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Physical Activity, Leisure, and Breast Cancer: Systematic Literature Review

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Abstract

Background: Breast cancer remains one of the leading causes of morbidity and mortality among women worldwide. Sedentary lifestyles, unhealthy body composition, and limited engagement in physical activity have been identified as important risk factors. Physical activity and leisure-based movement are increasingly recognized as non-pharmacological strategies that may contribute to cancer prevention and overall health promotion.
Aims: This study aimed to examine the role of physical activity and leisure in the prevention of breast cancer and to explore whether body composition may influence the risk of developing this disease.
Methods: A systematic literature review was conducted using databases including B-On, PubMed, the Repository of the Faculty of Sports of the University of Porto, and the Repository of the Faculty of Human Motricity. Articles published between 2018 and 2023 in English and Portuguese were selected based on predefined inclusion criteria. Eight relevant studies were analyzed using the Promoting the Emergence of Advanced Knowledge approach.
Result: The reviewed studies consistently indicate that regular physical activity and active leisure are associated with a reduced risk of breast cancer. Higher levels of physical activity were linked to healthier body composition, lower sedentary behavior, less aggressive tumor characteristics, and improved survival outcomes. However, the magnitude of these benefits varied according to individual factors such as body fat levels, menopausal status, and cultural context.
Conclusion: This review concludes that physical activity and active leisure play a meaningful role in breast cancer prevention by promoting healthier body composition and reducing sedentary behavior. These findings support the integration of physical activity into public health strategies and highlight the need for culturally sensitive and accessible interventions to enhance cancer prevention and long-term well-being.

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INTRODUCTION

Currently, the fast pace of daily life, together with tiredness and the daily commitments of work, family, and society, lead to a stressful lifestyle and unhealthy habits. On the other hand, the great facilities that technology has created, which promote an increase in people's level of inactivity, have led to a greater sedentary lifestyle and, inevitably, a decrease in their level of quality of life (Niño et al., 2025).Individuals' lifestyle is directly proportional to the benefits or harms that this philosophy can cause to their health (Albarqouni et al., 2022; Pinto et al., 2021). Therefore, active people with healthy habits are less likely to develop disease compared to those who are the opposite.

The dissemination of information associated with the practice of physical activity and its benefits is a phenomenon that has been increasing. Much is said about issues directly linked to this topic, namely health, quality of life, aesthetics, and self-esteem, with a growing awareness among people who, once informed, begin to worry about their own health and well-being (dos Santos et al.,

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2017; Merino et al., 2024).In this sense, it is important to mention that physical activity is a key point about the health of the general population and that it is designated as any body movement that is associated with muscular contraction, and that increases the expenditure of energy above the levels of rest.

Alongside this growing concern on the part of some people, also at a global level, in recent years, there has been greater concern on the part of members of the United Nations in the creation of natural and inclusive public spaces such as, for example, parks so that people can people can enjoy the space and at the same time also practice physical activity, when going for a walk, for example (Oliveira et al., 2022). The creation of this type of space is, in fact, important because green areas (such as parks, squares, tree-lined streets and urban forests) are often used by communities as spaces for health promotion practices, such as leisure and physical activities (dos Santos et al., 2017; Oliveira et al., 2022).

About leisure, there is not exactly a static concept that defines it, since each person defines leisure according to their tastes and the resources available to satisfy their needs, and may value the results differently, according to their system of values and aspirations (Oliveira et al., 2022). A structured set of activities with respect to the needs of the body and spirit: physical, practical, intellectual, artistic, and social leisure, within the limits of economic conditioning, social, political, and cultural aspects of each society (K. M. Lee & Hassim, 2023).Although there are more and more people concerned about having a healthy lifestyle, like what was previously mentioned, the truth is that a large part of the population worldwide is still not aware of the importance of practicing physical activity and moments of leisure in a human being's life, combined with a healthy and balanced diet.

All of this leads to a sedentary lifestyle that can result in an increase in values such as the amount of visceral adipose tissue and subcutaneous adipose tissue. The high presence of these values is associated with problems such as overweight or even obesity, constituting risk factors for the development of health problems such as cardiovascular diseases, insulin resistance, diabetes, sleep apnea, high blood pressure, some types of cancer, among others (Leyva et al., 2018; Pati et al., 2023). A healthy body in a healthy mind becomes a relevant concept to understand that it is, in fact, important to maintain a state of balance at the organism level, so that the necessary defenses to combat various diseases, some of which were mentioned above, are produced. One of them is cancer, more specifically breast cancer.

Currently, cancer is one of the chronic diseases that has hit the world's population the most. This is the result of a set of anomalous changes that occur at a cellular level, which may affect the tissues surrounding the cell in question or, through the blood and/or lymphatic stream, reach tissues in other parts of the body. The literature on this topic states that the probability of developing cancer increases with age (Montégut et al., 2024). The incidence of cancer increases considerably with age and therefore it is crucial to understand the basic mechanisms involved in the aging process to allow a putative postponement or even an effective elimination of the appearance of diseases such as cancer. In the specific case of breast cancer, this is the most common type of neoplasia among women, representing the first cause of death from cancer among people of this gender. In Portugal alone, in 2020, around 7,000 new cases were detected, with 1,800 women dying from this disease (Gomes & Nunes, 2020).

However, some studies suggest that practicing regular physical activity, that is, maintaining an active lifestyle, can reduce the risk of breast cancer (Burhaein et al., 2021; de Boer et al., 2017). Considering that, as already mentioned, breast cancer is an increasingly common disease, being responsible for several deaths, and that there is a considerable gap on this topic at a national level, it is essential to understand whether AF and leisure can effectively be preventive agents. Therefore, this article's main objectives are to understand the role of PA and leisure in preventing breast cancer, and to understand whether people's body composition can increase the risk of breast cancer. In this sense, the problem questions that this study aims to answer are: “What is the role of physical activity and leisure in preventing breast cancer?” and “Can people’s body composition increase or decrease the risk of developing breast cancer?”.

METHOD

To answer the questions previously mentioned, and to achieve the objectives defined for this study, also mentioned above, a review of the existing literature on this topic was carried out. The

literature review is a very advantageous tool, since when a synthesis is drawn up with the most pertinent knowledge, coming from various studies on the topic in question, it allows innovative results to be generated and to indicate new paths for research (Chigbu et al., 2023; Kraus et al., 2022). The results of this study were found through research in the databases B-on, PubMed, Repository of the Faculty of Sports of the University of Porto (FADEUP) and Repository of the Faculty of Human Motricity (FMH), between October 15th and November 30, 2023. This was carried out in Portuguese, with the keywords "physical activity", "breast cancer", "leisure" and "prevention", as well as in English using the corresponding words, namely "physical activity", "breast cancer", "leisure" and "prevention".

Inclusion Criterion, the publication date criterion was applied to the results found in the different databases, meaning that only articles published between 2018 and this year were selected. At PubMed, the "free full" filters were also selected. text", "review" and even "systematic review", while at B-On "full text" and "academic journals" were selected. After reading the titles of the articles initially obtained, the most pertinent ones were selected, that is, those that could effectively contribute to the construction of this article. Subsequently, the summary of each one was also analyzed, resulting in the sample being reduced to a total of studies, which are found in the following section. Based on the results of the initial search, a total of 129 articles, then reduced by inclusion criteria and multiple articles. The results are 8 selected articles which will then be analyzed using the Promoting the Emergence of Advanced Knowledge (PEAK) approach, presented in Table 1.

RESULTS AND DISCUSSION

Results

Breast cancer remains one of the biggest health challenges for women around the world. Amidst modern medical treatments and therapies, physical activity, and leisure play an important role in maintaining good health, including breast cancer prevention and recovery. Several studies have tried to understand more deeply how regular movement, active lifestyle choices and healthier daily patterns can provide real protection for our bodies. The following table summarizes the studies that have addressed the link between physical activity, leisure time and breast cancer from various perspectives, ranging from medical to social.

Table 1. PEAK Analysis of 8 final articles

Title	Author & Year	Purpose of the Study	Participants	Method	Results
A systematic review of the biological mechanisms linking physical activity and breast cancer.	Hong & Lee (2020)	Understand the role of PA and leisure in preventing breast cancer and understand the biological and cellular mechanisms associated with the onset, development, and post – cancer.	-	Systematic review	PA can be considered an effective non-pharmacological therapy for preventing breast cancer.
Sedentary work and breast cancer risk: A systematic review and meta-analysis.	J. Lee et al. (2021)	Quantitatively assess the contribution of sedentary work to the onset of breast cancer.	31 Studies, 13 and 18 case-control studies.	Systematic review	The results obtained indicate that sedentary behavior is associated with a 15.5% increase in the risk of breast cancer, which is

					why it is essential to reduce sedentary time and dedicate more time to PA and leisure as a primary preventive measure for this type of cancer.
Associations between Pre-Diagnostic Physical Activity with Breast Cancer Characteristics and Survival.	Lim et al. (2022)	Understand the relationship between AF, the characteristics of the breast tumor and the survival rate.	6.572 Breast cancer patients	Statistical analysis	PA can effectively reduce the risk of breast cancer. In cases of breast cancer, the tumor is less aggressive if, at pre-diagnosis, people already practiced PA in large quantities.
The Benefits of Physical Exercise in Breast Cancer.	Campos et al. (2022)	Understand the relationship between physical exercise, physical activity, and breast cancer.	-	Systematic review	The practice of PA contributes to the prevention of breast cancer and reduction of patient mortality. Furthermore, physical exercise is important for them, but studies are needed to better guide its prescription.
Physical Activity and Long-Term Risk of Breast Cancer, Associations with Time in Life and Body Composition in the Prospective Malmö Diet and Cancer Study.	Boraka et al. (2022)	Understand the relationship between a woman's menopausal status and her body composition and the risk of developing breast cancer.	15.983 Sedish women	Statistical analysis	Women who do little PA, and who have values such as fat mass percentage and BMI that are higher than normal have a 23% higher risk of developing breast cancer compared to women who are the opposite. Furthermore, for premenopausal or obese women, PA alone is not sufficient to prevent breast

					cancer in the long term.
Physical Activity and Sedentary Behavior in Relation to Cancer Survival: A Narrative Review	Jochem & Leitzmann (2022)	Gather existing scientific evidence on the relationship between physical activity and sedentary behavior in cancer survival.	-	Narrative review	It was concluded that PA can contribute to the prevention of breast and colorectal cancer, with its practice being beneficial during and after treatment. In this sense, it is important to reduce the amount of time people spend sedentary behavior.
Current and future costs of cancer attributable to insufficient leisure-time physical activity in Brazil.	Ferreira da Silva et al. (2023)	Quantify the current and future costs of providing healthcare to people with cancer correlated with insufficient PA during leisure time in Brazil.	Prevalence data on insufficient leisure-time PA in adults aged 20 years and over, and national records of health expenditure for adults aged 30 years and over with cancer.	Macrosimulation model	It was evidenced that, in leisure time, there is little PA practice, which at a monetary level translated into a expenditure of 43 million dollars by the government in providing healthcare to people with breast, colorectal and endometrial cancer in 2018 This value tends to increase, which is why the authors state that it is necessary to encourage the practice of PA in leisure time, to avoid these health problems and, consequently, the associated costs.
Physical activity and breast cancer prevention among Chinese American women: a	Sheng et al. (2023)	Understand the perception of Chinese American women about PA, its role in preventing breast cancer	20 Women, aged between 18 and 65, who identified with dual nationality:	Virtual semi-structured interview	It was concluded that these women, who have an increased incidence of breast cancer, had limited knowledge about the benefits

qualitative descriptive study.	and the influence of culture on the practice of PA.	American and Chinese.	of PA in reducing the risk of breast cancer. It was also possible to conclude that these people, when exposed to American culture, tended to increase their practice of PA during leisure time, which suggests that the prevention of this type of cancer is, indirectly, related to cultural factors.

Note: Article included in this study, classified according to their title, author(s), year of publication, study objective, sample/participants, method used, and main results obtained. These were sorted by year of publication and the alphabetically.

From the various findings reviewed, we can see one clear thread: the more physically active a person is, the greater the protection they have against breast cancer risk. Regular physical activity, even before one is diagnosed, has been shown to make tumor characteristics milder and increase the chances of survival. What's more, leisure time utilized for active pursuits such as walking, light exercise, or dancing provides multiple benefits, both for the body and mental health. However, these benefits are not always the same for everyone. Body conditions such as weight, fat levels and menopause also influence the outcome, so a personalized approach is necessary.

Even so, there are still some big challenges that need to be addressed. Not everyone has the same awareness or opportunity to engage in regular physical activity. Increasingly busy lifestyles, sedentary jobs, and a lack of open spaces and sports facilities are obstacles. In some cultures, the habit of moving is still not part of daily life. Going forward, more than just a call to healthy living, real support is needed, ranging from public education, policies that favor community movement, to building an environment that encourages us to be more active naturally. Because in the end, keeping the body moving is not just a physical matter, but also a matter of maintaining hope and quality of life.

Discussions

First, and according to all the results that were found, the agreement between the various studies is notable, in that, effectively, PA and the leisure associated with this practice can constitute a preventive measure for the appearance of the disease breast cancer. However, we would also like to highlight that, as it is possible to analyze, these same studies refer to another type of quite disparate questions, related to this topic, which we will also address during this discussion. Firstly, the practice of PA is fundamental in preventing the onset of this disease, and according to the authors (Hong & Lee, 2020) it can even be considered a non-pharmacological therapy in its prevention, since, as some studies point out presented previously, sedentary behavior and, consequently, a body composition in which there are greater amounts of body fat and a higher BMI than normal, constitute factors that can more easily trigger the appearance of this cancer.

Furthermore, and according to (Jochem & Leitzmann, 2022), this practice, in addition to being beneficial in terms of prevention, is also fundamental during treatment and afterwards, highlighting the importance of reducing sedentary behavior among the entire community. However, in terms of its correct and appropriate prescription during treatment, this is an area that requires more research as mentioned by the authors (Campos et al., 2022). Another very pertinent conclusion that was highlighted is that in people who were already active pre-diagnosis, the tumor turns out to be less aggressive and the mortality rate in these cases is also lower. Despite the extreme importance of this

information, according to (Ferreira da Silva et al., 2023), the reality is that most people do not practice any type of PA during their leisure time, which results in the appearance of many cases, both of this type of cancer and others, that could be minimally prevented.

This, in turn, directly results in very high expenses in providing health care to these people, and the trend is not to improve. Finally, another very interesting conclusion, highlighted in the last study in the results section, is that culture and the environment in which people live can also indirectly influence the risk of this disease appearing. This fact can be justified by the issue of cultural factors influencing people's knowledge about the importance of practicing PA and including it in their leisure time, and in their own habit of practicing it, which, consequently, directly affects prevention. of breast cancer, with populations having a greater tendency to develop it than others.

From the various findings reviewed, we can see one clear thread: the more physically active a person is, the greater the protection they have against breast cancer risk. Regular physical activity, even before one is diagnosed, has been shown to make tumor characteristics milder and increase the chances of survival. What's more, leisure time utilized for active pursuits such as walking, light exercise, or dancing provides multiple benefits, both for the body and mental health. However, these benefits are not always the same for everyone. Body conditions such as weight, fat levels and menopause also influence the outcome, so a personalized approach is necessary.

Even so, there are still some big challenges that need to be addressed. Not everyone has the same awareness or opportunity to engage in regular physical activity. Increasingly busy lifestyles, sedentary jobs, and a lack of open spaces and sports facilities are obstacles. In some cultures, the habit of moving is still not part of daily life. Going forward, more than just a call to healthy living, real support is needed, ranging from public education, policies that favor community movement, to building an environment that encourages us to be more active naturally. Because in the end, keeping the body moving is not just a physical matter, but also a matter of maintaining hope and quality of life.

Implications

The findings of this systematic review imply that physical activity and active leisure play a meaningful role in the prevention of breast cancer and in supporting overall health across the lifespan. Regular engagement in physical activity is consistently associated with healthier body composition, reduced sedentary behavior, and lower breast cancer risk. These results highlight the importance of promoting active lifestyles not only at the individual level but also through public health initiatives and community environments that encourage movement and leisure-based physical activity.

Research Contribution

This study contributes to the existing body of knowledge by synthesizing recent evidence on the relationship between physical activity, leisure, body composition, and breast cancer risk. By integrating findings from diverse methodological approaches, including systematic reviews, observational studies, and qualitative research, this review provides a comprehensive and updated perspective on how physical activity functions as a non-pharmacological strategy for breast cancer prevention. It also emphasizes the relevance of leisure-time physical activity within broader health promotion frameworks.

Limitations

Despite its contributions, this review has several limitations. The included studies varied in design, population characteristics, and measurement of physical activity, which may limit the comparability of findings. In addition, most evidence was derived from observational studies, restricting the ability to establish causal relationships. Language and database restrictions may also have resulted in the exclusion of relevant studies published outside the selected sources.

Suggestions

Future research should prioritize longitudinal and intervention-based studies to better clarify causal mechanisms linking physical activity and breast cancer prevention. Greater attention should also be given to cultural, socioeconomic, and environmental factors that influence leisure-time physical activity. Developing tailored physical activity guidelines for different population groups, including women at various stages of life and cancer survivorship, may further strengthen prevention strategies and practical applications.

CONCLUSION

This systematic literature review was conducted to address the expectations outlined in the Introduction, namely to understand the role of physical activity and leisure in breast cancer prevention and to examine how body composition may influence breast cancer risk. The findings presented in the Results and Discussion sections confirm that these expectations were achieved. The reviewed evidence consistently demonstrates that regular physical activity and active leisure are associated with healthier body composition, reduced sedentary behavior, and a lower risk of breast cancer. Moreover, individuals who maintain an active lifestyle before diagnosis tend to experience less aggressive tumor characteristics and improved survival outcomes, highlighting the preventive and supportive role of physical activity across different stages of the disease.

Beyond validating the initial research objectives, this review also points to important prospects for future research and practical application. The results emphasize the need to strengthen public health strategies that promote physical activity and leisure as accessible, culturally sensitive, and sustainable components of cancer prevention. Future studies should focus on longitudinal and intervention-based designs to better clarify causal mechanisms and to establish evidence-based physical activity guidelines tailored to different populations, life stages, and cancer survivorship phases. In this way, the present study not only consolidates existing scientific knowledge but also provides a foundation for further research and policy initiatives aimed at integrating physical activity into comprehensive breast cancer prevention and health promotion strategies.

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AUTHOR CONTRIBUTION STATEMENT

CCVL conceptualized the study, defined the research objectives, designed the review framework, supervised the literature search process, and led the synthesis and interpretation of the findings. CCVL also coordinated the overall structure of the manuscript and managed all stages of critical revision. LSO conducted the literature search, applied inclusion and exclusion criteria, organized and analyzed the selected studies, and contributed to drafting the initial manuscript. Both authors reviewed and approved the final version of the manuscript and take full responsibility for the integrity and accuracy of the work.

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