Review Article

The Role of Multidisciplinary Rehabilitation in Enhancing Comprehensive Cancer Care: A Descriptive Review

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Abstract

Objective: To highlight the effectiveness of cancer rehabilitation in improving physical, emotional, and social outcomes for patients with various forms of cancer. It evaluates the impact of cancer rehabilitation on physical function, psychological health, and social reintegration while identifying barriers and facilitators in the implementation of cancer rehabilitation programs.

Methodology: A literature search was conducted from December 2023 to February 2024, using two electronic databases: MEDLINE (via PubMed) and Google Scholar. After screening the titles and abstracts, the study selected 34 articles, including RCTs, clinical trials, observational studies, and systematic reviews. The study did not include letters to the editor, editorials, special and short communications, animal-based research, and non-English language publications. There were no restrictions on geographical distribution, age of the sample population, type, severity, duration, and outcome of cancer, or the year range from which the studies were selected.

Results: Rehabilitation interventions were effective in different cancer types, including breast, prostate, lung, and colorectal cancers. These interventions addressed common treatment-related challenges such as fatigue, pain, lymphedema, incontinence, and psychological issues, improving patients' quality of life and physical functioning. However, challenges such as physical limitations, emotional distress, access to care, financial barriers, and coordination of services were frequently noted. This highlights the need for tailored, accessible, and well-coordinated cancer rehabilitation programs.

Conclusion: Multidisciplinary and coordinated cancer rehabilitation has the potential to improve mobility, quality of life and physical functioning across various cancer types, but challenges in accessibility and coordination must be addressed.

Keywords: Cancer Rehabilitation, Multidisciplinary rehabilitation, Quality of life, Rehabilitation Medicine.

Introduction

Cancer rehabilitation is a multidisciplinary approach to helping people with cancer maintain and restore physical, emotional, and social function.[1] It can be started before, during, or after cancer treatment.[2,3] Rehabilitation professionals examine and devise customized rehabilitation plans for the cancer patient or survivor that address individual's problem list and rehabilitation goals. Cancer rehabilitation is a multifaceted approach ng including physical therapy, occupational therapy, psychological help, provision of orthotics and prosthetics (where required), and nutritional support .

It is designed to improve quality of life and help individuals return to their normal daily activities. There is strong evidence to support the role of cancer rehabilitation in improving physical function, reducing fatigue, and increasing overall well-being. It can also help individuals maintain their independence and reduce the need for additional medical care or institutionalization.[4] In addition to the benefits to individuals, cancer rehabilitation can also have a positive impact on the healthcare system as a whole. By helping cancer survivors return to their normal daily activities and reducing the need for additional medical care, cancer rehabilitation can potentially lower healthcare costs and reduce the burden on the healthcare system.[5]

Cancer rehabilitation can be an important part of the cancer journey for many individuals and can help improve physical, emotional, and psycho-social well-being. There is a need for increasing the knowledge of physicians about cancer rehabilitation. A study conducted in 2019, in Puerto Rico on physiatrists, reports that 66.7% of the Rehabilitation Medicine Physicians reported receiving no or minimal formal education on cancer rehabilitation.[6] Lack of education may result in sub optimal services the oncologists and rehabilitation medicine physicians may provide to the patients. We conducted this descriptive review to highlight the need for early, coordinated and comprehensive multidisciplinary cancer rehabilitation, explaining its types and summarizing the effectiveness of various forms of cancer rehabilitation in improving physical, emotional, and social outcomes for patients with cancer. The review evaluates the impact of cancer rehabilitation on physical function, psychological health, and social reintegration while identifying

barriers and facilitators in the implementation of cancer rehabilitation programs.

Methodology

Search Strategy

We conducted a comprehensive online literature search from December 2023 to February 2024 using two electronic databases: MEDLINE (via PubMed) and Google Scholar. The search strategy utilized a combination of the following keywords with Boolean operators (AND, OR, NOT): Oncology, Cancer Rehabilitation, Physical Therapy, Rehabilitation, Occupational Therapy, Pain Management, Breast Cancer, Colon Cancer, Prostate Cancer, Brain Tumor, Bone Cancer, Rehabilitation Interventions, Lymphedema, Quality of Life, Complication, Cancer Survivors, Outcomes, Exercise Therapy, and Exercise.

Inclusion/ Exclusion Criteria

We included the following; Original research articles, Randomized controlled trials, Quasi-experimental studies, Clinical trials, Review Articles (narrative and systematic reviews), Studies conducted in humans, Publications in English language, Articles focusing on cancer rehabilitation services worldwide, Studies reporting on effective interventions for cancer survivors. There were no restrictions on geographical distribution, age of the sample population, type, severity, duration, and outcome of cancer, or the year range from which the studies were selected.The following articles were excluded; Letters to the editor, Editorials, Special communications, short communications, Animal-based research, Non-English language publications. Some articles were excluded as they were behind pay walls, and the authors were unable to access them.

Study Selection

Two authors (FA and SA) independently performed the literature search and screening process. The initial screening was based on titles and abstracts, followed by full-text review of potentially eligible articles. Any disagreements were resolved through discussion and consensus.

Data Extraction

We extracted relevant data from the included studies, focusing on; Types of cancer rehabilitation services, Geographical distribution of services, Effectiveness of interventions, Outcomes in cancer survivors. The extracted data were synthesized narratively to provide a comprehensive overview of cancer rehabilitation services globally and to highlight effective interventions for cancer survivors.

Results

After screening the titles and abstracts, authors selected 34 articles, including RCTs, clinical trials, observational studies, and systematic reviews for data extraction. From the results of the studies included, there is evidence that cancer rehabilitation is effective in various forms of cancers in different stages (Table 1). Rehabilitation not only addresses the disability associated with the cancer but also

Table I: Summary of the Multidisciplinary Team Interventions in Cancer Rehabilitation.

Authors	Type of Manuscript	Cancer Type	Summary Points
van Weert E et al. (2005)[3]	Clinical Trial	Various Types	A 15-week rehabilitation program was developed for cancer survivors to improve QOL, and overcome physical and psychosocial problems. It showed statistically significant improvements in health-related QOL (0.38-0.99), exercise capacity, and muscle force. 80% of patients initially preferred the multidimensional program, as it had beneficial effects on QOL, exercise capacity, and muscle force.
Silver et al. (2011)[4]	Review	Various types	This review highlights the role of cancer rehabilitation in survivorship, improving pain, musculoskeletal issues, fatigue, balance, lymphedema, and psychosocial problems through physical and occupational therapy.
Brown et al. (2018)[7]	Randomized Controlled Trial	Colon Cancer	Aerobic exercise significantly improved physical functioning, sleep quality, and reduced fatigue in colon cancer survivors, with greater benefits at 300 minutes per week.
Möller et al. (2019)[8]	Systematic Review	Breast Cancer	This review identified exercise/PA, yoga, and tailored programs as effective for improving mobility, lymphoedema, pain, fatigue, QOL, and mental health in breast cancer rehabilitation.

Authors	Type of Manuscript	Cancer Type	Summary Points
Messaggi-Sartor et al. (2019)[9]	Randomized Controlled Trial	Lung Cancer	An 8-week aerobic and high-intensity respiratory muscle training program improved exercise capacity, respiratory strength, and IGFBP-3 levels post-lung cancer surgery, but did not enhance QOL.
Houben et al. (2023)[10]	Randomized Controlled Trial	Prostate Cancer	A 20-week resistance exercise program improved body composition, muscle mass, strength, and aerobic capacity in prostate cancer patients on ADT, with no additional benefit from protein supplements.
Molenaar et al. (2023)[11]	Randomized Controlled Trial	Colon Cancer	A 4-week multimodal prehabilitation program before colorectal cancer surgery reduced severe complications and improved recovery compared to standard care.

ADT: Androgen Deprivation Therapy; QOL: Quality of Life; PA: Physical Activity.

alleviates complications associated with the treatment of cancer, including chemotherapy and radiation. A summary of selected studies is presented in Table 1 below.

Based on our review of various manuscripts, we found that cancer rehabilitation was effective for individuals with different types of cancer at various stages of their journey. This included breast cancer,[9] prostate cancer,[11] lung cancer,[10] and colorectal cancer.[8,12] Breast cancer treatment often led to challenges such as fatigue, pain, and lymphedema, and cancer rehabilitation helped manage these issues, enhancing patients' quality of life.[9] Prostate cancer treatment can sometimes result in physical and emotional challenges, such as incontinence (inability to control urine) and sexual dysfunction.[12] Cancer rehabilitation can help individuals manage these challenges and improve their quality of life.[13] Lung cancer patients benefited from a multifaceted rehabilitation approach that improved fatigue, pain, and breathing difficulties.[10] Colorectal cancer treatment often resulted in fatigue, pain, and bowel and bladder dysfunction, with rehabilitation interventions playing a crucial role in optimizing physical and psychological well-being.[12] The findings from the review suggest that cancer rehabilitation is beneficial for a variety of cancer types. It is important for the cancer patients and cancer survivors to discuss their rehabilitation needs and goals with their healthcare team to determine the most suiTable interventions. The oncologists and other cancer team members should proactively offer guidance about cancer rehabilitation and make appropriate and timely referrals to Rehabilitation Medicine physicians.

The literature also highlighted several challenges patients faced during cancer rehabilitation. Physical limitations such as weakness, fatigue, and mobility issues were common, making participation in rehabilitation activities difficult.[13] Emotional challenges for cancer patients included fear, anxiety, depression, and grief.[14] This could potentially hinder active participation in rehabilitation and require additional psychological support. Access to rehabilitation services posed a significant challenge, especially for those in remote or rural areas, who often faced long travel distances to reach specialized care facilities.[15,16] Financial barriers were another issue identified. Rehabilitation services are frequently excluded from standard cancer treatment insurance policies, leading to decreased access.[17] This is particularly true for developing countries like Pakistan, where patients frequently pay out of pocket for rehabilitation services.[18] Coordination of care was identified as crucial but challenging, particularly when services were spread across different locations. Effective coordination, including the use of cancer patient navigators and interdisciplinary collaboration, was highlighted as essential for ensuring timely referrals and comprehensive support for diverse patient needs.[12]

Discussion

This review, based on an online literature search of 2 major databases provides evidence for the effectiveness of various forms of cancer rehabilitation in improving physical, emotional, and social outcomes for cancer survivors. It evaluated the impact on physical function, psychological health, and social reintegration, emphasizing that rehabilitation helps with the disabilities associated with both the disease and its treatment.

A cancer patient goes through psychological, physiological, or functional dysfunction or defects in anatomical structures before during or after cancer treatment. Some of the impairments are muscle mass loss, osteopenia/osteoporosis, plexopathy, radiation fibrosis syndrome, radiculopathy, scar adhesion, sensory deficits, sexual dysfunction , shoulder pain, speech impairment, urinary dysfunction, visuospatial and/or proprioception dysfunction, difficulty with activities of daily living, difficulty with instrumental activities of daily living (chores/shopping, etc.), fatigue, joint pain, musculoskeletal pain (e.g., myalgias, myofascial pain), neuropathic pain, somatic pain, visceral pain, deconditioning, backache, imbalance, bowel dysfunction, chest pain, cognitive impairment , abnormal gait , and joint range-of-motion limitations.[1-3] Associated disabilities include Physical, cognitive, psychological, social, and emotional disabilities and activities of daily living/ functional disabilities.[19] The analysis of the included studies highlights the benefits of cancer rehabilitation across various types and stages of

cancer (Table 1). Rehabilitation interventions have proven effective not only in addressing the disabilities directly associated with cancer but also in alleviating complications related to treatments such as chemotherapy and radiation therapy. For breast cancer survivors, Multidisciplinary Team (MDT) cancer rehabilitation programs have shown particular success in addressing post-treatment complications such as lymphedema, shoulder dysfunction, and cancer-related fatigue. This improvement in physical symptoms consequently enhanced the overall quality of life for these patients. Similarly, in prostate cancer, rehabilitation programs focusing on pelvic floor exercises, coupled with psychological support, were proven effective in managing post-treatment complications such as incontinence and sexual dysfunction, which are common issues.[13,14] Lung cancer treatment can sometimes result in physical and emotional challenges, such as fatigue, pain, and difficulty breathing.[20] Integrating respiratory therapy, exercise physiology, and nutritional support resulted in significant improvements in exercise capacity, respiratory strength, and helped manage treatment-related fatigue and pain and improved the quality of life for lung cancer survivors.[9,15] In colorectal and prostate cancer, rehabilitation in addressed fatigue, pain, and bowel and bladder dysfunction resulted in both physical and psychological well-being.[16,17]

These findings highlight the critical role of personalized rehabilitation programs that cater to the specific needs of patients based on their cancer type and individual health conditions. Despite the clear benefits of cancer rehabilitation, several challenges were identified. For cancer patients and survivors, physical limitations such as weakness, fatigue, and mobility issues often restrict the patients' ability to adequately participate and engage in rehabilitation activities. In addition to that, emotional challenges, including fear, anxiety, depression, and grief, were significant barriers in providing adequate cancer rehabilitation, Therefore, it is necessary to integrate psychological support into rehabilitation services.

There is a growing interest in implementing cancer prehabilitation and rehabilitation programs before cancer treatment begins. Proponents argue that prehabilitation can improve treatment tolerance and post-treatment outcomes. Zamora et al. (2023) evaluated the impact of prehabilitation on treatment costs in patients undergoing gastrointestinal cancer surgery.[18] The model estimated that prehabilitation resulted in significant cost savings, with a patient-weighted average of £785, excluding ICU costs. ICU cost savings were £1,620. For the NHS, this translated to £186.1 million in cost savings from reduced complications and hospital days, and £52.8 million from ICU stay.[18]

Despite its potential to improve function and QOL in the cancer survivors, MDT cancer rehabilitation faces several challenges.[19] Accessibility to cancer rehabilitation services is a significant challenge, especially for individuals residing in remote or rural areas. These individuals often have to travel long distances to reach specialized cancer care facilities, which can be a considerable burden.[20] Onega et al. (2008) found that while 91.8% of the U.S. population had access to specialized cancer care within an hour, nonurban residents and Native Americans faced significantly longer travel times.[21] Similarly, Liu et al. (2023) from the USA reported that pediatric cancer care also faces geographical accessibility issues, impacting timely treatment.[22] Lin et al. (2015) highlighted the extreme travel times patients endure, and the geographical distribution of oncologists.[23] He observed that increased travel burden was associated with a decreased likelihood of receiving adjuvant chemotherapy, regardless of insurance status. Another similar study emphasized the low utilization of cancer rehabilitation services, attributing this to logistical demands and travel challenges.[24]

Cancer rehabilitation can be expensive, and individuals may not have insurance coverage for certain rehabilitation services.[25] In developing countries like Pakistan where patients have to pay out of pocket for the medical treatment, it becomes very difficult to manage the cost of rehabilitation once the medical or surgical management of cancer is completed. This can be addressed by exploring hub and spoke care models and mobile rehabilitation units. Coordination of care in cancer rehabilitation is crucial for improving patient outcomes, but it presents significant challenges when services are spread across different locations. Nicole et al. highlight the importance of proactive functional screening and assessment in bridging oncology and rehabilitation systems. They advocate for cancer patient navigators to coordinate care, ensuring timely referrals to rehabilitation services. This model involves interdisciplinary collaboration to address diverse patient needs through a coordinated effort. Overall, cancer rehabilitation can be a challenging process. It is important for individuals to work closely with their healthcare team and to seek support from family, friends, and support groups as needed. Early and seamless integration of rehabilitation services with standard oncology care remains a challenge around the globe and particularly in the Low- and Middle-Income Countries (LMIC).[25] Patients are usually discharged home without a referral to the rehabilitation medicine physician or addressing their needs to improve their functioning and mobility. This is often complicated by the fact that the patients based in the LMIC have usually exhausted their out-of-pocket finances by the time curative cancer care is completed.

Cancer rehabilitation encompasses various management options tailored to individual needs, including physical therapy, occupational therapy, psychological support, speech therapy, lymphedema therapy, prosthetics and orthotics, and nutritional support. Physical therapy focuses on enhancing strength, mobility, and managing side effects like fatigue and lymphedema, especially in breast cancer survivors. Occupational therapy aids in resuming daily activities and adapting home environments, while psychological support addresses emotional challenges such as anxiety and depression. Speech therapy is crucial for addressing swallowing difficulties, particularly in head and neck cancers. Lymphedema therapy involves managing swelling through exercises, compression, and manual lymphatic drainage.[26]

Prosthetics and orthotics assist in regaining functionality after the loss of body parts, and nutritional support ensures adequate health and strength maintenance. The choice of interventions depends on the individual's specific needs and rehabilitation goals. It is important to work closely with a cancer rehabilitation team to determine the most appropriate interventions for an individual's unique situation. The specific steps of cancer rehabilitation will depend on the individual's needs and goals and may be modified as their condition changes.

To summarize, we may say that cancer rehabilitation is a collaborative process and may involve a range of healthcare professionals, including rehabilitation medicine physicians, nurses, physical therapists, occupational therapists, psychologists and other rehabilitation professionals, to provide comprehensive and tailored support for each patient's recovery journey.

Limitations

This review has several limitations that should be considered when interpreting its findings. First, the literature search was limited to only two databases, potentially missing relevant studies indexed elsewhere. Second, no formal quality assessment of the included articles was conducted, which may introduce bias in the interpretation and synthesis of the findings. Third, some potentially relevant articles were excluded due to being behind paywalls, limiting the comprehensiveness of the review. Additionally, this review only included articles published in English, which may have led to language bias and the omission of research published in other languages. As a descriptive review, it lacks the systematic and comprehensive approach of a systematic review or meta-analysis, potentially introducing subjectivity in the selection and interpretation of studies. The absence of a formal assessment of the quality of included articles further limits the ability to weigh the strength of evidence presented in the review. These limitations highlight the need for caution when generalizing the findings and underscore the importance of conducting more comprehensive, systematic reviews on this topic in the future.

Conclusion

While cancer rehabilitation offers considerable benefits in enhancing the quality of life and functional outcomes for cancer patients, addressing the identified challenges is essential for its widespread implementation and effectiveness. This includes improving accessibility to services, integrating psychological support, and ensuring effective coordination of care. Future research and policy efforts should focus on overcoming these barriers to make cancer rehabilitation services more universally accessible and effective, ultimately supporting better patient outcomes across various cancer types and stages.

Conflict of Interest: The authors declare no conflict of interest.

Author contributions: FAR contributed in conception, design, literature search and writing the initial draft; SA did literature search and writing the final draft HMM did literature search and writing the final draft. All authors approve the final draft of the manuscript and take responsibility for the contents of the article.

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