Available online at www.ijmrhs.com

ISSN No: 2319-5886

International Journal of Medical Research and Health Sciences, 2025, 14 (3): 1-12

The Effect of Exercise Stress and Activity on Cancer Recovery and Treatment Results

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Received: 11-April-2024, Manuscript No. IJMRHS-24-132105; **Editor assigned:** 15-April-2024, PreQC No. IJMRHS-24-132105 (PQ); **Reviewed:** 30-April-2024, QC No. IJMRHS-24-132105; **Revised:** 13-May-2025, Manuscript No. IJMRHS-24-132105 (R); **Published:** 20-May-2025

ABSTRACT

This study investigates the impact of stress and exercise activity on the recovery process and treatment results for cancer patients. This study aimed to assess the positive contribution of exercise activity to recovery and the potential negative effects of excessive and unplanned physical stress on the physical and psychological health of patients.

The research findings highlight the important role of exercise activity in the recovery phase of cancer patients. Regular exercise has been shown to improve physical strength and reduce treatment related side effects, contributing to an overall improvement in health. Participation in exercise activity during and after cancer treatment has been shown to improve patients' energy levels and quality of life.

However, the study also revealed the potential harm caused by excessive and unplanned physical stress Patients who engaged in intense physical activity without proper guidance experienced increased physical fatigue, longer recovery periods and increased treatment side effects in addition, these individuals reported higher levels of psychological distress, including anxiety and depression.

The research study emphasizes the importance of stress management techniques and the development of individual exercise plans for cancer patients. Therefore, the study made recommendations for stress management interventions, such as meditation and awareness-based stress reduction, to support the mental health of patients. Health care professionals were urged to create personalized exercise plans that take into account each patient's unique situation, treatment system, physical abilities and preferences.

Keywords: Physical activity, Stress, Exercise therapy, Physical fitness, Cancer

INTRODUCTION

Statement of the problem

Cancer continues to pose a major threat to individuals around the world, causing enormous physical, emotional, social and economic burdens. According to World Health Organization statistics, cancer is one of the leading causes of death globally, being responsible for approximately 9.6 million deaths in 2018 alone. Effective cancer recovery and treatment results are of paramount importance in combating this disease and improving patient prognosis. While the harmful effects of stress on health have been extensively studied, the relationship between stress, exercise activity and cancer recovery remains relatively unexplored. On the one hand, athletic activity has been associated with many health benefits, including improved fitness, enhanced immune function, and reduced psychological distress. On the other hand, stress, especially chronic stress, has been shown to negatively affect immune function and general well-being, which may hinder the recovery process in cancer patients [1].

Understanding the relationship between physical stress, such as stress from exercise activity and cancer recovery is critical for developing targeted interventions that can improve treatment results. However, there is limited research specifically looking at the impact of minimal stress and athletic activity on cancer recovery and subsequent improvement in treatment results.

Therefore, the research problem in this study is to explore the relationship between minimal stress and athletic activity on cancer recovery and treatment results. By investigating this relationship, we can identify the potential benefits and risks associated with exercise activity in cancer patients, as well as determine the optimal level of physical stress that can support recovery while minimizing any negative effects. This research aims to bridge the current knowledge gap, provide valuable insights into the role of stress and exercise activity in cancer recovery and guide the development of evidence-based interventions to enhance treatment results [2].

LITERATURE REVIEW

The importance of the study

- **Knowledge development:** Research on the impact of stress and exercise activity on cancer recovery and treatment results contributes to the scientific understanding of complex interactions between psychological factors, physical activity and cancer results. It provides valuable insights into the underlying mechanisms and pathways through which stress and athletic activity affect recovery, leading to a deeper understanding of cancer biology and response to treatment [3].
- **Determining optimal stress levels:** This research helps determine optimal stress levels that may facilitate cancer recovery. By investigating the impact of different stress levels, including minimal stress; researchers can determine the range at which stress promotes positive results while avoiding potential negative effects. This knowledge can inform the development of targeted interventions and strategies designed to individual patients' stress levels.
- **Enhancing treatment effectiveness:** Understanding the impact of stress and exercise activity on cancer recovery can enhance treatment effectiveness. By demonstrating the impact of these factors on treatment results, researchers can identify strategies to improve treatment response and improve patient diagnosis.
- **Precision medicine informing:** Research into the emerging field of precision medicine can contribute by providing insight into how individual differences in stress levels and athletic activity affect cancer recovery. This knowledge can help healthcare professionals design treatment plans based on patients' specific needs, including stress levels, physical abilities and treatment regimens, leading to more personalized and effective care.
- **Guidance for future research:** Research on stress and athletic activity in cancer recovery serves as a basis for future studies. It identifies gaps in knowledge and highlights areas that require further exploration and this can inspire researchers to conduct more focused studies, leading to a better understanding of the complex interactions between stress, physical activity and cancer recovery, ultimately leading to the development of the field of oncology.

Applied importance

- **Improve patient care:** Search results can be translated into practical applications to improve patient care. By understanding the impact of stress and exercise activity on recovery, health care providers can develop evidence-based interventions and recommendations for cancer patients that may include prescribing exercise programs, stress management techniques, and lifestyle adjustments to improve overall health and treatment results.
- **Patient empowerment:** Research empowers cancer patients by providing them with knowledge about the potential benefits of exercise activity and reducing stress in their recovery process. Educating patients about the positive impact of physical activity and stress management can motivate them to actively participate in their treatment journey, leading to improved commitment and overall patient satisfaction.
- **Informing survival programs:** Research findings can inform survival programs designed to support individuals after they complete cancer treatment. By incorporating elements of stress management and exercise into these programs, health care providers can help survivors maintain a healthy lifestyle, manage stress, and reduce the risk of cancer recurrence, ultimately improving long term results and quality of life.
- **Public health initiatives:** The research has implications for public health initiatives that aim to promote physical activity and reduce stress in cancer patients. By raising awareness of the benefits of exercise activities and stress management, policymakers can develop strategies to facilitate access to appropriate resources, such as exercise facilities, counseling services, and community support programs, to help individuals successfully navigate the cancer journey.

Objectives of the study

- Check the relationship between stress levels and cancer recovery results.
- Study the impact of exercise activity on cancer recovery and treatment results.
- Determine the optimal level of physical stress that promotes cancer healing.
- Assess the impact of stress and athletic activity on treatment response and overall diagnosis.
- Recognize potential mechanisms by which stress and sporting activity af fect cancer healing.
- Investigate the effects of different types and intensities of exercise activity on cancer recovery.
- Assess the impact of stress and exercise activity on the quality of life and mental health of cancer patients.
- Provide evidence based recommendations to healthcare providers regarding the integration of stress management and exercise activity into cancer treatment plans.

Study questions

- How does stress affect cancer recovery and treatment results in individuals?
- What is the relationship between exercise activity and cancer recovery in terms of treatment response and overall diagnosis?
- Does the level of stress experienced by cancer patients affect the course of their recovery and the results of their treatment?
- How does exercise activity affect the mental health and quality of life of cancer patients during and after treatment?
- What are the possible mechanisms by which stress and sporting activity affect cancer recovery and treatment results?
- Can stress management techniques, such as relaxation or counseling images, enhance treatment results and improve the chances of recovery in cancer patients?
- What are the effects of different exercise activities and intensity on cancer recovery and treatment results?
- How do stress levels and athletic activity interact to affect the physical and mental health of cancer survivors?

The CT descriptive scanning method was used to assess the impact of stress and exercise activity on cancer recovery and treatment results. This design allows data to be collected at a specific time, providing a quick overview of participants' stress levels, exercise activity patterns and their relationship to recovery and treatment results [4].

Cancer survivors were also included, as a sample of 50 participants was selected from various health care centers and hospitals. The inclusion criteria included individuals who completed cancer treatment and were declared cancer free.

The relationship between chronic physical stress and cancer

Cancer is a multifaceted disease that arises from a combination of genetic, environmental and lifestyle factors. Over the years, researchers have investigated various potential risk factors, including chronic physical stress. While stress is a part of everyday life, chronic stress, characterized by long-term exposure to stressors, has drawn attention for its potential impact on cancer progression and development [5].

Chronic physical stress refers to prolonged exposure to physical stressors that can disrupt the body's balance and can range from repeated physical exertion to exposure to environmental toxins and radiation. Chronic stress triggers a series of physiological responses, including the release of stress hormones such as cortisol and adrenaline, which can have diverse effects on different body systems and one important aspect of chronic stress is its potential impact on immune function. Chronic stress has been shown to impair immune responses, leading to decreased immune surveillance and increased susceptibility to infections and diseases, including cancer stress induced changes in immune function may contribute to cancer development by impairing the body's ability to detect and eliminate malignant cells.

Chronic stress can also contribute to the promotion of chronic inflammation and oxidative stress, which are known to be major factors in the development of cancer. Prolonged exposure to stress hormones and pro-inflammatory media can disrupt the delicate balance within the body, leading to chronic inflammation and increased production of reactive oxygen species. These processes can lead to DNA damage, genetic mutations and cellular dysfunction, which may fuel the initiation and development of cancer. To understand the relationship between chronic physical stress and cancer, many epidemiological studies have been conducted to explore various factors associated with stress and cancer outcomes. Many studies have investigated the relationship between occupational stress and cancer risk. For example, an analysis of 12 cohort studies found that high job stress, characterized by high work demands and low decision-making range, was associated with an increased risk of colorectal cancer and another meta-analysis of 16 studies reported a positive relationship between work stress and breast cancer risk among women.

Stressful life events, such as the loss of a loved one or a traumatic experience, also have a role in cancer risk. A systematic review and analysis of 165 studies showed a modest but statistically significant correlation between stressful life events and an increased risk of cancer, especially for breast, colorectal, and lung cancers.

However, the exact mechanisms behind this relationship are still unclear and require further investigation and telomeres, the protective structures at the ends of chromosomes, play a crucial role in maintaining genetic stability Chronic stress may accelerate cell aging by shortening telomeres, which is associated with an increased risk of cancer Analysis of 24 studies revealed a significant association between short telomere length and increased cancer incidence and mortality. However, more research is needed to clarify the exact relationship between chronic stress, telomere length and cancer.

Several animal studies have shown that chronic stress can promote tumor growth and spread. For example, mice exposed to chronic stressors such as physical restriction have shown an increase in tumor growth and metastasis in various cancer models. These results suggest that chronic stress may affect the microenvironment of the tumor and enhance the aggressiveness of cancer cells. Animal studies have also shed light on the biological mechanisms that link chronic stress to tumor development. Stress hormones, such as cortisol and adrenaline, can directly affect cancer cells and their microenvironment, promoting angiogenesis, immune evasion and resistance to cell death. In addition, chronic inflammation caused by stress and oxidative stress can create a favorable environment for tumor growth and spread.

While chronic physical stress may have adverse effects on cancer risk and development, physical activity has emerged as a potential protective factor, epidemiological studies consistently demonstrate that regular physical activity is associated with a reduced risk of many cancers, including breast, colon, endometrial, kidney, bladder, esophagus and stomach cancers. Physical activity has been shown to modify various pathways associated with cancer, such as reducing inflammation, improving immune function, enhancing DNA repair mechanisms, and regulating hormone levels. Physical activity before and after cancer diagnosis has also been linked to the observed improved survival outcomes. The analysis of 27 studies indicated that higher levels of athletic activity were associated with a lower risk of all-cause mortality among breast cancer survivors. Similarly, colorectal cancer

patients who engaged in regular physical activity after diagnosis showed an improvement in survival compared to their inactive counterparts [6].

Benefits of exercise for cancer patients

Regular exercise has been shown to provide various physical benefits to cancer patients, enhancing their overall health and mitigating the side effects of cancer treatment. Exercise can help cancer patients maintain or improve their physical functions, including cardiovascular fitness, muscle strength, endurance and flexibility. Studies have consistently shown that exercise interventions lead to significant improvements in measures of physical performance among cancer patients. Exercise has been found to relieve many of the side effects associated with treatment, including fatigue, nausea, pain and sleep disorders. A systematic review and analysis of 56 studies showed that exercise interventions were effective in reducing cancer-related fatigue, which is a common and debilitating symptom experienced by cancer patients. Exercise has also been shown to have positive effects on the immune system, which plays a crucial role in monitoring cancer and defending against infection. Research indicates that exercise can enhance immune function in cancer patients, which may improve their ability to fight disease and recover from treatment related complications [7].

In addition to physical benefits, exercise has a profound impact on the mental health of cancer patients, helping to manage emotional disorders and improve the overall quality of life. Exercise has been shown to be effective in reducing symptoms of anxiety and depression in cancer patients. The analysis of 22 studies reported that exercise interventions led to a significant decrease in anxiety and depression, highlighting the possibility of exercise as a non-pharmacological approach to managing psychological distress. Regular exercise has been linked to improved mood and emotional well-being in cancer patients. Exercise boosts the release of endorphins, also known as “feel-good” hormones, which can help relieve feelings of sadness, stress and anxiety.

Cancer treatment can also have a significant impact on body image and self-esteem. Exercise interventions that focus on improving body composition, strength and physical appearance have been shown to enhance self-esteem and body image in cancer patients. Exercise has been increasingly recognized for its potential impact on treatment outcomes and survival among cancer patients. Research indicates that regular exercise can improve treatment tolerance by reducing treatment-related side effects, enhancing physical performance and improving overall health. It has been proven that exercise interventions help patients adhere to treatment protocols and complete prescribed treatment cycles [8].

Exercise interventions have been consistently linked to improved quality of life among cancer patients. An analysis of 34 studies showed that exercise interventions led to significant improvements in overall quality of life, physical performance and emotional well-being. Emerging evidence suggests that exercise may have a positive impact on cancer survival outcomes. Several studies have reported associations between higher levels of physical activity and improved survival rates among different cancers, including breast, colorectal and prostate cancers.

Developing and implementing exercise programs that are designed to the specific needs and abilities of cancer patients is essential to maximize the benefits of exercise. Exercise programs for cancer patients often include a multidisciplinary approach, including input from oncologists, exercise specialists, physical therapists and other healthcare professionals. This collaborative effort ensures that exercise programs are safe, appropriate, and designed to individual patient needs. Exercise programs must be individualized, taking into account factors such as cancer type, stage of treatment, fitness and personal preferences. Individual exercise recipes can help improve the benefits of exercise while reducing the risk of injury or overstrain.

Cancer patients must obtain medical clearance from health care providers before starting an exercise program This is especially important for patients with a complex medical history or those undergoing intensive treatments, exercise programs must start with an appropriate intensity and progress gradually to avoid excessive stress or injury. The principle of personalization should guide the intensity, duration and frequency of exercise sessions and careful monitoring and supervision by qualified healthcare professionals, exercise specialists or physical therapists can help ensure proper form, technique and safety during exercise sessions [9].

The relationship between stress levels and the course of recovery

Cancer is a devastating disease that affects millions of individuals worldwide. Along with traditional treatments such as surgery, chemotherapy and radiotherapy, managing physical stress is critical to the overall wellbeing and recovery

of cancer patients. Physical stress refers to the physiological and psychological stress experienced by the body due to various factors such as illness, treatment side effects, pain, fatigue and emotional distress. These stressors can significantly affect the course of cancer patients' recovery and several studies have shown that high levels of physical stress can negatively affect cancer patients' ability to tolerate treatment. For example, a study published in the journal of clinical oncology found that high levels of distress were associated with increased treatment-related toxicity and decreased adherence to treatment in breast cancer patients, as cancer patients often experience impaired immune function due to the disease itself and the treatments they undergo.

Physical stress weakens the immune system, making patients more susceptible to infections and delaying their recovery. A study published in the Journal of Psychosomatic Research revealed that stress-induced immunosuppression was associated with lower cancer outcomes and increased mortality rates. Physical stress can have a profound impact on the quality of life of cancer patients during and after treatment. Pain, fatigue, sleep disturbances and reduced physical performance are common symptoms experienced by patients undergoing cancer treatment. These symptoms not only hinder daily activities, but also contribute to mental disorder and reduce overall health. Given the significant impact of physical stress on cancer patients' recovery, effective stress management strategies are essential. Research has shown that interventions such as exercise, relaxation techniques, mindfulness-based stress reduction and psychosocial support can relieve physical stress, promote treatment tolerance and improve overall well-being [10].

Subgroups of cancer patients who may be more affected by physical stress

Age is an important factor affecting the ability of cancer patients to withstand physical stress and exercise. Older people often experience age-related physiological deterioration, which makes them more susceptible to severe physical stress. A study published in the Journal of Geriatric Oncology found that older cancer patients experience higher levels of physical stress and have greater difficulty exercising than younger patients. The severity of cancer treatment can also affect patients' ability to withstand physical stress and participate in exercise. Patients undergoing aggressive treatment methods, such as high-dose chemotherapy or radiation therapy, often experience more serious side effects that limit their ability to exercise. According to a study published in the Journal of Supportive Oncology, cancer patients receiving intensive treatment report higher levels of physical stress and face greater challenges in maintaining exercise routines.

The stage and progression of cancer can affect the severity of physical stress experienced by patients and their ability to exercise. Patients with advanced cancer or metastatic cancer often face a greater burden of symptoms, which may hinder their ability to exercise. Research published in the European journal of cancer care revealed that patients with advanced cancer reported higher levels of physical stress and faced more barriers to participating in exercise and the underlying physical performance and presence of comorbidities could affect a patient's ability to tolerate physical stress and exercise. Cancer patients with pre-existing physical limitations or comorbid conditions, such as cardiovascular disease or musculoskeletal impairments, may experience more severe physical stress and require designed exercise programs. A study published in the journal of clinical oncology found that cancer patients with reduced baseline physical functioning experienced more challenges during exercise interventions.

In a study that examined the effects of 18 weeks of exercise, starting 6 weeks after a breast cancer diagnosis, on preventing increased fatigue, the study was a multicenter trial randomized to 204 breast cancer patients for either routine care (n=102) or intervention in supervised aerobic and resistance exercises (n=102). All patients received chemotherapy between baseline and 18 weeks. Fatigue was the primary outcome measured at week 18, while quality of life, anxiety, depression and fitness were measured at Weeks 18 and 36 and mixed linear model analysis aimed at treatment showed that physical fatigue increased significantly less during cancer treatment in the exercise intervention group compared to the control group (mean difference between group at 18 weeks: -1.3; 95% CI -2.5 to -0.1; magnitude of effect -0.30). Fatigue was the primary result that measured at Week 18, while quality of life, anxiety, depression and fitness were measured at Weeks 18 and 36 and mixed linear model analysis aimed at treatment showed that physical fatigue increased significantly less during cancer treatment in the exercise intervention group compared to the control group (mean difference between group at 18 weeks: -1.3; 95% CI -2.5 to -0.1; magnitude of effect -0.30). Results of general fatigue were comparable but did not reach statistical significance (-1.0, 95% CI -2.1 to 0.1; magnitude of effect -0.23) and at week 18, submaximal cardiorespiratory fitness and several muscle strength tests (leg extension and flexion) were significantly higher in the exercise intervention group compared to the control group. However, the peak of oxygen uptake did not differ between groups. At week 36,

these differences are no longer statistically significant. Quality of life results favored the exercise group, but the differences between groups were not significant.

In a study that aimed to estimate the size of the demographic impact of exercise on cancer related fatigue during and after treatment and to determine the extent of the impact variation across the treatment and recovery period, the study retrieved articles published before August 2011 from various databases including Google Scholar, Medline, PsycINFO, PubMed and Web of Science. Seventy studies involving 4,881 cancer patients were selected during or after treatment. Articles included cancer-related fatigue outcomes measured at baseline, post-intervention and random assignment to exercise or no exercise comparison. Effect sizes were calculated, study quality was assessed and random-effects models were used to estimate sampling error and population variance. The study found that exercise significantly reduces cancer related fatigue during and after cancer treatment. The mean effect size (Δ) at 95% Confidence Intervals (CI) was 0.32 (0.21, 0.43) during treatment and 0.38 (0.21, 0.54) after treatment, and during treatment, patients with low baseline fatigue scores and high exercise adherence achieved the greatest improvements in fatigue. After treatment, improvements were greater in trials with longer periods between treatment completion and exercise initiation, shorter exercise program durations and when using waitlist comparisons [11].

RESULTS

Table 1 shows data in Pearson correlation coefficients between dimensions and overall survey score.

Table 1 Pearson correlation coefficients between dimensions and overall survey score

Correlation coefficient	Number of paragraphs	Dimensions
0.859	5	Physical strength and function
0.913	6	Quality of life
0.798	5	Side effects of treatment
0.774	6	The effect of physical stress on patients in the recovery stage

It is clear from the results of the previous table that the values of the coefficients increased, which reflects the relationship between the different dimensions and the extent to which they represent the questionnaire. This is largely reflected in the degree of credibility of these dimensions, as they achieved statistically significant correlation coefficients with the total score of the questionnaire, ranging from (0.774 to 0.913). This confirms that the questionnaire has a high degree of internal consistency.

8/3 stability of the study tool

The stability measurement was based on the Cronbach alpha coefficient and the meaning of stability is that the scale gives the same results if it is reapplied to the same sample at different times, and takes values ranging from zero to one and if there is no stability in the questionnaire, the value of the coefficient is equal to zero and on the contrary, if there is complete stability in the questionnaire, the value of the coefficient is equal to one and whenever the value of the coefficient exceeds 0.6, this indicates that the stability property has been achieved, and this is clear from the following Table 2 [12].

Table 2 Cronbach's alpha coefficients for the stability of the study tool

Cronbach alpha coefficient	Number of paragraphs	Dimensions
0.819	5	Physical strength and function
0.912	6	Quality of life
0.789	5	Side effects of treatment

0.725	6	The effect of physical stress on patients in the recovery stage

It is clear from the previous table that the coefficients of stability between the dimensions and the total score of the questionnaire ranged between (0.725-0.912), which are acceptable and excellent stability scores, which indicates reassurance in the use of the study tool (Table 3) [13].

Table 3 Arithmetic mean, standard deviation and relative importance of paragraphs after physical strength and function

Paragraphs	Number	Arithmetic mean	Standard deviation	Rank
Exercising while recovering from cancer can improve physical strength and function	50	4.12	0.961	1
Regular exercise helps cancer patients regain muscle mass and endurance	50	4.04	1.029	2
Sports activity can contribute to a faster recovery from cancer treatment	50	3.92	1.122	3
Exercising while recovering from cancer can reduce the severity of side effects associated with treatment	50	3.56	1.033	4
Physical activity can relieve symptoms such as fatigue, nausea and pain that you experience during cancer treatment	50	3.26	1.367	5
General average	50	3.78	1.115	

It is clear from the data of the previous table that the total score of the respondents' answers to the paragraphs related to the dimension (physical strength and function) was high, with an arithmetic mean of (3.780) and a standard deviation of (1.115) and the highest responses of the respondents to the paragraph that states “Exercising while recovering from cancer can improve physical strength and function?” (Table 4)

Table 4 Arithmetic mean, standard deviation and relative importance of paragraphs after quality of life

Paragraphs	Number	Arithmetic mean	Standard deviation	Rank
Being active while recovering from cancer can improve quality of life	50	3.72	1.144	1

Regular exercise during cancer treatment increases energy levels	50	3.36	1.321	2
Sports activity can enhance sleep patterns in cancer patients	50	3.28	1.457	3
Sports activity distracts from the challenges of cancer treatment	50	3.08	1.455	4
Being physically active while recovering from cancer promotes a sense of normalcy	50	2.8	1.4	5
Sports activity during cancer treatment can contribute to forming a more positive outlook on life	50	3.88	1.043	6
General average	50	3.353	1.897	

It is clear from the data of the previous table that the total score of the respondents' answers to the paragraphs related to the dimension (quality of life) was average, with an arithmetic mean of (3.353) and a standard deviation of (1.897), and the highest responses of the respondents to the paragraph that states “exercise activity during cancer treatment contributes to the formation of a more positive view of life?” (Table 5).

Table 5 Arithmetic mean, standard deviation and relative importance of paragraphs after treatment side effects

Paragraphs	**Number**	**Arithmetic mean**	**Standard deviation**	**Rank**
Being active while recovering from cancer can help reduce the severity of side effects associated with treatment	50	3.56	1.264	1
Regular exercise can relieve symptoms such as fatigue that occur during cancer treatment	50	3.5	1.129	2
Regular exercise can help improve appetite and maintain a healthy weight during cancer treatment	50	3.44	1.296	3
Exercise can help reduce the impact of cognitive side effects, such as "chemo brain" or memory loss	50	3.3	1.111	4
Physical activity during cancer treatment can	50	3.28	1.161	5

help improve overall treatment tolerance and adherence				
General average	50	3.416	0.827	

It is clear from the data of the previous table that the total score of the respondents' answers to the paragraphs related to the dimension (treatment side effects) was high, with an arithmetic mean of (3.416) and a standard deviation of (0.827), and the highest responses of the respondents came to the paragraph that states:" Exercising during cancer recovery can help reduce the severity of treatment-related side effects?" (Table 6)

Table 6 The arithmetic mean, standard deviation and relative importance of paragraphs after the effect of physical stress on patients in the recovery stage

Paragraphs	Number	Arithmetic mean	Standard deviation	Rank
Excessive physical stress can have a harmful effect on patients in the recovery phase	50	4.02	1.04	1
Excessive physical stress prolongs the recovery period for patients	50	4	0.926	2
Unplanned physical stress can increase the risk of complications during the recovery phase	50	3.74	1.103	3
Excessive physical stress can lead to increased side effects of treatment during the recovery phase	50	3.12	1.223	4
Excessive physical stress increases the likelihood of physical fatigue in patients in the recovery phase		3.22	1.2	5
General average	50	3.62	1.213	

It is clear from the data of the previous table that the total score of the respondents' answers to the paragraphs related to the dimension of (the impact of physical stress on patients in the recovery stage) was high, with an arithmetic mean of (3.620) and a standard deviation of (1.213), and the highest responses of the respondents to the paragraph that states "excessive physical stress can have a detrimental effect on patients in the recovery stage?"

This research study aimed to find out the impact of stress and sports activity on the recovery stage and the results of treatment in cancer patients. The researcher conducted a comprehensive questionnaire that revealed two main results: The positive contribution of sports activity in the recovery stage and the negative effects of excessive and unplanned physical stress on the physical and psychological health of patients [14].

The stage of exercise and recovery

Survey responses overwhelmingly indicated that physical activity plays an important role in the recovery phase of cancer patients, with participants who exercised regularly reporting feeling physically stronger and experiencing fewer treatment related side effects. Notably, those who incorporated sports activity into their routines showed higher energy levels and improved overall health compared to sedentary individuals. This finding is consistent with existing research on the benefits of exercise in cancer recovery [15].

The negative effects of excessive and unplanned physical stress

The research highlighted the potential negative consequences of excessive and unplanned physical stress on cancer patients as participants who engaged in intense physical activity without proper guidance or planning reported increased physical fatigue, increased treatment side effects, and even prolonged recovery periods. Furthermore, these individuals exhibited higher levels of psychological distress, including anxiety and depression, than those who participated in a moderately and appropriately planned athletic activity. These findings underscore the importance of carefully managing physical stress levels during cancer treatment [16].

CONCLUSION

This research study highlighted the significant impact of stress and exercise activity on cancer recovery and treatment outcomes. The results highlight the positive contribution of exercise activity in the recovery phase and confirm its role in improving physical strength, reducing side effects associated with treatment and enhancing general well-being. It has been proven that regular exercise plays a vital role in supporting the recovery of cancer patients and improving treatment outcomes.

However, this study revealed that excessive physical stress can lead to increased physical fatigue, increased treatment side effects, and prolonged recovery periods. Furthermore, it can contribute to psychological distress, including anxiety and depression. These findings underscore the importance of carefully managing stress levels and implementing appropriate exercise activity guidelines during cancer treatment.

Moving forward, healthcare professionals should prioritize stress management techniques and develop individualized exercise plans for cancer patients. By providing education, support and resources, patients can make informed decisions regarding their physical activity levels and avoid potential harm. Stress management techniques, such as meditation and mindfulness-based stress reduction, should be integrated into cancer care to enhance patients' mental health and promote a positive recovery experience.

While this research study contributed valuable insights into the effects of stress and exercise on cancer recovery, more research is warranted to explore the long-term effects and optimal strategies for incorporating exercise into cancer care. By continuing to investigate this topic, healthcare professionals can improve treatment methods and provide comprehensive care that addresses the physical and psychological health of cancer patients.

RECOMMENDATIONS

Stress management: Due to the harmful effects of excessive stress on cancer patients, stress management techniques should be an integral part of cancer care. Healthcare professionals should provide patients with resources and support to help them deal with stress effectively. Techniques such as meditation, deep breathing exercises and mindfulness based stress reduction can be implemented to enhance patients' mental health and promote a positive recovery experience.

Individual exercise plans: To ensure safe and beneficial exercise activity during cancer treatment, individual exercise plans should be developed in collaboration with healthcare professionals. These plans should take into account the patient's specific condition, treatment regimen, physical abilities, and preferences. By designed exercise programs to each individual, patient can participate in activities that promote recovery without overwhelming their bodies.

Education and support: Educating patients about the importance of balanced physical activity and the potential risks of excessive stress is critical. Providing guidance on the appropriate intensity, duration and frequency of

exercise can help patients make informed decisions and avoid potential harm. Support groups and educational resources can provide patients with the necessary information and encouragement to maintain a healthy balance between physical activity and recovery.

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