

Establishment of a Rehabilitation Clinic for Colorectal Cancer. Will it End Patients' Sufferings?

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1. Abstract

1.1. Background: Colorectal cancer (CRC) is the third most common diagnosis and the second most lethal malignancy in both men and women.

1.2. Aim: To establish a rehabilitation clinic in the oncology department in hospitals and address its positive effect on colorectal cancer patients' need.

1.3. Methods: Searching literature data and collecting information that support advantages of colorectal cancer patients Rehabilitation Clinic. The clinic will include different specialties that support colorectal cancer patients' need pre and post treatment/surgery.

1.4. Discussion: Clinical pharmacist interventions showed to improve nurses' drug knowledge and error awareness which reduced the incidence and severity of medication administration errors. Furthermore, pharmacist interventions are associated with positive clinical, economic, and organizational results. Different interventions provided by the clinic can support and minimize treatment / surgery related side effects and educate the patient and his caregiver about the post operation new setting and how to adapt with.

1.5. Conclusion: The rehabilitation clinic is an essential need to address cancer patients care requirements and enhance patient's quality of life.

2. Introduction

2.1. Epidemiology of colorectal cancer

Colorectal cancer (CRC) is the third most prevalent diagnosis and the second most fatal tumour in both genders. It is associated with both substantial environmental and genetic risk factors. Except for younger individuals (those under the age of 50), the incidence of new cases and death has been consistently dropping in recent years, presumably due to increased cancer screening and better treatment techniques. [1]

Colorectal cancer accounts for 11% of all cancer cases. Furthermore, it is more likely in males than in females, and 3 to 4 times more common in developed countries than in developing countries. [2]

Before the age of 50 and up to 85 years, the age-standardized rate increases by more than tenfold, with men having a 50% increased risk compared to women (for age group of 0 to 74 years risk is 2.75% in men and 1.83% in women). Although colorectal cancer screening has helped to minimize the frequency of advanced-stage diagnoses, most cases are discovered after symptoms appear. The number of colorectal cancer deaths globally was projected at 0.88 million in 2018, accounting for 1.4% of all-cause and 8.9% of cancer-related deaths, with a 30% increase over the previous 15 years and a further 25% increase predicted by 2030. [3]

Between the ages of 0 and 74, the cumulative risk of death from colorectal cancer is 0.92% (1.14% in males and 0.72% in women). The 5-year cumulative survival rate is 64 to 67%, with 89 to 90% in localized cancer patients, 70 to 71% in regional cancer patients,

and 14 to 15% in distant cancer patients. [3]

2.2. Risk factors of colorectal cancer

The findings of epidemiologic studies show that there are considerable environmental and lifestyle connections with CRC. Obesity, red/processed meat, cigarettes, alcohol, androgen deprivation treatment, and cholecystectomy are all associated with a slight increase in CRC risk. Large population studies with varying degrees of evidence, on the other hand, have discovered CRC protective factors such as physical activity, diet like fruits and vegetables, fibre, resistant starch, fish; vitamin supplements like folate, folic acid, pyridoxine B6, calcium, vitamin D, magnesium; garlic and coffee, and drugs like aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), hormonal replacement therapy in postmenopausal, statins, and bisphosphonate. [4]

The gut microbiota plays an important role, and dysbiosis can cause colonic carcinogenesis via a chronic inflammatory mechanism. *Fusobacterium* spp., *Bacteroides fragilis*, and *Escherichia coli* are among the microorganisms responsible for this multiphase process. Mutations in oncogenes, tumour suppressor genes, and genes involved in DNA repair pathways are leading causes of CRC. [5]

Diabetes mellitus was associated with considerably higher short-term perioperative mortality. In a long-term mortality meta-analysis, those with diabetes experienced a 32% increase in all-cause death compared to those without diabetes. According to known research, pre-existing diabetes mellitus increases the likelihood of several post-operative complications as well as cancer recurrence after 5 years. [6]

2.3. Treatment models of colorectal cancer

Colorectal resection is the usual therapy for colorectal cancer patients (CRC). However, the surgery has a high post-operative death rate and a worse quality of life. Improving pre-operative cardiopulmonary fitness may enhance post-operative results. A multi-center controlled trial showed that most patients after CRC surgery found hospital-supervised and home-based exercise regimens to be extremely satisfactory. Pre- and post-operative exercise may be delivered within the CRC care pathway, but systematic planning of capacity and resources is essential to optimize implementation. [7]

Laparoscopic surgery remains the most often used method for treating colorectal cancer. But, innovative surgical techniques such as transanal total mesorectal excision, robotic surgery, and laparoscopic lateral pelvic lymph node dissection are being developed. [8]

Evidence-based changes in traditional care, such as consultation before admission, avoiding mechanical bowel preparation, carbohydrate drinks for 2 hours before surgery, avoiding fluid overload, shortening fasting, minimally invasive surgery, avoiding early removal of drainage tubes and catheters, and multimodality of opioid retention analgesia, early feeding are all part of enhanced

post-operative recovery. [9]

Therapeutic alternatives involved single-agent 5-fluorouracil (5-FU) therapy to combination regimens combining 5-FU and oxaliplatin, irinotecan, or both. Furthermore, the introduction of targeted drugs has boosted treatment effectiveness in the metastatic situation. These targeted drug includes bevacizumab, cetuximab, panitumumab, regorafenib, and aflibercept. [10]

Delayed commencement of adjuvant chemotherapy has a deleterious influence on long-term survival in colorectal cancer patients. The findings of a 363-patient study revealed that getting adjuvant chemotherapy on time was related with improved recovery. Adjuvant chemotherapy should be started as soon as possible in colorectal cancer patients. [11]

According to the findings of a qualitative study in Denmark, clinical experts working in rehabilitation have inadequate awareness of national rehabilitation policies, and there is a lack of systematic identification and documenting of physical, psychological, and social rehabilitation needs. Within the standardized surgical fast-track approach, documenting of rehabilitation needs was part of the patients' treatment regimen. [12]

The objective of this review is to present the benefits and colorectal cancer patients' need for a rehabilitation clinic to be established in the oncology department in the general hospitals or in the oncology special hospitals. The infrastructure together with the services to be provided through this clinic will be presented in full details in the review.

3. Materials and Methods

3.1. What Colorectal Cancer Patients Suffer From?

A clinical study revealed that non-stoma patients, compared to stoma patients had lower functionality in terms of physical function, role function, social function, emotional function, general health, and overall quality of life. It was also shown that stoma patients had the lowest quality of life in terms of body image, sexual pleasure, and marital satisfaction. The findings also revealed that stoma patients experienced more severe symptoms such as tiredness, diarrhoea, and male sexual issues. Furthermore, Stoma patients had more depression than non-stoma patients. In terms of anxiety, both stoma and non-stoma patients showed anxiety. [13]

Furthermore, malnutrition impacts the survival prognosis, quality of life, and oncological treatment in a high proportion of colorectal cancer patients. [14]

Almost all caregivers of colorectal cancer patients experience psychological distress as a result of their anxiety of the implications of expressing their emotions. This issue raises the likelihood of psychological suffering, somatic symptomatology, reduced marital satisfaction, increased fear of intimacy, and decreased perceived social support. [15]

The most difficult pain linked with colorectal cancer is neuropathic pain caused by lumbosacral plexus invasion. It is resistant to opi-

ates and need a multidisciplinary approach. [16]

There is chemotherapy related side effects like cardiotoxicity, nephrotoxicity, neurotoxicity, fatigue, nausea, diarrhoea, skin and hair changes. Radiotherapy related side effects includes skin changes, fibrosis, mucositis, oesophagitis, and pneumonitis. [17]

Cardiovascular and pulmonary comorbidities were the most frequent in cancer patients. A clinical study showed that 75% of colon cancer patients had comorbidities. [18] This means that it is important to address non-cancer comorbidities to prevent their contribution to impairment of cancer patient rehabilitation and quality of life.

3.2. Rehabilitation

It has been described as the therapeutic restoration of a sick or handicapped person by reeducation to involvement in regular daily activities within the restrictions of the individual's physical disability. [19]

Physical and psychological rehabilitation are required for patients with colorectal cancer who require an ostomy. An enterostomal therapy nurse's knowledge can be beneficial to the patient/family, surgeon, oncology nurse, and other health care professionals. Living effectively with a colostomy requires careful patient preparation, education, and planning. [20]

Furthermore, enterostomal therapists and the use of innovative technologies can assist colostomy patients in achieving independence and satisfaction. Colostomy care instructions should begin as soon as possible following surgery and before hospital discharge. [16]

Patients with stomas must adapt their way of living. Changes in body image, incontinence, and sexuality are examples of these. The patient's acceptance of the ostomy may be the most critical problem in the rehabilitation of the ostomized patient. If the patient refuses to accept the reality that he or she has an ostomy, the patient's recovery and QOL will suffer significantly. [19]

Social support is an important part of rehabilitation program. Health care professionals should coordinate with and give the advice to the patients' family members, friends, caregivers, and coworkers to provide the patient with required social and psychological support.

The aim of rehabilitation clinic for colorectal cancer patient is to restore the patients' normal life activities, and bowel functions. On the other hand, it is important to focus on emotional recovery and restoring patients' sexual function. Rehabilitation clinic role is to address and optimize the required needs for the patient pre and post therapeutic/operative management. This will provide the patient a better quality of life, and self-dependence besides minimal chemotherapy and adjuvant therapy adverse effects.

3.3. The Clinic Services Include:

1. Patient Counseling (on site sessions).

2. Assessment for drug interactions and duplicated therapy.
3. Side-effect management and enhancing patients' chemotherapy tolerance.
4. Assessment of lacking therapeutic efficacy.
5. Meets palliative and supportive care needs.
6. Provides follow-up for patients returning to the community.
7. Adjusting medication therapy for pain and symptom management.
8. Detects and manage tumor recurrence.

3.4. A specialized team and tools are required to provide rehabilitation service on site. This team includes the following:

3.4.1. Oncologist: Contribute to cancer diagnosis, prevention, and research. Also, oncologist provide a complete and systematic approach to treatment and care, while assuring the use of cancer medications that is evidence-based, safe, and cost-effective. [21]

3.4.2. Clinical oncology pharmacist: Implementing valid scientific information and recommendations on the safe and acceptable use of chemotherapy, improving treatment efficacy, avoiding side effects, and addressing unclear/compliance difficulties. [22]

Resolution of drug-related problems is an important role for clinical oncology pharmacist. A clinical study indicated that the incidence of drug-related problems in chemotherapy-treated patients was reduced. Recommendations of clinical oncology pharmacists solved 91.7% of the drug-related problems. Furthermore, patient's quality of life was getting better. [23]

3.4.3. Nurses: Can help with screening, coordination, referral, physical activity counselling, direct nutritional nursing, symptom control, psychological support, and supportive care.[24]

3.4.4. Nutritional specialist: Monitoring nutritional status throughout treatment that can be used to plan appropriate nutritional therapy to improve patient responses, reduce adverse effects, and decrease recovery time. [14]

3.4.5. Computer system: The rehabilitation clinic will need an integrated information system that satisfies all healthcare professionals demand by providing an accurate and precise information about the patients' health situation pre-, during, and post treatment/surgery. This will reduce processing time, and provide a chance for making the correct and fast decisions for improving the patient quality of life.

4. Discussion

In a clinical setting in china, an investigation showed that Total Parenteral Nutrition (TPN) standardization driven by clinical pharmacists improved postoperative clinical outcomes in patients with colorectal cancer (CRC). [25]

Prediction of prescription mistakes is possible by analyzing the influence of risk variables on error incidence to enhance quality and safety. It is evident that the treatment of cancer patients should

be automated in order to eliminate mistakes such as body surface area calculation and hence dosage errors. [26]

Positive clinical, economic, and organizational outcomes are related with pharmacist interventions. A study demonstrates the value of pharmacist review of injectable antineoplastic prescriptions for patient safety and total healthcare system benefit. From the organizational point of view, the results showed that 67.5% of pharmacist interventions had a positive influence on patient management. A significant economic impact of 44.3% of pharmacist interventions was noted. From the clinical point of view, it was noted that 8.9% of pharmacist interventions had major clinical impact, 20.7% had moderate clinical impact, 26.2% had minor clinical impact, and 40.0% had no clinical impact. [27]

Clinical pharmacist interventions aimed at enhancing nurses' drug knowledge and error awareness have been proven to be successful in lowering the frequency and severity of medication delivery mistakes. This was revealed by lowered medication errors from 34.2% pre pharmacist intervention to 15.3% post pharmacist intervention. [28]

4.1. Patient Management in Rehabilitation Clinic for Colorectal Cancer

Complications from colorectal cancer surgery can have a negative impact on long-term survival. Study results from 43908 colon and 16955 rectal cancer patients indicated that Non-surgical complications are more likely to cause death than surgical complications. [29]

Successful enhancing patients' psychological state, lowering complications, alleviating pain, and fast-track surgery during the perioperative period of CRC surgery optimizes postoperative rehabilitation, decreases economic stresses, and improves quality of life. [30]

In addition to clinical variables, identified social and lifestyle aspects appeared to be important in decision-making. The use of inpatient rehabilitation therapy was linked to improved overall and disease-specific survival. [31]

According to the findings of this study, an early rehabilitation accelerated program is extremely helpful in the treatment of patients with surgically treated colorectal cancer. The study comprised 58 patients with surgically treated colorectal cancer (39 men and 19 women), ranging in age from 36 to 85 years old, with an average age of 63.3. All patients received early multimodal accelerated rehabilitation. Patients' quality of life was greatly enhanced, both physically ($p < 0.01$) and mentally ($p < 0.01$). [32]

Data from pilot trial revealed that post-operative, combined, and supervised physical exercise program may improve quality of life, cognitive functioning, fatigue, functional ability, and nutritional status in patients undergoing laparoscopic colorectal cancer surgery. [33]

Seven studies were discovered that looked into the effects of reg-

ular exercise during adjuvant chemotherapy for individuals with colorectal cancer or a mixed group. Endurance exercise alone was proven to improve lower extremity strength as well as endurance capacity. The benefits of strength training on the lower extremities are moderate, but the rise in the upper extremity is minor. According to one study, exercise therapy may be useful for colorectal cancer patients receiving adjuvant treatment. [34]

Health professionals assist caregivers in better understanding patients' symptoms and requirements, and the care they provide to persons suffering from serious illnesses can enhance their quality of life. One duty of nurses in assisting caregivers in better adapting to their new tasks may be to ask caregivers to put themselves in the position of the patient, or to imagine themselves as the ill individual. [35]

The enterostomal therapy nurse advises the patient and family on ostomy care, nutritional and hydration changes, and strategies to integrate ostomy management into the patient's life. In addition, the enterostomal therapy nurse offers long-term follow-up treatment in outpatient settings, which includes continued counselling, education, and monitoring for issues that require medical intervention. [36]

Nutrition principles during anticancer therapy should primarily consider light and low-fat foods, the exclusion of lactose and gluten-containing foods in some cases, or the introduction of special dietary products such as oral nutrition supplements, and it should be tailored to patients' individual needs. [14]

In radiotherapy treatment, patients are advised to eat easy-to-digest and avoid hard-to-digest meals like fatty foods, raw milk, raw vegetables and fruits, carbonated drinks, juices, and spices. Fiber and lactose restriction is occasionally recommended to decrease adverse effects such as bloating, stomach discomfort, and diarrhoea. A higher protein intake is also recommended like low-fat cottage cheese, lean poultry meat, rabbit meat, sea fish, small amounts of eggs. The amount of vegetables taken should be increased, and they should be supplied in the form that the patient can tolerate like cooked, pureed, ..etc.[37]

Rehabilitation of a cancer patient is a complex process that is hardly to measure or estimate its yield. Lack of information, untrained healthcare personnel, poor patient education and family awareness, lack of patient follow-up are all barriers for successful rehabilitation program. Proper training and education for rehabilitation team, patient, and the caregivers is essential for obtaining the desired outcomes.

Several factors, including dietary modifications, increased physical activity, vitamin D supplementation, and coffee consumption, have been demonstrated to be helpful following colorectal cancer surgery. Oral nutritional supplements, which are distinguished by their convenience and easy availability, are often regarded as a preferable nutritional intervention in patients at risk of malnutrition. [14]

Dietitian can support patients and rehabilitation team by providing dietary information and tailored dietary regimen for every case, and so provide the support in minimizing therapy related side effects, and improving patients' quality of life.

The use of digital tools to provide online home support and counseling, and decreasing the number of clinic visits will be an advantage in patient follow-up, hence it will provide time flexibility, and will reduce travel time and distance to clinic, and enhance patient compliance (Table 1).

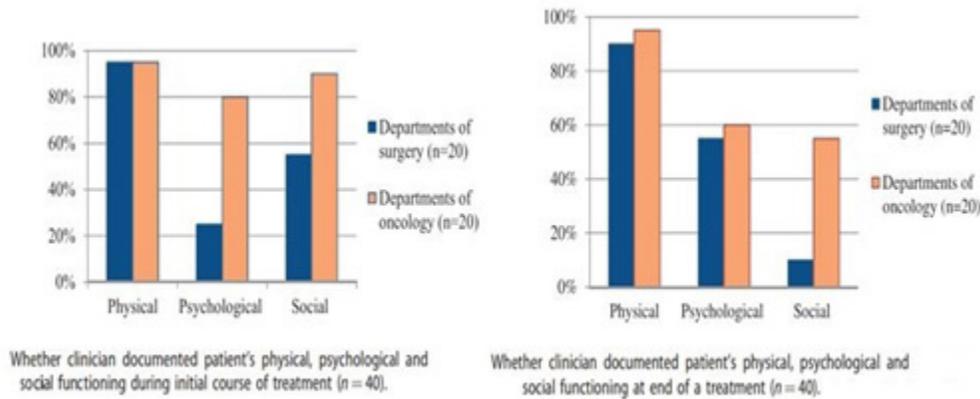


Figure 1: patient's physical, psychological, and social functioning during initial course and at end of treatment

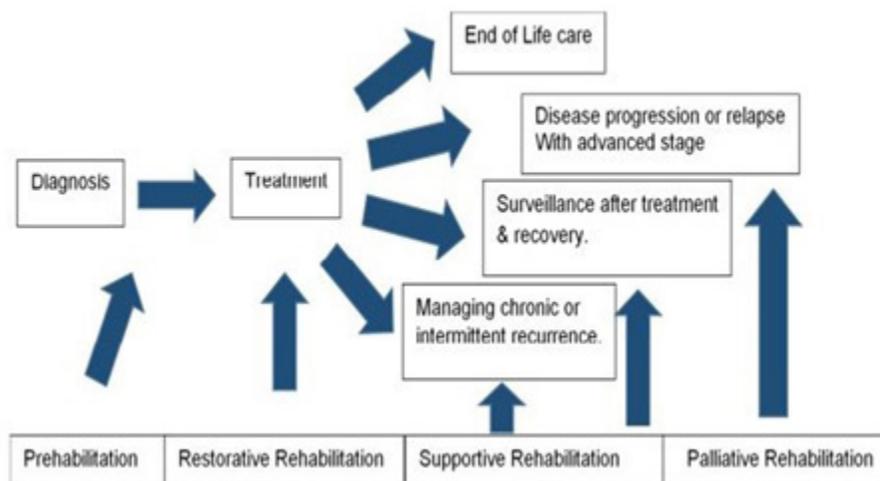


Figure 2: Diagram showing different stages of rehabilitation in cancer care [17].

Table 1: Summary table including patient requirements and their management way

Patients' Side effect / Comorbidity / requirements	Management
Physical activity and fitness [34]	Endurance exercise
Ostomy care [36]	Enterostomal specialist / Nurse (continued counselling, education, and monitoring) inpatient and outpatient settings
Caregivers psychological distress [15]	Health professionals / Nurse (Assist caregivers in better understanding patients' symptoms and requirements)
Minimizing radiotherapy side effects [37]	Recommended: Higher protein intake (low-fat cottage cheese, lean poultry meat, rabbit meat, sea fish, small amounts of eggs)
	Avoid hard-to-digest meals (fatty foods, raw milk, raw vegetables and fruits, carbonated drinks, juices, and spices)
	Avoid fiber and lactose containing food.
Chemotherapy induced Nausea/emesis [38]	5-HT3 antagonist, Avoid cold food or drink and contact with cold surfaces during and shortly after infusion
Chemotherapy induced Neurotoxicity [38]	If neurological symptoms persist over 7 days or if paraesthesia without functional impairment persist until next cycle: reduce chemotherapy dose reduction
	If paraesthesia with functional impairment persist until next cycle: discontinuation

5. Conclusion

The rehabilitation clinic is an essential need to address cancer patients care requirements and enhance patient's quality of life. Patients after surgical treatment require life style modifications and proper education and follow-up to know how to deal with the post-operative new setting. Nurses, pharmacist, nutritional specialist, oncologist are all playing an important role in enhancing patient quality of life.

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