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From Diagnosis to Recovery: The Life-Changing Benefits of Exercise for Cancer Patients

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Abstract
Physical activity has emerged as a crucial component in the comprehensive care of oncological patients, offering significant benefits across the cancer continuum - from prevention to treatment, recovery, and survivorship. This article provides an in-depth exploration of the role of exercise in cancer care, highlighting its potential to improve physical function, reduce treatment-related side effects, enhance mental well-being, and improve overall quality of life. Epidemiological evidence supports the protective effect of regular physical activity in reducing the risk of developing certain cancers, such as breast, colorectal, and endometrial cancer, through mechanisms like hormonal regulation, inflammation reduction, and immune function enhancement. During active cancer treatment, exercise helps combat common side effects such as fatigue, muscle wasting, and cardiovascular decline, while also offering psychological benefits like reduced anxiety and depression. Tailored exercise programs, developed in collaboration with healthcare professionals, are essential for addressing the unique needs of cancer patients, considering factors like cancer type, treatment stage, and comorbidities. Post-treatment, physical activity continues to play a vital role in rehabilitation, reducing the risk of recurrence, and supporting long-term survivorship. Despite the clear benefits, barriers such as physical limitations, psychological distress, and lack of access to resources can hinder patients' ability to engage in regular exercise. Addressing these challenges through personalized care plans, patient education, and supportive interventions is crucial. As research in exercise oncology advances, integrating physical activity into routine cancer care holds promise for improving outcomes and enhancing the overall well-being of cancer patients.

Keywords: Physical activity, oncological treatment, cancer, physical activity after oncological treatment, physical activity barriers

Introduction

Physical activity is crucial for the management and well-being of oncological patients. Research has consistently shown that engaging in exercise before, during, and after cancer treatment can lead to significant improvements in cancer-related fatigue, physical function, and quality of life [1]. Exercise offers a wide range of benefits for cancer patients, serving as neoadjuvant or adjuvant therapy and aiding in symptom control during and after primary treatments like radiotherapy, chemotherapy, and hormone therapy [2]. In geriatric oncology, exercise is emphasized to help older adults with cancer maintain or enhance their function, underscoring the importance of healthcare providers discussing the short- and long-term advantages of physical activity with their patients [3]. The timing of exercise concerning cancer treatment has garnered interest, with studies suggesting potential benefits to timed exercise in cancer treatment, paving the way for further research in chronobiology and exercise medicine in oncology [4]. Despite the known benefits, there is a lack of awareness among patients and healthcare providers regarding exercise recommendations, timing, and referrals to exercise programs for cancer patients [5]. Understanding patient and provider perceptions about exercise in cancer care is crucial, with a significant percentage of patients preferring home-based exercise programs provided by their oncologists [6].

Guidelines from reputable sources like the American Society of Clinical Oncology (ASCO) and the American College of Sports Medicine (ACSM) support efforts to promote exercise in oncological settings, offering essential guidance for oncology clinicians and exercise professionals [7]. Tailoring exercise promotion strategies to specific patient populations, such as survivors of head and neck cancers, is essential. Existing exercise guidelines and strategies need to be reviewed to effectively promote physical activity in these unique patient groups [8]. Prehabilitation through exercise has shown promise in supporting recovery from major cancer surgeries, with evidence indicating its benefits in reducing postoperative complications and overall morbidity in various surgical settings [9]. Healthcare professionals, particularly oncologists, play a significant role in encouraging exercise among cancer patients. Studies have demonstrated that oncologists often recommend exercise to their patients based on beliefs in its benefits for daily tasks, mental health improvement, and mitigating physical decline from treatments [10]. However, barriers to exercise participation exist, particularly among patients with established cancer cachexia who may lack motivation and self-efficacy for structured exercise programs [11]. Understanding patient perspectives on exercise is crucial, especially in advanced cancer and cachexia cases, where qualitative studies have highlighted motivators, barriers, and preferences related to physical activity [12]. In the realm of cancer survivorship, integrating exercise programs into clinical and community care has shown positive effects on physical functioning and quality of life in cancer survivors. This has led to the development of exercise guidelines tailored specifically for this population [13]. Adherence to exercise interventions during and after cancer treatment remains a challenge, with systematic reviews identifying predictors of adherence that can inform strategies to enhance patient compliance with exercise programs [14]. Exploring how exercise discussions are facilitated, such as through web-based forums, can provide valuable insights into supporting cancer survivors in maintaining active lifestyles [15]. Taking everything into consideration, physical activity is a multifaceted and essential component of oncological care, crucial for improving outcomes and quality of life for cancer patients. From promoting exercise before and after treatment to understanding patient and provider perceptions, addressing barriers to exercise participation, and tailoring interventions to specific patient populations, integrating exercise medicine into cancer management is paramount. By leveraging existing evidence and guidelines, healthcare professionals can effectively promote and support physical activity in oncological patients, contributing to better overall health and well-being in the cancer care continuum.

Purpose

The present article aims to review and analyze the existing literature on the relationship between physical activity and oncological patients.

Materials and methods

The review was based on the analysis of materials collected in the „Pubmed", Google Scholar, ResearchGate databases, books and other scientific articles. The search was performed using the keywords: oncological treatment, physical activity, cancer prevention, physical activity during oncological treatment, physical activity after oncological treatment

Understanding Cancer and Its Impact on Patients

Understanding cancer and its impact on patients is a multifaceted endeavor that encompasses various dimensions of physical, emotional, and social well-being. Cancer patients often face a myriad of challenges, both from the disease itself and the treatments they undergo. Patient-reported outcomes (PROs) play a crucial role in providing insights into the holistic impact of cancer care on individuals, shedding light on aspects such as fatigue, stress, pain, and psychological well-being [16]. These outcomes are essential for healthcare providers to tailor interventions that address the specific needs and experiences of cancer patients, recognizing the diverse ways in which cancer can affect their lives [16]. The physical toll of cancer and its treatments is significant, with conditions like cachexia, sarcopenia, and changes in body mass index (BMI) posing challenges for patients, particularly those undergoing complex treatments like cytoreductive surgery and hyperthermic intraperitoneal chemotherapy [17]. Research has also delved into the "obesity paradox," where obesity, in some cases, has been shown to have a protective effect in cancer, highlighting the intricate relationship between body composition and cancer outcomes [17]. Moreover, the experience of cancer pain, often a debilitating aspect of the disease, can have profound implications for the quality of life of patients and their caregivers, emphasizing the need for comprehensive pain management strategies [18]. Beyond the physical aspects, cancer exerts a substantial emotional and psychosocial impact on patients. Studies have explored the psychosocial dimensions of cancer, including its effects on human sexuality, anxiety, depression, and coping mechanisms [19]. The bio-psycho-social impact of cancer is evident in how it can disrupt not only physical health but also emotional well-being and social relationships, underscoring the importance of addressing the holistic needs of cancer patients [19]. Additionally, understanding the psychosocial impact of cancer on family caregivers is crucial, as they often take on various roles and responsibilities to support their loved ones through the cancer journey [20]. Cancer diagnosis and treatment can also have implications for patients' social support networks and decision-making processes. Validated tools like the Multidimensional Scale of Perceived Social Support (MSPSS) are instrumental in assessing the impact of social support on cancer patients, highlighting the significance of interpersonal relationships in coping with the challenges of cancer [21]. Furthermore, patient-clinician communication plays a pivotal role in cancer care outcomes, with effective communication being essential for shared decision-making, symptom management, and overall patient well-being [22]. Enhancing communication strategies and utilizing patient-generated health data can improve patient perceptions of their care and functional status, fostering a collaborative approach to cancer management [22]. The impact of cancer extends beyond the individual patient to their families and caregivers, who often shoulder the emotional and practical burdens of cancer care. Studies have explored the experiences of family caregivers, highlighting the challenges they face in supporting their loved ones through cancer diagnosis, treatment, and survivorship [20]. Moreover, understanding the financial implications of cancer care is crucial, as treatments can be costly and place a significant burden on patients and their families, emphasizing the need for personalized interventions and support mechanisms [23]. Additionally, the socioeconomic status of cancer survivors and their families can influence the financial stress associated with medical costs, further underscoring the importance of addressing economic disparities in cancer care [24].

In the context of the COVID-19 pandemic, the landscape of cancer care has undergone significant changes, with implications for treatment delivery, outcomes, and patient experiences. Studies have explored the impact of the pandemic on cancer recurrence, treatment decisions, and clinical outcomes, highlighting the need for adaptive strategies to ensure continuity of care and support for cancer patients during public health crises [25]. The pandemic has also underscored the importance of early palliative care interventions for advanced cancer patients, emphasizing the need for comprehensive support systems to address the physical, emotional, and social needs of individuals facing terminal illness [26]. In conclusion, understanding cancer and its impact on patients requires a comprehensive approach that considers the physical, emotional, social, and financial dimensions of the disease. Patient-reported outcomes, psychosocial support, effective communication, and personalized interventions are essential components of holistic cancer care. By addressing the diverse needs of cancer patients, their families, and caregivers, healthcare providers can enhance the quality of care and support throughout the cancer journey, promoting better outcomes and improved quality of life for those affected by cancer.

The Role of Physical Activity in Cancer Prevention

Physical activity plays a crucial role in cancer prevention, treatment, and overall management. Research has shown that engaging in regular exercise and structured physical activity can have significant benefits in preventing cancer [27]. Exercise interventions not only aid in preventing cancer but also play a vital role in managing treatment-related side effects and improving the rehabilitation of cancer patients [28]. Physical activity during and after cancer treatment has been found to help with symptom management and reduce the risk of cancer recurrence [6]. Epidemiological studies have highlighted the importance of dietary habits and aerobic exercise in preventing various cancers, including prostate cancer [29]. Moreover, physical exercise has been identified as an efficient strategy for cardio-oncology preventive care, as it can mitigate cardio-toxicity and adverse effects of chemotherapy such as lymphedema, fatigue, and immunological disorders [30]. Exercise is not only beneficial for specific types of cancer but has a broader impact, as seen in studies focusing on reducing the risk of oral cancer through regular physical activity [31]. The literature is replete with evidence supporting the positive effects of exercise in individuals diagnosed with cancer, leading to the development of international guidelines advocating for the integration of exercise programs into cancer care [13]. In the context of prostate cancer, physical activity has been shown to reduce systemic inflammatory mediators, offering a cost-effective means of counteracting the proinflammatory effects of obesity in cancer patients [32]. Exercise across the cancer care continuum has been found to be effective in alleviating various treatment-related adverse effects, enhancing quality of life, physical function, sleep, and bone health among cancer survivors [33]. Studies have underscored the importance of muscle strength, aerobic capacity, and body balance through optimal exercise for cancer patients and survivors to improve overall body function and health [34]. Furthermore, the benefits of exercise extend to individuals living with and surviving cancer, with scientific evidence supporting the practice of physical activity tailored to the individual's clinical status for optimal benefits without significant side effects [35].

Recognizing the significance of exercise, guidelines have been developed to support cancer patients, with recommendations for engaging in regular physical activity, including aerobic and strength training, to aid in recovery from major cancer surgeries [9]. Exercise is considered a key modality in cancer rehabilitation, emphasizing its role in enhancing the overall well-being of individuals affected by cancer [36]. Studies have also explored the molecular mechanisms underlying the benefits of exercise in preventing and ameliorating various diseases, including cancer, by targeting specific pathways involved in disease progression [37]. Exercise has been shown to suppress cancer growth through specific pathways, highlighting its potential as a preventive measure against carcinogenesis [38]. Additionally, exercise has been found to inhibit age-related inflammation, liver steatosis, senescence, and tumorigenesis, underscoring its role in mitigating various aspects of cancer development and progression [39]. To summarize, the role of physical activity in cancer prevention is well-established, with numerous studies highlighting its preventive, therapeutic, and rehabilitative benefits across various types of cancer. Engaging in regular exercise not only aids in preventing cancer but also plays a crucial role in managing treatment-related side effects, improving quality of life, and enhancing overall well-being in individuals affected by cancer. The evidence supporting the positive impact of exercise on cancer underscores the importance of integrating physical activity programs into cancer care to optimize patient outcomes.

Physical Activity During Cancer Treatment

Physical activity during cancer treatment is a crucial component that can positively impact patient outcomes. Engaging in physical activity during and after cancer treatment has been shown to help with symptom management and reduce the risk of cancer recurrence [6]. Studies have indicated that a significant percentage of survivors, such as colorectal and breast cancer survivors, participate in regular physical activity during treatment, emphasizing the importance and feasibility of exercise interventions [10]. The Clinical Oncology Society of Australia (COSA) has recognized the importance of exercise in cancer care, advocating for its integration as part of standard practice to counteract the adverse effects of cancer and its treatment [40]. Exercise interventions during and after cancer treatments have been found to result in improvements in physical functioning, cancer-related symptoms, and quality of life [34]. A systematic review of exercise interventions in the cancer literature has further supported the benefits of exercise before, during, and after cancer treatment across various cancer types [41]. Research has shown that exercise is safe and feasible during and after cancer treatments, leading to improvements in health-related fitness, quality of life, and overall well-being for survivors [13]. Exercise has been identified as a valuable strategy for managing treatment-related side effects, improving physical and emotional health, and enhancing the overall quality of life for cancer patients undergoing treatment [31]. Moreover, exercise interventions have been associated with mitigating the known effects of cancer treatments, including fatigue, muscle wasting, and cardiorespiratory issues [42]. Overall, physical activity during cancer treatment plays a crucial role in symptom management, improving quality of life, and enhancing overall well-being for cancer patients. Integrating exercise as part of standard cancer care has been shown to have numerous benefits.

The evidence supports the safety, feasibility, and effectiveness of exercise interventions during and after cancer treatments, emphasizing the importance of promoting physical activity as an integral component of comprehensive cancer care.

Cancer Post-Treatment Physical Activity

Physical activity plays a crucial role in the post-treatment phase for cancer survivors. Research indicates that engaging in regular physical activity can lead to various benefits for cancer survivors, including improved physical function, reduced anxiety and depression, decreased risk of cancer recurrence, enhanced quality of life, and better overall physical and mental health [43-46]. Studies have shown that physical activity can increase strength, self-esteem, and quality of life while reducing negative treatment-related side effects, fatigue, anxiety, and mortality [44, 47]. Moreover, physical activity has been associated with improvements in prognosis and quality of life among cancer survivors [47, 48]. While there is a lack of completed randomized controlled trials specifically confirming the mortality risk reduction among colorectal cancer survivors through physical activity, evidence suggests that structured exercise is safe and beneficial for these individuals, improving cardiorespiratory fitness and physical function [49]. Additionally, guidelines recommend that cancer survivors engage in at least 150 minutes of moderate to vigorous physical activity per week to reap the benefits of physical activity [50]. It is essential to promote physical activity among cancer survivors, especially during the transition period after treatment completion, to establish healthy habits and improve overall well-being [51]. Various interventions, such as community-based programs, dyadic-based interventions, and lifestyle physical activity group interventions, have been developed to increase physical activity levels among cancer survivors and enhance their quality of life [52 - 54]. These programs aim to address the unique challenges faced by cancer survivors and provide support for maintaining an active lifestyle. To conclude, the evidence strongly supports the importance of physical activity in the post-treatment phase for cancer survivors. Encouraging regular physical activity not only improves physical health outcomes but also positively impacts mental well-being, quality of life, and overall prognosis for individuals who have undergone cancer treatment.

Barriers and Challenges to Physical Activity in Cancer Patients

Physical activity is essential for the well-being of cancer patients; however, there are numerous barriers that hinder their participation in physical exercise. Studies have identified common obstacles faced by cancer patients, including the lack of referral to exercise professionals within the cancer care team, fear of injury post-surgery and during treatment, treatment-related side effects, healthcare providers' insufficient knowledge about exercise benefits, awareness of available programs, time constraints, and safety concerns [55 - 57]. Healthcare professionals also encounter challenges in promoting physical activity due to inadequate training opportunities, limited knowledge about exercise prescription for cancer survivors, time constraints, and resource limitations [58]. Furthermore, cancer survivors themselves face barriers such as illness, joint stiffness, pain, weakness, fatigue, late effects of cancer treatment, lack of motivation, and lack of time, which hinder their engagement in physical activity [57, 59].

Additionally, factors like inconvenient program schedules, inadequate capacity, lack of information, and poor communication between healthcare providers can impede the implementation of physical activity programs for cancer patients [60]. Moreover, the belief that exercise may not be beneficial during treatment side effects due to insufficient patient education is another significant barrier [43]. The challenges and barriers to physical activity in cancer patients are multifaceted. Addressing these obstacles necessitates a comprehensive approach involving educating healthcare professionals, improving access to exercise programs, enhancing communication between healthcare providers, and providing adequate support and resources to cancer patients. By understanding and addressing these barriers, healthcare providers can effectively promote physical activity among cancer patients, ultimately enhancing their quality of life and overall health outcomes.

Discussion

Physical activity is a crucial component in the comprehensive care of oncological patients. Research consistently demonstrates that engaging in regular physical activity can lead to improved patient-reported outcomes, physiological benefits, and overall prognosis during and after cancer therapy [61]. National guidelines recommend physical activity for cancer patients to reduce cancer-related fatigue, maintain quality of life, physical function, and enhance survival rates [62]. The benefits of physical activity for cancer patients are extensive, including reduced anxiety, fewer depressive symptoms, improved quality of life, and enhanced physical function [63]. Despite the advantages of physical activity, barriers exist that hinder its implementation among cancer patients. Studies have identified obstacles such as lack of communication between oncology providers and patients regarding physical activity, treatment-related side effects, fear of injury, and inadequate knowledge among healthcare professionals about exercise benefits [43, 64, 65]. Additionally, environmental constraints within hospitals can impact the physical activity levels of cancer patients, highlighting the importance of improving the hospital environment to promote physical activities crucial for cancer recovery and prevention of recurrence [66]. Efforts to integrate physical activity promotion into routine cancer care are essential to enhance the physical and mental health of individuals diagnosed with cancer [67, 68]. Healthcare professionals play a vital role in promoting physical activity among cancer patients, and studies have shown that providing education on the benefits of physical activity and evidence-based interventions can facilitate discussions about physical activity within routine cancer care [69, 70]. Moreover, the development of personalized physical activity programs, mobile apps, and activity trackers has shown promise in improving physical activity levels and quality of life in cancer patients, including those with metastatic breast cancer [71, 72]. In summary, by addressing barriers, improving communication between healthcare providers and patients, and implementing personalized physical activity interventions, healthcare professionals can optimize patient outcomes, enhance quality of life, and contribute to better overall prognosis for individuals undergoing cancer treatment.

Conclusion

Physical activity plays a transformative role in the care and management of oncological patients, offering a wide array of benefits that extend beyond physical health to encompass mental well-being, social engagement, and overall quality of life. From prevention through survivorship, exercise is a powerful tool that can mitigate the adverse effects of cancer and its treatments, improve physical function, and enhance emotional resilience. The evidence supporting the integration of physical activity into cancer care is compelling. Regular exercise has been shown to reduce the risk of developing certain cancers, alleviate treatment-related side effects like fatigue and muscle wasting, and improve cardiovascular health. Furthermore, physical activity can enhance mental health by reducing anxiety, depression, and stress, while also fostering a sense of empowerment and control over one's health. However, the implementation of exercise programs for cancer patients must be carefully tailored to each individual’s unique needs, taking into account their type of cancer, treatment stage, and any comorbidities. Collaboration between oncologists, physical therapists, and exercise specialists is essential to ensure that patients receive safe, effective, and personalized exercise guidance. Despite the many benefits, challenges such as physical limitations, psychological barriers, and lack of access to resources must be addressed to make physical activity more accessible to all cancer patients. Strategies to overcome these challenges include patient education, supportive interventions, and the development of community-based exercise programs. As the field of exercise oncology continues to evolve, it is clear that physical activity should be an integral part of cancer care. Ongoing research, coupled with innovations in personalized medicine and technology, will likely further enhance our understanding of how exercise can be optimized for cancer patients. By embracing physical activity as a cornerstone of cancer treatment and survivorship, healthcare providers can help patients achieve better outcomes, improved quality of life, and greater long-term well-being.

Author's contribution

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