

Physical Activity and Cancer Prevention: Evidence, Reflections and Notes for the Unified Health System

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Atividade Física e Prevenção de Câncer: Evidências, Reflexões e Apontamentos para o Sistema Único de Saúde
Actividad Física y Prevención del Cáncer: Evidencia, Reflexiones y Notas para el Sistema Único de Salud

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Abstract

Introduction: Chronic Noncommunicable Diseases are among the main causes of morbidity and mortality in the world, especially for cancer. For its prevention, physical activity appears as one of the strategies. **Objective:** To present and discuss recent scientific evidences about physical activity for the prevention of cancer and to expose reflections and notes on the complexities and inequities related to physical activity in the Unified Health System. **Method:** Current references from cutting edge institutions in research on physical activity, cancer prevention and related topics were selected: a) Summary of the III Expert Report on Food, Nutrition, Physical Activity and Cancer; b) Scientific Report of the US Physical Activity Guidelines Advisory Committee; c) Round Table of the American College of Sports Medicine. Its relevance lies in the gathering of evidence systematically reviewed by a wide scientific community of experts. **Result:** Physical activity is an important health action for cancer prevention, however it was not possible to identify the specific amount since the comparison is between higher versus lower levels of physical activity. **Conclusion:** There are strong evidences about the relationship between physical activity and cancer prevention for breast, colon, endometrium, esophagus, stomach, kidney, bladder, liver. To carry them out, it is necessary to recognize that physical activity is related to different health determinants and conditions and that public programs in the Unified Health System have great potential for the expansion of this practice by the population.

Key words: Neoplasms/prevention & control; Chronic Disease/prevention & control; Public Health Policy; Health Status Disparities; Exercise.

Resumo

Introdução: As doenças crônicas não transmissíveis estão entre as principais causas de morbimortalidade no mundo, especialmente o câncer. Para a sua prevenção, a atividade física figura como uma das estratégias. **Objetivo:** Apresentar e discutir evidências científicas recentes acerca da atividade física para a prevenção de câncer e expor reflexões e apontamentos sobre as complexidades e iniquidades relacionadas à atividade física no Sistema Único de Saúde. **Método:** Foram selecionadas referências atuais de instituições de vanguarda na pesquisa sobre atividade física, prevenção de câncer e temas correlatos: a) Sumário do III Relatório de Especialistas sobre Alimentação, Nutrição, Atividade Física e Câncer; b) Relatório Científico do Comitê Consultivo das Diretrizes de Atividade Física dos EUA; c) Mesa- -redonda do Colégio Americano de Medicina do Esporte. Sua relevância está na reunião de evidências sistematicamente revisadas por uma ampla comunidade científica de especialistas. **Resultado:** A atividade física é uma importante ação de saúde para a prevenção do câncer, contudo não foi possível identificar a quantidade específica, já que a comparação é entre níveis mais altos *versus* mais baixos de atividade física. **Conclusão:** Há fortes evidências para a relação entre atividade física e prevenção de câncer de mama, cólon, endométrio, esôfago, estômago, rim, bexiga, fígado. Para efetivá-las, é necessário reconhecer que a atividade física é relacionada a diferentes determinantes e condicionantes da saúde e que programas públicos no Sistema Único de Saúde têm grande potencial para a ampliação dessa prática pela população.

Palavras-chave: Neoplasias/prevenção & controle; Doença Crônica/prevenção & controle; Políticas Públicas de Saúde; Disparidades nos Níveis de Saúde; Exercício Físico.

Resumen

Introducción: Las enfermedades crónicas no transmisibles se encuentran entre las principales causas de morbilidad y mortalidad en el mundo, especialmente el cáncer. Para su prevención, la actividad física aparece como una de las estrategias. **Objetivo:** Presentar y discutir evidencia científica reciente sobre la actividad física para la prevención del cáncer y exponer reflexiones y notas sobre las complejidades e inequidades relacionadas con la actividad física en el Sistema Único de Salud. **Método:** Referencias actuales de instituciones de vanguardia en la investigación sobre actividad física, prevención del cáncer y temas relacionados: a) Resumen del III Informe de Expertos en Alimentación, Nutrición, Actividad Física y Cáncer; b) Informe Científico del Comité Asesor de Pautas de Actividad Física de EEUU; c) Mesa-redonda del Colegio Americano de Medicina del Deporte. Su relevancia radica en la recopilación de evidencia revisada sistemáticamente por una amplia comunidad científica de expertos. **Resultado:** La actividad física es una acción de salud importante para la prevención del cáncer, sin embargo, no fue posible identificar la cantidad específica ya que la comparación es entre niveles más altos *versus* más bajos de actividad física. **Conclusión:** Existe una fuerte evidencia de la relación entre la actividad física y la prevención del cáncer de: mama, colon, endometrio, esófago, estómago, riñón, vejiga, hígado. Para llevarlos a cabo, es necesario reconocer que la actividad física está relacionada con diferentes determinantes y condiciones de salud y que los programas públicos en el Sistema Único de Salud tienen un gran potencial para la expansión de esta práctica por parte de la población.

Palabras clave: Neoplasias/prevenção & control; Enfermedad Crónica/prevenção & control; Políticas Públicas de Salud; Disparidades en el Estado de Salud; Ejercicio Físico.

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INTRODUCTION

FIRST STEPS

Non-communicable diseases (NCD) are one of the major causes of morbimortality in the world and one of the main strategies for its prevention is the reduction of behavioral risk factors¹. Cancer stands out as one of the NCDs, it is a shared constellation of abnormal cell behaviors associated to DNA changes and genetic damage of the cells along the time^{2,3}.

It is important to highlight the high morbimortality associated with this disease. In 2020, more than 625 thousand new cases of cancer are expected and in 2017, 118 thousand deaths by this disease were counted in Brazil^{4,5}.

Physical activity, widely known as protective factor for NCDs, has been explored by investigators, governmental initiatives, populations and media as a health action, being currently included in the global public health agenda. This could be evidenced in the global action plan on physical activity⁶. The current scientific evidence emphasizes that physical activity, no matter the intensity and duration, brings many health benefits⁷, such as the cancer prevention as shown on this text. In general, the benefits are higher as the intensity and duration increases.

It should be highlighted that the physical activity is mentioned in different policies of the Unified Health System (SUS - acronym in Portuguese), from the national policies addressing general topics as health promotion⁸, until those that have the specificity of cancer control⁹.

Therefore, this text aims to discuss the physical activity for cancer prevention, based on systematic literature reviews carried out by renowned institutions which are described on the next topic. From this evidence, it will be developed some reflections and notes related to the complexities and inequities of physical activity, allowing or not that the individuals enjoy the overall health benefits and for cancer prevention, especially the emphasis on disseminating information to help people to become more physically active and, consequently, healthier.

In addition, it should be emphasized the importance of physical activity public programs, among other issues, in order to bring elements that contribute to the expansion of the feasibility of the evidences within the Brazilian reality and the SUS. It is attempted to discuss with different areas of knowledge using the current scientific evidence and contextual elements that individuals live in and that bring more or less possibilities to health care.

The relevance of the present study, firstly, is related to the magnitude of the prevalence and mortality from cancer in Brazil; and, in the second place, by the challenge of social recognition of the association between physical activity and cancer prevention. National and international

researches show that there is poor knowledge about the risk and protective factors for cancer, with special emphasis on physical activity¹⁰⁻¹³. Finally, the scarcity of studies in the national literature about the association between physical activity and lower risk for some types of cancer highlights the relevance of the present discussion.

METHODS

PATHS CROSSED

The present article was guided by the following research questions: i) What are the current evidences about the association between physical activity and cancer prevention? and ii) How to make physical activity important within SUS reality in order to materialize the evidences?

Aiming to present the evidences related to cancer prevention through physical activity, three documents were selected: a) Summary of the Third Expert Report about Diet, Nutrition, Physical Activity and Cancer of the World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR)²; b) US Physical Activity Guidelines Advisory Committee (PAGAC)⁷; and c) Round table of the American College of Sports Medicine (ACSM)¹⁴.

These references were selected because they were originated from three cutting-edge institutions in physical activity, cancer prevention and related topics. Its relevance lies in the gathering of systematically revised evidences by a wide scientific experts community.

The Summary of the Third Expert Report of WCRF/AICR includes systematically revised evidence by a wide scientific community of experts through the Continuous Update Report (CUP), consisting in a permanent program to identify new evidences and update the scientific literature systematically². PAGAC was the document that guided the updating of the recommendations of physical activity for the health of the American population. It contains a wide discussion about some health conditions, including cancer. The roundtable of ACSM was summoned to evaluate and translate the evidence linking physical activity to cancer prevention, treatment and control, with representation of 20 organizations from around the world¹⁴.

RESULTS

TAKING SOME MORE STEPS: PHYSICAL ACTIVITY AND CANCER PREVENTION

According to the documents mentioned above, there are strong evidences that physical activity reduces the risk of eight types of cancer: breast, colon, endometrium,

esophageal (adenocarcinoma), stomach, kidney, bladder and liver. As shown in Table 1, it is worth to highlight that colon, breast and endometrium cancers were described in all the three selected references. On the other hand, the esophageal (adenocarcinoma), stomach, kidney and bladder were highlighted as strong evidence in two of the three documents reviewed. Finally, liver cancer was mentioned in one of them.

However, the ACSM Roundtable states that physical activity may increase the risk of skin cancer melanoma and given the unequivocal evidences to the sun exposure as cause of melanoma, it is likely that it is related to the greater amount of time that physically active people stay in open air space without the proper sun protection¹⁴. They argue that this should be communicated to the population through campaigns and messages encouraging the practice of outdoor physical activities.

It is important to emphasize that these three documents are different in relation to the methodological approach adopted, highlighting the criteria used to evaluate the strength of the scientific evidence and the study selection and analysis of the studies. In this context, methodological aspects that will help to understand the scientific evidences about the theme will be presented.

In the Summary of the Third Expert Report of WCRF/AICR², in PAGAC⁷ and in the update of this last publication, conducted by McTiernan et al.¹⁵, it was used a gradation criteria - which considers the quality of the studies, the possibility of confounding and biases – was used to evaluate the strength of the scientific evidence. Patel et al.¹⁴ considered the PAGAC and the Summary of the Third Expert Report as well as other references and the inconsistencies among these recent reports. Detailed information about this methodological approach are described elsewhere.

In general, it was not possible to identify the specific quantity of physical activity needed to protect against cancer, since the methodology adopted compares the extremes of physical activity (higher levels *versus* lower levels). That is, the population was divided in strata and the comparison was made between the highest and the lowest, which does not allow the referenced identification.

On the other hand, it is important to emphasize that recent scientific evidences have stimulated discussions and revisions about the populational recommendations of physical activity pointing out that there are health benefits, such as the prevention of NCD and cancer, regardless of duration or intensity¹⁶⁻¹⁸. The correlation between physical activity and health outcomes is curvilinear, indicating that health benefits are observed even with minor volumes of physical activity, including the greatest reduction in the risk of incidence and

mortality due to different NCDs, verified when passing from none to a small volume of physical activity¹⁷, when compared with the active individual who increases the volume of physical activity.

These evidences have presented methodological advances, as they appear with the proposition of direct measure of physical activity through the use of electronic devices as accelerometers, that have provided answers to the limitations encountered when only subjective measures are used^{19,20}.

Regarding the methodology adopted to evaluate the physical activity there is no standardization of the instruments^{2,7}. On the majority of the epidemiological studies included in these documents, data collection occurred through self-report¹⁵, possibly producing biases of overestimation^{16,17}.

It is worth to highlight that the majority of the epidemiological data about physical activity and risk of cancer concentrates on aerobic activity¹⁵. Many studies evaluate only the leisure physical activity while others also include occupational activities, and only few studies consider the domestic activities. Patel et al.¹⁴, for instance, present evidences per domain of physical activity.

In the present study, it is worth to mention that the biological mechanisms related to cancer prevention through physical activity will not be addressed, which would limit other approaches prioritized throughout this manuscript. Detailed information about the biological approach are described in Koelwyn et al.²¹ and in Patel et al.¹⁴.

Considering the estimate of the incidence of the main types of cancer in Brazil, during the triennium 2020-2022, except non-melanoma skin cancer, the physical activity plays an important role to contribute for the prevention of some of the main types of cancer in women (breast and colon) and in men (colon and stomach)⁴.

Therefore, it is important to emphasize that the physical activity can have an impact on the public health issue, producing reduction on the mortality and improving the quality of life and financial stability¹⁵.

In Table 1, a summary of the strong evidences related to the association between physical activity and lower risk of cancer is presented.

The International Agency for Research on Cancer (IARC)²², another cutting-edge institution for cancer control, ratified the findings of PAGAC⁷ and MacTiernan¹⁵. New evidences related to the CUP from the WCRF are similar to the findings regarding the breast cancer²³.

And using the Mendelian randomization based in summarized statistics of the genome-wide association study, it is stated that the physical activity, and other factors, was inversely associated with the general risk of

Table 1. Summary of the strong evidences about the association among physical activity and lower risk of different types of cancer.

III Summary of Evidences – WCRF/AICR ²	PAGAC7 and McTiernan ¹⁵	Patel et al. ¹⁴
Colon	Colon	Colon
Breast	Breast	Breast
Endometrium	Endometrium	Endometrium
-	Esophagus (adenocarcinoma)	Esophagus (adenocarcinoma)
-	Stomach	Stomach
-	Kidney	Kidney
-	Bladder	Bladder
-	-	Liver

prostate cancer²⁴, but still demanding to be included in the agenda of the institutions.

DISCUSSION

In this topic, physical activity in the SUS was discussed from a reflexive-analytical perspective, among other possible ones; that is, the idea is not to embrace the total complexity involved in this phenomenon.

THE EMPHASIS ON THE INFORMATIONAL COMPONENT OF PHYSICAL ACTIVITY IN PUBLIC HEALTH POLICIES

In order to think and discuss physical activity in SUS, it is important to discuss the aspect of emphasis on the informational component, in general, a bet on public health policies related to the physical activity. The beginning came from the idea that only informing people about risk factors and lifestyle related to cancer is not enough to bring substantial and sustainable changes in their life habits².

As much as it is attempted to raise the awareness of healthy choices, it is important to highlight that the knowledge, attitudes and beliefs influence the personal choice, but fail to respond to the whole phenomenon. Thus, they are not only the result of an active choice, but also a reflection of the social norms and social, economic and environmental factors². In this perspective, it is possible to question the extent to which it is a choice or an imposition given all the complexity of inequities and different contexts as it will be presented.

The bet on the informational component occurs from the wide disclosure of the benefits of physical activity for health, which makes their direct relation nearly unquestionable. And, therefore, the consequent

acceptance of the common sense, which would create the people's "awareness". Even when there is knowledge about the association between physical activity and health, there are limits that difficult the transformation into actions and life habits.

It is worth mentioning a survey in which more than 80% of the interviewees considered themselves as 'informed and aware' about the risks, in general, of 'sedentary lifestyle'; but, even though, they were not physically active, and only 12% answered that they did not like to practice²⁵, showing that it was not due to the lack of information.

This is widely relevant for physical activity because there are still concepts that hold accountable only and exclusively the persons for not practicing it and, therefore, have health benefits. However, there are concrete barriers such as the unavailability of an appropriate space, lack of company and the feeling of tiredness or lack of motivation showing that being 'informed and aware' is one element, among others, in the complexity related to physical activity²⁶.

It is recognized the importance of informative campaigns, educational actions, motivational and environmental programs on physical activity in order to be one of the measures related to cancer prevention²⁷. However, when the action, program or policy are strongly or exclusively based on the informational component, which occurs in a wide range of initiatives - academic, governmental, from private institutions and health professional and others, expecting such "awareness", it may not be enough to increase the practice of physical activity.

There are different meanings for physical activity, prevention and health. The isolate bet on the informational component is fragile due to the other aspects that place the 'choice' or 'imposition' on the ways of living, which does not mean that it should be abandoned but that it is possible to deepen the referential around the recommendations, in order to articulate, with the contexts of life, the inequities, public policies and, still considering the corporate and economic interests that can become barriers.

PUBLIC PROGRAMS OF PHYSICAL ACTIVITY IN THE UNIFIED HEALTH SYSTEM

In contrast, public programs are an example of an important public policy to expand the practice of physical activity. There are records of physical activity in SUS since 30 years ago and it is possible to affirm that more recently, in the last 15 years, with the first version of the health promotion policy in 2006, it is becoming apparent in the speech and governmental action in parallel with the position of institutions such as the World Health Organization (WHO).

The existence of these programs, in the SUS and in other segments, is essential for providing access. In this sense, it is relevant to highlight the Health Academy Program, City Academy Program, municipalities initiatives from some Brazilian capitals and innumerable other initiatives from different municipalities.

In Figure 1, there is a timeline with the main events considered relevant for physical activity programs and actions in SUS, among them, the beginning of some of them. However, the specificities of each one of these programs are not the object of analysis in the present study.

One of the possibilities for actions with physical activity is to expand the offer of exercise modalities based on the interest of those involved and to reduce classes with themes guided by the interest of professionals or other actors. Data from one of the main public programs of physical activity in primary care indicate that the proposed activities are basically gymnastic (94%) and jogging/walking (81%)²⁸.

There is a vast repertoire of physical activity unexplored in SUS and possibly these predominant activities mentioned above do not raise the interest of many people. The diffusion that specific activities had, to the detriment of others, can help to explain the challenge for adherence. It is important the diversification of the practices, identifying and recovering those that are pleasurable and culturally relevant, but at the same time still timid from the perspective of public health policies. This strengthens the social participation, in a micro scale, possibly contributing to other forms of participation.

It is recognized that governmental programs of physical activity have grown in SUS; but, in addition to the epidemiological perspective, there are also ideological

and political aspects permeated into these actions, requiring critical analysis of the proposals²⁹.

Public policies are an important step in creating environments that facilitate the adoption of habits, such as physical activity, that contribute to the cancer prevention. However, policy makers face even more barriers and challenges for the development and implementation of policies that help to prevent the growth of NCDs³⁰.

The benefits of physical activity based on the speech of active life and consequently healthier life, are explored even by the auto and fast food industries, which can be understood as an important contradiction. In the case of the food industry, it ends up being an attempt to escape from the responsibility in the growing epidemic of NCDs such as obesity.

PHYSICAL ACTIVITY CONTRIBUTES FOR CANCER PREVENTION: WHICH WAY TO FOLLOW?

As previously presented, some reflections and notes on physical activity in the SUS will be addressed, in addition to those carried out in the previous topic, which came from discussions raised in the scientific literature as well as in classrooms and scientific events about the topic. These experiences provide opportunities for interaction with professionals who offer physical activity through the SUS in Brazil. In addition, multiple professional experiences were useful to highlight some points throughout this study, among other possible, considering the wide debate about physical activity in SUS.

It is pertinent to ask how to implement the evidence presented previously, once it is not possible to think about physical activity in an abstract way without the necessary

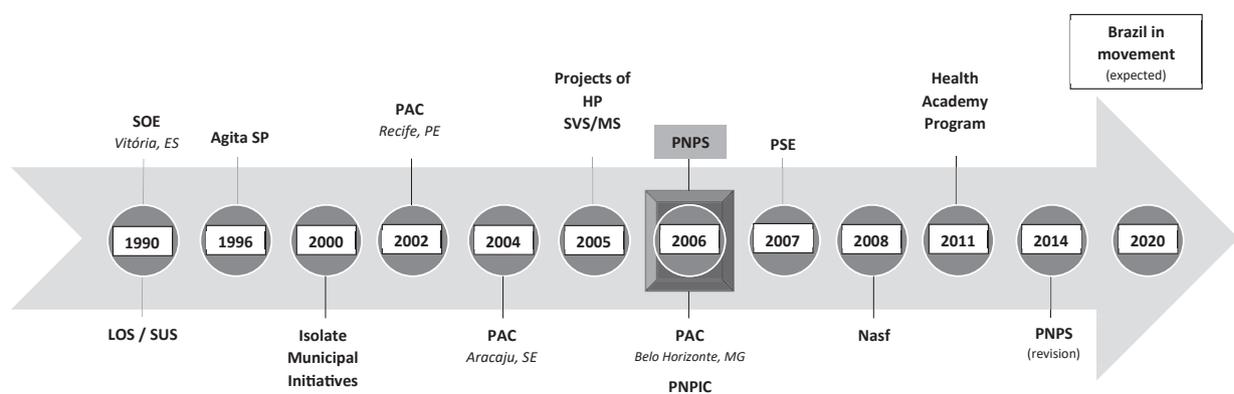


Figure 1. Timeline with relevant milestones for physical activity programs and actions in SUS.

LOS/SUS: Health Organic Law/Unified Health System; SOE: Orientation Exercise Service; PAC: City Academy Program; PS: Health Promotion; SVS/MS: Secretary of Health Surveillance of the Ministry of Health; PNPS: National Policy of Health Promotion; PNPIC: National Policy of Integrative and Complementary Practices; PSE: Program Health in School; Nasf: Family Health Support Centers (later named as Family Health and Primary Health Care Expanded Support Center).

contextualization. Therefore, as we “dialogue” with the daily reality in SUS and, considering the different social and economic contexts in which people live, the question is: how to offer physical activity so it can mean protection against cancer and other NCDs?

It is essential not to lose sight, in this route, the current situation of SUS in times of fiscal austerity and resources restrictions^{31,32}. The new funding way of the primary care, the level of assistance in which the physical activity is offered more often, it has been criticized because of potential loss of resources^{33,34}, which can impact the funding of public programs of physical activity and hamper the expansion of the access.

In Brazil, there are important socioeconomic inequalities and health inequities, which provide unequal opportunities for different population groups. As an example, the access to health services associated to race/color, gender, education, among other. Thus, health inequities can exacerbate or create inequalities since cancer is a chronic condition^{27,35}.

In a document that addresses social inequalities and health inequities related to the cancer, the IARC states that risk factors for cancer, as with other NCDs, tend to be more prevalent in the lives of disadvantaged and vulnerable groups.

These factors include, in addition to the higher prevalence of physical inactivity, smoking and unhealthy diet, a poor access to health services, and also increased stress related to material difficulties and lack of social support, being very complex and multifaceted²⁷. It is highlighted that health inequities can be mitigated when there are investments in health and social protection^{27,36}, for example, in the context discussed in this text, the public programs of physical activity.

Regarding to the physical activity, there are important inequities in relation to gender, income, education and life cycles³⁷. Apparently, the situation of health inequities repeats when the scenario is the utilization of services of physical education with low access, more prevalent in private services and restricted to a few and privileged population groups³⁸. The opportunity of being physically active is permeated by social questions and it is not under the exclusive governability of the individuals.

Thus, physical activity is not a ‘simple’ change of behavior, as usually described in social media messages and by professionals or health institutions. It is advocated that the complexities related to physical activity as well as the concrete reality of individuals and territories, with their potential, limitations and challenges, should be seriously considered.

When considering physical activity as a protective factor for cancer in SUS, it is relevant to highlight the

understanding of the body movement beyond the energy expenditure and the biological and organic benefits, which are considered essential, but a broader vision can offer more possibilities of fruition as offer of health care and promotion, contributing to the increase of the practice and consequently, the protection against different types of cancer.

While practicing physical activity, the persons must mean it, for fruition and benefit of other nature such as mental health through positive feelings and fulfillment of modalities that the individuals identify and like, including them in their daily life. There is always an important portion of people who will not adhere, or who do not like or do not have intention to practice physical activity, and their autonomy must be respected.

It is necessary to consider people and their relations with physical activity and diseases. Therefore, it will be possible to give meaning to the care processes in a qualified way³⁹. Walking, for example, does not have benefits on its own, but it can also provide opportunities for the dialogue and coexistence, which, in consequence, can contribute to the mental health of the users, collaborating for the adherence to physical activity. On the other hand, when there is a focus only on prescription (frequency, volume and intensity), adherence can be hampered³⁹.

The practice of physical activity, for example, suffers influence of unfamiliarity with public programs and the lack of interest on the proposed activities since the local culture and interests could not be considered, which would stimulate the respect and valorization of the regional and local contexts^{40,41}.

CONCLUSION

Physical activity is an important protective factor for cancer, with strong evidence for breast, colon, endometrium, esophageal (adenocarcinoma), stomach, kidney, bladder and liver, reminding that sun protection is essential when practiced in open air because of the increased risk of melanoma skin cancer.

However, it is necessary to emphasize that physical activity is determined and conditioned by a series of social, economic and environmental factors, in addition to the individual motivations and the possibility of access.

When presenting scientific evidences and dialoguing with contexts, realities and the SUS, trying to answer ‘where to go to’, it is stated that physical activity is a complex and multi-determined phenomenon, since it is related to more specific issues, from the beliefs that it is enough to wish and thrive, in a simple and individual understanding until the most general ones such as the SUS funding.

The current evidences indicate that any intensity and duration of physical activity can be beneficial for health, so these elements are not the only or the most important ones, that is, they do not determine the finality or the sense of enjoyment of the physical activity.

It is emphasized the importance of physical activity programs in SUS and in other segments as Education, Sport and Leisure to guarantee access to more people, in particular, considering the diversification of practices with identification and rescue of those culturally relevant in the territories.

Based in the argument presented, the expansion of the understanding of physical activity may contribute to increase the practice and prevalence, providing protection against cancer and other NCDs, and also health benefits, in general, not only those mediated by biological components.

CONTRIBUTIONS

Fabio Fortunato Brasil de Carvalho, Thatiana de Jesus Pereira Pinto and Alan Goularte Knuth contributed for the conception and planning of the study, gathering, analysis and/or interpretation of the data, wording and/or critical review and approval of the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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