Effects of Physical Exercise in Older Patients with Cancer: Integrative Literature Review

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Efeitos do Exercício Físico no Idoso com Diagnóstico de Câncer: Revisão Integrativa da Literatura

Efectos del Ejercicio Físico en Ancianos con Diagnóstico de Cáncer: Revisión Integradora de la Literatura

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ABSTRACT

Introduction: The increase of the older population and the prevalence of cancer in these individuals bring up the emergency of studies able to expand the debate about the effects of exercise in oncological patients. **Objective:** To verify the effects of aerobic, resisted, and combined physical exercise in older individuals diagnosed with cancer. **Method:** Integrative review carried out in the databases PubMed, PEDro, SciELO, between November 2022 and March 2023, in addition to articles published between 2018 and 2023. The following key words were used: physical exercise, physical training, older, older individuals in Portuguese and in English. The inclusion criteria were articles addressing older than 60 years individuals or more diagnosed with cancer, in pharmacological treatment or not, who performed aerobic, resisted or combined physical exercises. In total, 318 articles were found, seven of which met the inclusion criteria. **Results:** The studies included evaluated the effects of a combined exercise program, comprising aerobic and resisted exercise protocols. It was possible to verify that the practice of physical exercises produced positive effects in the population, with better functional capacity and physical performance of those diagnosed with cancer. **Conclusion:** An analysis of the studies allowed to conclude that aerobic and resisted physical exercises are beneficial for older patients diagnosed with cancer, improving their functional capacity.

Key words: Health of the Older Adults; Exercise; Exercise Therapy; Neoplasms/therapy.

RESUMO

Introdução: O aumento da população idosa e a prevalência de câncer nessa população trazem a emergência de estudos que ampliem o debate acerca dos efeitos do exercício no paciente oncológico. **Objetivo:** Verificar os efeitos do exercício físico aeróbico, resistido e combinado em idosos com diagnóstico de câncer. **Método:** Revisão integrativa da literatura realizada nas bases de dados PubMed, PEDro e SciELO, entre novembro de 2022 e março de 2023, além de busca isolada por periódicos da área, publicados entre os anos de 2018 e 2023. Foram utilizadas as palavras-chave: exercício físico, treinamento físico, idoso, pessoa idosa, câncer; e seus equivalentes em inglês. Os critérios de inclusão foram artigos que incluíssem idosos com 60 anos ou mais, com diagnóstico de câncer, em tratamento farmacológico ou não, que realizaram exercícios físicos aeróbicos, resistidos ou combinados. No total, foram encontrados 318 artigos, dos quais sete cumpriram os critérios de inclusão. **Resultados:** Os estudos incluídos avaliaram os efeitos de um programa de exercícios combinados, compreendendo protocolos de exercícios aeróbicos e resistidos. Foi possível verificar que a prática de exercícios físicos produz efeitos positivos nessa população, com melhora da capacidade funcional e desempenho físico de idosos com diagnóstico de câncer. **Conclusão:** A análise dos estudos permitiu verificar que os exercícios físicos aeróbicos e resistidos são benéficos para o paciente idoso com diagnóstico de câncer, melhorando principalmente a capacidade funcional.

Palavras-chave: Saúde do idoso; Exercício Físico; Terapia por Exercício; Neoplasias/terapia.

RESUMEN

Introducción: El aumento de la población y la prevalencia del cáncer en esta población refleja el surgimiento de estudios que amplían el debate sobre los dos efectos del ejercicio en pacientes oncológicos. Objetivo: Verificar los efectos del ejercicio físico aeróbico, resistido y combinado en el diagnóstico de cáncer. **Método:** Revisión integradora realizada en las bases de datos PubMed, PEDro, SciELO entre noviembre de 2022 y marzo de 2023. Foro utilizado como palabras clave: ejercicio físico, entrenamiento físico, personas, personas, cáncer; y sus equivalentes en inglés. Los criterios incluyen ítems que incluyen a niños mayores de 60 años o más, con diagnóstico de cáncer, en tratamiento farmacológico o no, que realicen ejercicios físicos aeróbicos, resistivos o combinados. En total se encontraron 318 artículos, siete de los cuales cumplieron los criterios de inclusión. **Resultados:** Los estudios incluidos evaluaron los efectos de un programa de ejercicio combinado, que comprende protocolos de ejercicio aeróbico y de resistencia. Se pudo comprobar que la práctica de ejercicios físicos produjo efectos positivos en la población, con mejor capacidad funcional y rendimiento físico de los diagnosticados con cáncer. **Conclusión:** El análisis de dos estudios permitió comprobar que los ejercicios físicos aeróbicos y resistivos son beneficiosos para pacientes sanos diagnosticados con cáncer, mejorando principalmente la capacidad funcional.

Palabras clave: Salud del Anciano; Ejercicio Físico; Terapia por Ejercicio; Neoplasias/terapia

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INTRODUCTION

According to the Brazilian Society of Geriatrics and Geronthology[1], nearly 60% of the cancers affect 60 years or older individuals. Because life expectancy increased, the theme requires attention in view of the repercussion neoplasms cause on this population. The particularities of older individuals with senescence-related symptoms in addition to those related to cancer and its respective treatment[2] are relevant aspects. Older individuals can present physiologic changes in functioning, cognition and nutrition while ageing further to comorbidities and depression[3], directly impacting the functionality and autonomy. These situations can be aggravated in the presence of tumor and respective therapies[4].

Physical exercises are essential to improve the functionality of older adults, with special relevance for individuals diagnosed with cancer because it may influence the reduction of risks of mortality by all causes. It is known that inactivity leads to increased morbidity and treatment adverse events and potential low survival. These changes stand out even more after chemotherapy treatment that causes negative effects on muscle mass and physical strength associated with functional losses[5].

In addition, literature shows that programs focused to progressive gain of muscle strength and balance training help to prevent falls in this population. Plans with regular aerobic activities generate cardiovascular benefits, being effective in reducing oncologic fatigue, well-being and mood improvement and cognition after increasing the practice of physical exercises. However, studies with this population are limited and it is unclear which type of exercise should be performed, intensity and time of practice[4].

The continuous increase of older adults and prevalence of neoplasms in this population brings up the emergency of studies that widen the debate on this theme in order to implement this practice in this group. Through evidence-based clinical practice and scientific investigation, it was noticed that physical exercise is an important strategy that can minimize the functional losses of patients with cancer, improving the physical conditioning and muscle strength, positively interfering in the quality-of-life. The present study has the objective of verifying the effects of aerobic exercise resisted or combined over physical function and functional capacity of older adults diagnosed with cancer.

METHOD

Integrative review of the literature with the following stages: selection of the theme, definition of inclusion and exclusion criteria, analysis of the studies, interpretation and presentation of the study.

Scientific articles published in Portuguese, English and Spanish in journals indexed at the databases PubMed, PEDro and SciElo were searched in addition to articles published in the last five years (2018-2023) in journals of the area of interest. Only complete articles available and published were looked up based in the Health Science Descriptors (DeCS): *exercício físico, treinamento físico, idoso, pessoa idosa, câncer* and equivalent in English found in Medical Subject Headings (MeSH): exercise, aged, older adults, cancer. The key-words were combined with the Boolean operator "OR" to include similar terms and "AND" for association among the others.

The inclusion criteria were studies with samples of individuals older than 60 years or more diagnosed with cancer in pharmacologic treatment or not who performed aerobic, resisted or combined exercises. Non-original, duplicates, incomplete articles, literature or bibliographic reviews, systematic reviews, guidelines, opinion articles, technical manuals, abstracts and chapters of online books were excluded.

307 articles were found in PubMed, six in PEDro, three in SciElo and two after manual search, reaching 318 results. Eventually, 57 articles were selected for reading and analysis of the abstracts. Of these, 34 were selected for complete reading and seven clinical trials met the goals of the present study.

The articles were searched from November 2022 to March 2023, the data were obtained upon application of a collection instrument earlier elaborated by the authors which responded to the following research question: "What are the effects of physical exercise in older patients diagnosed with cancer?" The following variables were collected: title, authors, journal, objective, study design, protocol of exercises, main results, discussion and conclusions. Figure 1 presents the flowchart of search of publications for the present study.

RESULTS

Chart 1 lists the following information from the studies: authors, year of publication, study design, sample size and characteristics of the population. All the studies included were clinical trials and five were randomized studies. Of the total, six were published in international journals of great impact in the area. Chart 2 describes the protocol of exercises and results found. The seven studies included evaluated the effect of a combined exercise programs, comprehending protocols of aerobic and resisted exercises. Of these, three addressed home exercises; four studies evaluated a 12-week, 2-3 times a week physical exercise programs. The patients evaluated presented different types of cancer as gastrointestinal, colorectal, lung or breast among others.

All the studies presented some type of improvement of the functional capacity and physical performance of older patients with cancer post physiotherapeutic intervention with increase of strength and muscle resistance. Evolution of gait speed and/or flexibility of upper limbs was noticed as well. These outcomes were evaluated by functional tests among which stand out the 6-minute walk test (6MWT), Senior Fitness Test, handgrip strength and test of maximum repetition. In addition, three studies also evaluated the quality-of-life by the European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30), showing improvement of the quality-of-life of these patients after the proposed exercises.

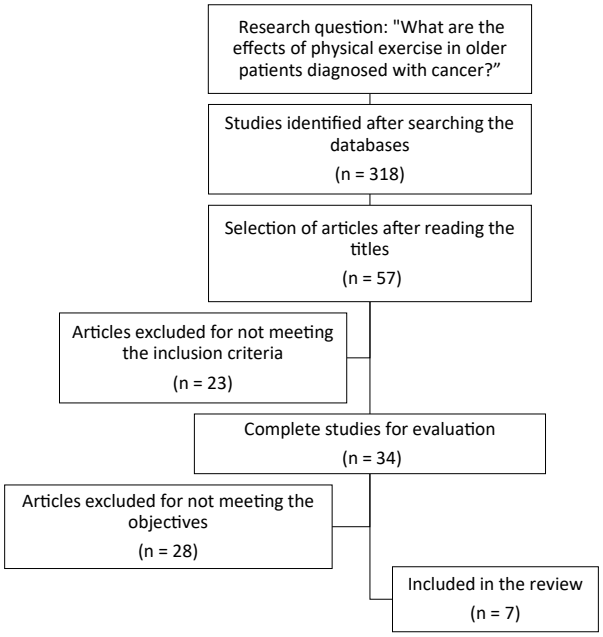

Figure 1. Flowchart of the methodology

Source: Adapted from PRISMA 2020[6].

DISCUSSION

The objective of the study is to verify the effects of aerobic, resisted or combined physical exercise over the physical function and functional capacity of older patients diagnosed with cancer. The integrative review concluded that the practice of physical exercises produces positive effects for this population. The outcomes of all the studies analyzed revealed some improvement of functional capacity and physical function in addition to quality-of-life. Of these, three studies showed the effects of home exercises with positive impact on physical performance of the older adult with cancer. All the studies addressed resisted, aerobic or both exercises under the supervision of the physiotherapist with significant difference of physical performance pre and post protocols of intervention.

Chart 1. Description of the articles selected

Author	Year	Study design	Sample	Population
Mikkelsen et al.[7]	2022	Randomized clinical trial	84	≥ 65 years with advanced non-small cells pancreatic, biliary ducts or lung cancer
Rosero et al.[8]	2020	Non-randomized clinical trial	26	≥ 70 years diagnosed with lung cancer
Souza Filho et al.[9]	2020	Randomized clinical trial	33	Mastectomized 60-74 years old women diagnosed with breast cancer in hormone therapy
Dittus et al.[10]	2020	Comparative clinical trial	481	Middle-age (45-64 years) and older individuals (≥ 65 years) after cancer treatment
Arrieta et al.[11]	2019	Multicenter randomized clinical trial	301	≥70 years with lymphoma or carcinoma needing curative treatment
Karlsson et al.[12]	2019	Controlled randomized clinical trial	602	≥70 years diagnosed with colorectal cancer
Maréchal et al.[13]	2018	Randomized clinical trial	14	65-85 years old in cancer treatment

Chart 2. Description of the objective, protocol of exercises and results

Author	Protocol of exercises	Main results
Mikkelsen et al.[7]	Mild warm-up, balance and stretching exercises, resisted training with 2-3 series, 10-15 repetitions, relaxation twice a week	Difference of 2.4 repetitions of the test chair rise ($p < 0.0001$), improvement of physical resistance, handgrip strength and quality of life
Rosero et al.[8]	10-week, twice a week, resisted exercise with 30%-60% of 1MR with 8-12 repetitions, aerobic with 50-80% of the maximum HR, balance and flexibility	Significant improvement in Short Physical Performance Battery ($p = 0.004$), test of gait speed ($p = 0.036$), test timed up and go ($p = 0.007$) and muscle performance ($p < 0.001$)
Souza Filho et al.[9]	30-minute exercises weekly, 19 exercises for range-of-movement and 10 for muscle fitness	Significant improvement in the group of physical exercises with Senior Fitness Test ($p < 0.02$)
Dittus et al.[10]	Resistance training of 60-70% of 1MR, two sets of 1MR and 40 minutes of aerobic training twice a week for 12 weeks, with 1–2 min of rest between sets. When 12 repetitions are completed, the resistance is advanced to a higher load.	Physical exercise improved all indexes of physical functions and strength in both age ranges ($p < 0.001$)
Arrieta et al.[11]	Resisted training with low to high intensities avoiding pain and exhaustion. Recommendation of individualized aerobic training	After two years, decline in Physical Performance Battery to 29.8% in the usual care group and 5% in the intervention group with breast cancer ($p = 0.006$)
Karlsson et al.[12]	Inspiratory muscle training with 30 breathing twice a day. Resistance training until reaching the effort perceived of 7-8 (Borg), 2-3 times/week for two weeks	Significant difference of inspiratory muscle strength among groups favoring intervention group ($p < 0.01$)
Maréchal et al.[13]	Aerobic training at 70-75% of maximum HR for 40 minutes. Resisted training with 2-3 series of 10-15 repetitions with load of 50-65%, 1MR for 12 weeks	Both groups presented significant differences in functional capacity and physical function pre and post-intervention ($p = 0.01$)

Captions: Maximum HR = maximum heart rate; 1MR = one maximum repetition.

A protocol of combined exercises is able to improve the physical function and functional capacity of this population, the result of a 12-week intervention protocol with increase of flexibility, strength and muscle resistance evaluated by the Senior Fitness Test[13]. Similarly, 12-week combined aerobic and resisted training of upper and lower limbs in older adults submitted to cancer surgery caused an increase of the functional capacity evaluated by the 6MWT and of the strength and muscle resistance with the application of the maximum repetition test (1MR)[10]. The progression of the functional capacity was noticed in older adults with lung cancer who performed combined exercises for ten weeks, twice a week. The resisted training utilized a 30-60% load of 1MR while aerobic training kept 50%-80% of the age-adjusted maximum heart rate[8].

The benefits of combined exercises on improvement of functional autonomy were already known. An 18-month, three-times a week protocol applied in older women increased the performance of daily activities and functional autonomy[14]. Patients in chemotherapy have also benefitted from this modality of exercise, specially resisted training that can induce muscle hypertrophy and reduce sarcopenia, generating better quality-of-life[15].

Likewise, resisted training associated with aerobic improved balance, strength and resistance of the patients with chemotherapy-induced complications from palliative care, promoting improvement of quality-of-life[16]. Exercises helped to ameliorate fatigue, functional capacity and physical fitness in patients who underwent oncologic treatment[17].

The decline of physical function can directly affect the quality-of-life of this population, confirmed after the application of the questionnaire EORTC QLQ-C30, a tool to evaluate the perception of the health-related quality of life of the patient with cancer through scales of functional performance and cancer-related symptoms where high scores mean significant impact of the disease[8,12].

12-week combined stretching, aerobic and strength exercises increased the functional capacity of older patients with pancreatic and lung cancer in addition to better quality-of-life[7]. Also, a 12-week combined protocol applied on women with breast cancer positively impacted physical, emotional, social well-being and symptoms when compared with those who did not submit to the training[18].

A supervised home-based exercises program can also benefit the cancer patient. A 12-week intervention on women with breast cancer who submitted to radiotherapy improved the quality-of-life and did not cause adverse events[19]. The protocol involving strength, balance, proprioception, flexibility and aerobic training is able to improve the physical function of older cancer patients[11]. A home-based combined training exercises increased the shoulder range-of-motion on mastectomized older women breast cancer survivors, in addition to increased flexibility of upper limb evaluated by the "reach-out-back test", of the Senior Fitness Test[9]. Furthermore, this training can be applied pre-oncologic surgeries to minimize treatment-related functional losses[12].

Despite the benefits found in the present study, the heterogeneity of the types of cancer and discrepancy of the evaluations, modalities and intensities of the exercises are limitations of the investigation. In addition, the study design allows to analyze different effects of the exercise, but more controlled studies are necessary to define a protocol for this population. Nonetheless, the effects of other modalities of physical exercises need to be verified.

CONCLUSION

The analysis of the studies revealed the benefit of aerobic and resisted physical exercises of older patients diagnosed with cancer. A 12-week, twice a week combined aerobic and resisted exercises program may potentially increase the functional capacity and physical function, in addition to ensuring a better quality-of-life, being an alternative treatment for this population.

CONTRIBUTIONS

All the authors contributed to the study design, acquisition, analysis and interpretation of the data, wording and critical review. They approved the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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