. 9684–9694, 2020.

[16] H. Tomoko, S. Dai, A. Yuka et al., “Laparoscopic versus open colectomy for elderly patients with colon cancer: a propensity score analysis with the controlling nutritional status (CONUT) score,” *Nutrition and Cancer*, vol. 73, no. 2, pp. 246–251, 2021.

[17] L. Xia, “The effects of continuous care model of information-based hospital-family integration on colostomy patients: a randomized controlled trial,” *Journal of Cancer Education*, vol. 35, no. 2, pp. 301–311, 2020.

[18] K. Senem, D. Izzet, U. A. Cigdem et al., “Does nutritional status affect treatment tolerability, response and survival in metastatic colorectal cancer patients? Results of a prospective multicenter study,” *Journal of Oncology Pharmacy Practice*, vol. 27, no. 6, pp. 1357–1363, 2020.

[19] T. Tetsuro, N. Toshiya, A. Takashi et al., “Prognostic nutritional index and postoperative outcomes in patients with colon cancer after laparoscopic surgery,” *Surgery Today*, vol. 50, no. 12, pp. 1633–1643, 2020.

[20] J. L. Gao, Y. B. An, D. Wang, H. W. Yao, and Z. T. Zhang, “Current status of research on short-term quality of life after sphincteric-saving surgery in rectal cancer patients,” *Zhonghua Wei Chang Wai Ke Za Zhi*, vol. 23, no. 4, pp. 415–420, 2020.

[21] T. Matsuda, Y. Umeda, T. Matsuda et al., “Preoperative prognostic nutritional index predicts postoperative infectious complications and oncological outcomes after hepatectomy in intrahepatic cholangiocarcinoma,” *BMC Cancer*, vol. 21, no. 1, p. 708, 2021.

[22] M. van Heinsbergen, N. den Haan, A. J. Maaskant-Braat et al., “Functional bowel complaints and quality of life after surgery for colon cancer: prevalence and predictive factors,” *Colorectal Disease*, vol. 22, no. 2, pp. 136–145, 2020.

[23] S. Alexandra, L. Kristopher, M. Lucile, N. Favez, and C. Flahault, “Sexual health in colon cancer patients: a systematic review,” *Psycho-Oncology*, vol. 29, no. 7, pp. 1095–1104, 2020.

[24] G.-G. Teresa, C.-B. Alberto, J.-F. Paula et al., “Biopsychosocial and clinical characteristics in patients with resected breast and colon cancer at the beginning and end of adjuvant treatment,” *BMC Cancer*, vol. 19, no. 1, p. 1143, 2019.