Rev Bras Cineantropom Hum

review article

DOI: dx.doi.org/10.5007/1980-0037.2019v21e56303

Evidence-based public health: concepts, principles and applications to promote physical activity in the Brazilian context

Saúde Pública baseada em evidências: conceitos, princípios e aplicações para promoção da atividade física no contexto Brasileiro

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Abstract – The aim of this study was to present the Evidence-Based Public Health (EBPH), describing its concept, principles, application, and relate these theoretical elements for the promotion of Physical Activity (PA) in Brazil. A narrative research on EBPH was conducted in books and in the PUBMED database in 2017. EBPH stages comprise aspects widely disseminated in the public health area, which are beginning to be used for the promotion of PA in Brazil. The use of these concepts can improve Evidence-Based Decision Making (EBDM) through various aspects, including greater access to key scientific evidence, communication between those responsible for EBDM and researchers, in addition to investments in qualification of health professionals.

Key words: Brazil; Health promotion; Motor activity; Public health.

Resumo – *Esse estudo tem como objetivo apresentar a Saúde Pública Baseada em Evidência (EBPH), descrevendo o conceito, princípios, aplicações da EBPH e aproximar esses elementos teóricos para promoção da Atividade Física no Brasil. Realizou-se uma busca sobre a EBPH em livros e na base de dados PUBMED em 2017. As etapas de EBPH compreendem aspectos amplamente difundidos na área de saúde pública e que começam a ser empregados para a promoção de AF no Brasil. O emprego destes conceitos pode aprimorar a Tomada de Decisão Baseada em Evidências (EBDM) mediante diversos aspectos, incluindo maior acesso as principais evidências científicas, comunicação entre os responsáveis por EBDM e pesquisadores, além de investimentos na qualificação dos profissionais de saúde.*

Palavras-chave: *Brasil; Promoção da Saúde; Atividade motora; Saúde pública.*

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Received: April 10, 2018
Accepted: November 03, 2018

How to cite this article
Becker LA, Rech CR, Reis RS. Evidence-based public health: concepts, principles and applications to promote physical activity in the Brazilian context. Rev Bras Cineantropom Desempenho Hum 2019, 21:e56303. DOI: http://dx.doi.org/10.5007/1980-0037.2019v21e56303

INTRODUCTION

In the last decades, there has been an increase in the proportion of deaths attributed to chronic noncommunicable diseases (CNDs) worldwide[1,2]. In Brazil, it is estimated that 72.4% of deaths are attributed to CNDs and their risk factors[3]. In view of the magnitude of this problem, initiatives to mitigate and even reverse this condition, mainly through the Unified Health System, have been proposed and some implemented[4]. Although these initiatives present consistent evidence, it is suggested that they could be improved with the use of current scientific evidence during the decision-making process related to the definition, prioritization and use of resources for health promotion strategies and programs[5].

In fact, international studies indicate that interventions based on scientific evidence may be more effective in solving community health problems[6,7]. It is believed that the application of concepts and principles of Evidence-Based Public Health (EBPH) in programs to promote physical activity (PA) is able to improve the use of resources (human and financial) and identify strategies to make these programs more effective[1,2,8].

In Latin America, the discussion about EBPH in health decision-making [9] is still incipient. Actions such as providing websites with health content and training on health management have been carried out in order to disseminate this concept among managers [10]. However, the implementation of EBPH concepts presents important barriers such as lack of professional qualification, lack of planning time, lack of incentive and support by health managers, as well as lack of knowledge about the EBPH process[9,11,12]. In addition, organizational aspects such as infrastructure, financing and legislation aspects may also limit the effectiveness of this concept[9,11,12]. It is suggested that the use of EBPH in Latin America is limited, at least in part, by the lack of knowledge of concepts, principles and stages of application in public health[5,9]. Therefore, the understanding of these elements can stimulate researchers and managers to adopt evidence-based decision making in a systematic way in the field of research and health service, including the promotion of PA.

The growing concern about the impact of physical inactivity on CNDs has been observed through policy formulation[4], program implementation[13] and human resource training in the Brazilian context. In this context, the use of EBPH concepts may help to improve actions to promote PA in Brazil[14]. Therefore, the present study aims to: a) describe concepts, principles and applications of EBPH; b) discuss the possibilities of application of EBPH in the promotion of physical activity in Brazil.

DEVELOPMENT

Article Search Strategy

Evidence-based decision making (EBDM) and EBPH are widespread concepts in the health area, especially in medicine and other professions

in the public health area[15,16]. However, in relatively new areas, such as promotion of PA, such knowledge is still incipient. Therefore, a literature review on the subject was carried out in order to describe concepts, phases and methods used in EBPH, as well as the implications of this subject for EBDM for the promotion of PA in Brazil.

The search was performed at PubMed databases in August 2017 and comprised the entire period available on databases. Original articles and systematic reviews were inserted using the following descriptors: "public health", "health promotion", "motor activity", "evidence-based practice" and "evidence-based decision making". In order to expand the search strategy, the book "Evidence-based public health: the fundamental concept for public health practice" was used as a conceptual basis, as well as the manual search of publications of the main EBPH experts.

Evidence-Based Public Health Definition and Principles

According to literature, EBPH has been generally defined as "the process of integrating science-based interventions with community preferences to improve the health of populations"[6,7], that is, the application of this concept is directly related to the identification of available scientific evidence on a clearly defined health problem.

The operationalization of this concept is complex and has been linked to EBDM in a set of principles that guide EBPH (Figure 1). The application of EBPH concepts is directly related to the identification of the best available scientific evidence, i.e., scientific information that would support EBDM. In general, EBDM understands the use of complex data and occurs in one cycle. Initially, the phenomenon to be investigated is observed, and a theory that can explain the phenomenon is established and an experiment is carried out. However, in this process, other elements need to be considered, such as: the characteristics, needs and social norms of the community; analysis of available resources, including the team's ability to make evidence-based decisions; and finally the organizational and contextual environment of organizations or institutions involved in EBDM [6,7]. In addition, it is worth mentioning that in some cases, especially in the context of PA promotion, conducting an experiment is ethically questionable and operationally infeasible. For example, a number of policy and environmental modifications aimed at PA promotion (e.g., changes in the built environment of neighborhoods or cities, reduction of taxes on PA-related products) are implemented without any control on the part of the researcher, and participants and study sites cannot be randomized. In these situations, the use of natural experiments and serial cross-sectional studies, as well as other designs, can provide important scientific evidence and should be considered [7].

Identifying the best public health evidence

One of the central principles of EBPH is to identify the best evidence in health. Health managers could make extensive use of evidence, which in-

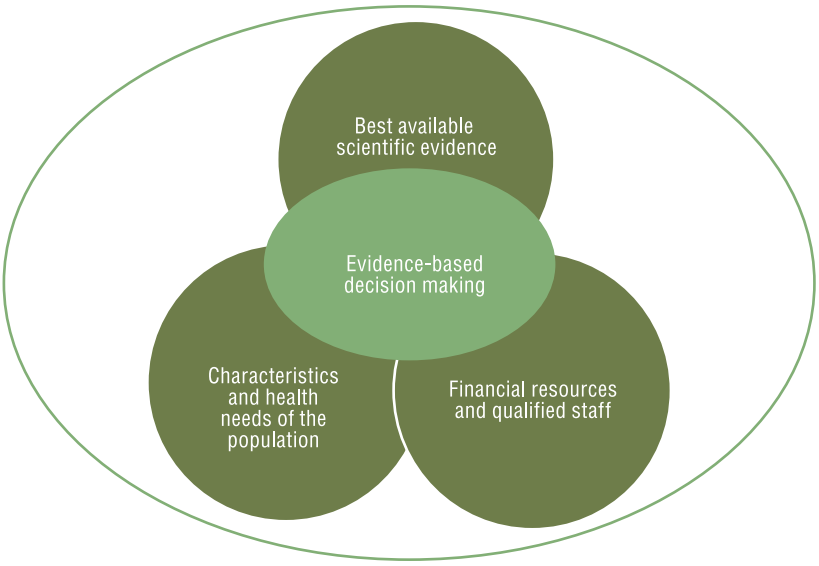

Figure 1. Factors influencing the use of evidence-based decision making.

cludes scientific studies (epidemiological, randomized, cross-sectional, with quantitative and/or qualitative data), health books, reports, and guidelines to analyze the effects of a health program. In this sense, Brownson et al.[6,7] proposed three levels of evidence that can aid in the EBDM process in disease prevention and health promotion programs[6,7].

Type I evidence comes from longitudinal studies (randomized, retrospective, cohort studies). They are characterized as the most appropriate evidence to test the causal relationship between two variables. In these studies, a group of individuals is followed for a period and the relationship between exposure and the health outcome is analyzed. These evidences have been used as a basis for the implementation of community programs, since in addition to establishing the cause (s) of diseases, they allow analyzing the magnitude of intervention consequences, as well as its determinants and mediators. A classic example of this type of evidence is observed in tobacco control interventions. By establishing the causal relationship between smoking (exposure) and increased risk of lung cancer (outcome), campaigns, programs, and laws were developed to reduce tobacco use. Although it is the highest level of evidence, there are difficulties in elaborating studies at this level, since they are complex, require human and financial resources, and some follow-up time[17].

Type II evidence results from the description of interventions based on type I evidence. That is, after being supported by type I evidence, interventions are put into practice and their impacts are evaluated, thus obtaining type II evidence. At this level, evidence is still in the consolidation process and a thorough analysis of its applicability needs to be carried out. For example, increasing the price of cigarette packet and restricting media campaigns to encourage cigarette smoking could reduce the number of smokers (exposure) and consequently decrease the number of cases of lung cancer (outcome). However, the application of this level of evidence

may be limited due to the small number of interventions performed at community level, so little is known about its effectiveness[18].

Finally, type III evidence comes from intervention programs that have resulted in positive changes in the health of individuals. However, implementing such interventions elsewhere requires adequate adaptation according to local and population characteristics. For example, the ban on smoking indoors has been successfully applied in Brazil, but its application in other Latin American countries requires adaptation[18]. Type III evidence has less dissemination in health promotion, including PA promotion. When considering the adaptation of a program to a new reality, it is necessary to observe five characteristics[6,7]: a) characteristics of individuals, that is, the characteristics of the target population, such as sex, age, schooling, risks and/or health history; b) interpersonal characteristics among different realities, such as greater community involvement, greater social support (family and friends), behavioral changes and improvements in information (orientation); c) organizational characteristics, programs can be implemented with a qualified team in places close to the community according to the intervention characteristics, for example, health sectors, community clubs, gyms, churches, schools and basic health units; d) socio-cultural characteristics, refers to the social and cultural norms of localities, as well as established cultural relations; e) political and economic characteristics, refers to the political decisions resulting from the high number of cases of diseases, for example, approval of laws to ban smoking indoors, increase of taxes on processed foods, reduction of sodium in food, and the dry law (driving under the effects of alcohol).

Evidence-based health phases

The advance in the production of knowledge in the area of health promotion has not proportionally reflected in improving the conditions of care provided to the population and professional practice. In part, this may be related to the fact that less than half of health professionals worldwide have never had training on public health[19]. In this way, the lack of specific training can hinder the interpretation of scientific evidence. In order to extend the use of the EBPH concept, seven phases are considered necessary to disseminate and apply scientific knowledge to practical actions in the community[6,7] (Figure 2).

The first phase consists of assessing the community: Initially, the project manager and team should identify health priorities in the community. To do so, the review of data from the country or city surveillance system may be of great value in identifying the magnitude of the problem. For example, identifying the prevalence of physically inactive individuals in the area covered by the intervention may indicate the local situation of the problem. The next phase is to identify the problem: It is suggested to elaborate guiding questions related to the problem. For example, which organization (s) is (are) responsible for developing strategies to promote physical activity? What is the best strategy to promote the practice of physical activity?

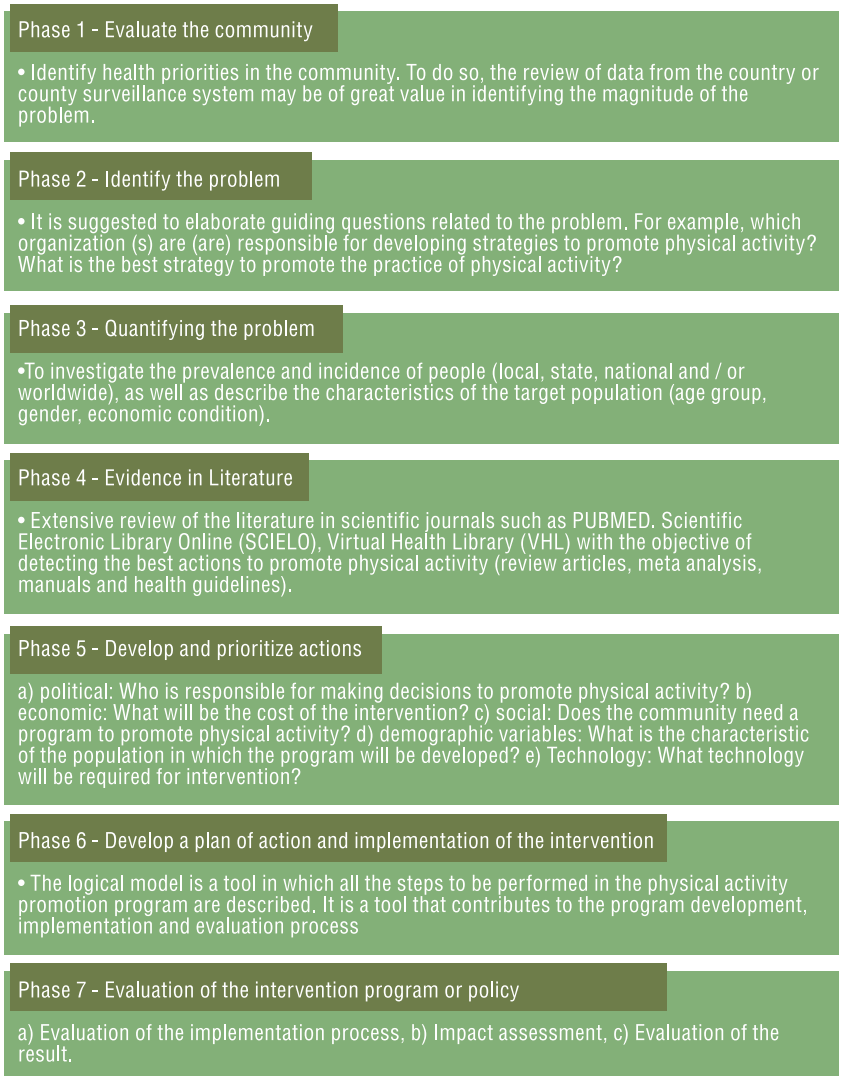

Figure 2. Seven phases to disseminate and apply scientific knowledge to practical actions in the community

This phase is extremely important as it defines the responsibilities in the decision-making process and makes it clearer what the real extent of the problem is. Subsequently, the problem is quantified: Once the number of physically inactive people is defined, it is necessary to investigate the prevalence of the problem according to geographic scale (local, state, national and/or worldwide), as well as to describe the characteristics of the target population (age group, gender, economic condition). For example, cities that do not have a surveillance system can use data from the surveillance system for risk factors and protection for chronic diseases by telephone survey (VIGITEL)[3] conducted in all capitals and in the federal district, and then compare the extent of the city's problems.

After assessing the community, identifying the problem and quantifying the number of physically inactive people, it is recommended to identify the *evidence in literature* on actions to promote physical activity. The use of scientific literature at this phase is of great value, since scientific journals

are the main vehicles in which researchers disseminate research results[20]. In this way, public health managers, politicians and / or those in charge of EBDM need to carry out an extended search in databases that store scientific journals such as PubMed, COCHRANE, Scientific Electronic Library Online (SCIELO) and Virtual Health Library (VHL) with the aim of identifying evidence on the most effective actions to promote physical activity (review articles, meta analysis, manuals and health guidelines).

Based on previous phases, it is necessary to develop and prioritize actions considering five aspects: a) political: Who are the decision makers to promote physical activity? Example: Group of employees, multiprofessional team and/or director of the health department. Is there a consensus among the workforce that promoting physical activity is a priority? Will decisions about planning, implementation, and development of the physical activity promotion program be defined by the entire workforce or by the program manager? b) economic: What will be the cost of the intervention? Is it necessary to seek partners for the intervention? The investment will enable a return to the community, "municipal, state or federal" health department", "cost effectiveness of intervention" c) social: does the community need a program to promote physical activity? d) demographic variables: what is the characteristic of the population in which the program will be developed? Example: (gender, age group, socioeconomic level, schooling) e) technology: what technology will be needed for intervention? Example: infrastructure (gym equipment, courts, balls and hiking trail).

One of the key phases in the development of EBPH is the development of the action plan and the implementation of the intervention. At this phases, it is suggested to develop a logical model. The logical model is a tool in which the stages to be performed in the physical activity promotion program are described. The logical model contributes to the program development, implementation and evaluation process. In this sense, we sought to report examples proposed by the Useful Guide for interventions in Physical Activity (GUIA), Centers for Disease Control (CDC)[21], and the Physical Activity Guidelines for Americans[22].

- What will be the aims of the program? Does it need to develop medium- and long-term goals?
- How the evaluation of program participants will be carried out? Example: (adapted and validated questionnaires, clinical trials "blood tests, strength tests")
- What activities will be offered in the program? Examples: hiking, gymnastic classes, group classes and counseling for physical activity.
- Where activities will be offered? Example: parks, squares, gymnasiums, health academies, schools and basic health units.
- Who are the creators of the project? Example: managers and / or health professionals. What is the responsibility of the program coordinators? Example: program planning, development and implementation.
- What is the cost of the intervention? Example: resources needed to

improve the intervention site, purchase of materials and pay for program professionals.
- Training for program professionals. Example: Workshop, Webinar and training programs.
- Which is (are) the partner (s) of the program. Example: Institutions that can assist in the development of the program (universities, research groups, government institutions and companies) (Figure 3).

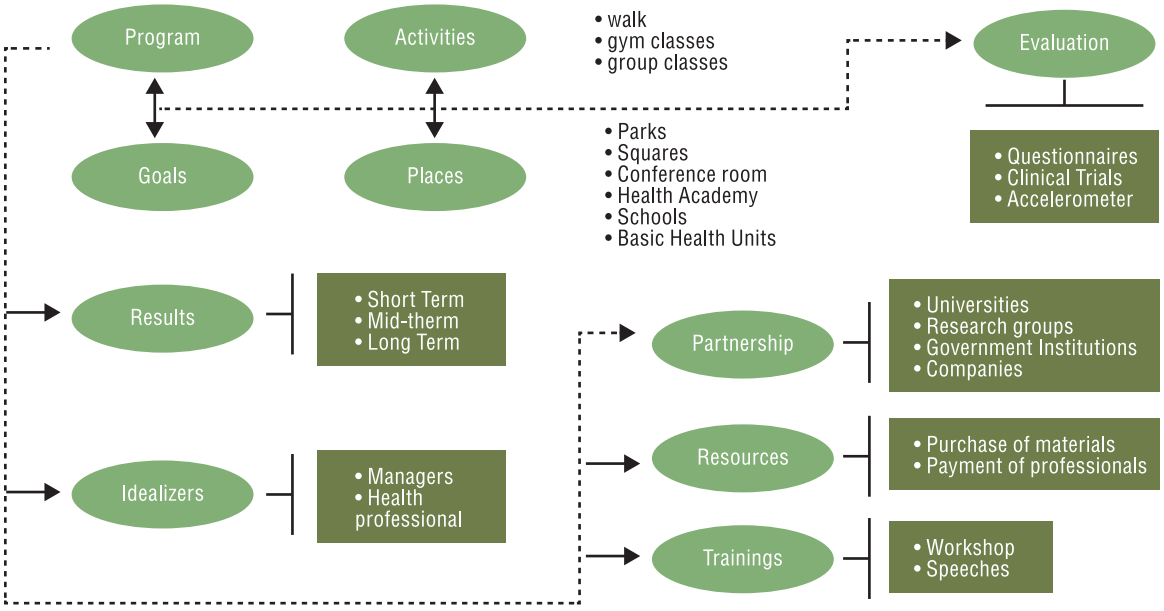

Figure 3. Development of the action plan and implementation of the intervention (logical model).

Immediately after the program is implemented, it is necessary to carry out the evaluation of the intervention program or policy: Program evaluation is an important process carried out at different times to verify the costs and benefits of the program or its "cost effectiveness". In this sense, there are different ways to evaluate a program.

a) Evaluation of the program implementation process: Are interventions consistent with the proposed objectives? How many people are participating in the program? What methodology is used to develop the program? Are the resources sufficient for the program continuity? What materials are available to disseminate the program? Is there adequate infrastructure for the program?
b) Evaluation of the program impact: To evaluate the impact, the evaluation of the program's participants is necessary. Example: Intellectual (knowledge about risk factors related to physical inactivity) and behavioral development (changes in population behavior, incentive to active commuting and leisure physical activity).
c) Evaluation of results: The results are usually analyzed according to the study design (cross-sectional, longitudinal, quasi-experimental or experimental). Short- and medium-term studies seek to identify improvements in the perception of the population's quality of life and

health indicators. In the area of PA promotion, programs need to be of long duration (therefore requiring longitudinal design) to verify the mortality rate, morbidity and gain in life expectancy.

Evidence-based decision making for the promotion of physical activity in Brazil

Physical inactivity is a public health problem that affects one in three adults[23] and contributes to the increase in the number of deaths related to CNDs worldwide[24], generating a high cost for the economy[14,25]. In this way, using the EBPH and EBDM concepts can help promoting PA, identifying the best programs, especially in low- and middle-income countries[23,26].

In Brazil, the Useful Guide for interventions in Physical Activity (GUIA) project developed the main systematic review study on studies published between 1980 and 2010. The review identified the best evidence-based strategies to promote PA in the context Brazilian. Interventions were classified into three categories. (a) "evidence-based interventions", (b) "promising interventions" and (c) "insufficient interventions", following the model proposed by the US Community Guide[27,28].

According to Hoehner et al.[27] school physical education was the only intervention classified as "evidence-based", being an important strategy to increase the levels of PA of children and adolescents. However, other interventions have been classified as "promising" and may contribute to increase the population's PA levels such as: interventions in the political and environmental context (changes in street design, mixed land use, creation of places for the practice of PA[27], reduction in the use of automobiles, improvement of the safety perception between pedestrians and cyclists), behavioral context (PA classes in community settings, CuritibAtiva-PR[29] program, "Academia da Cidade" program in Recife-PE[30,31] and programs with multiprofessional teams) and informative actions (community campaigns in radio, television, and behavior change stimulus)[27]. Although interventions in the school environment were the only classified as "evidence based", there is a need to broaden the evaluation of interventions considered promising to promote PA.

In this context, after publications of the GUIA[32] project, as well as other evaluation studies carried out in Brazil[33-35], the Ministry of Health created the Health Academy Program in 2012, which is the main action to increase PA levels of the population. At the time of launch, there were plans to implement 4,000 places of the program nationwide by the year 2015. However, currently the number of places in operation is below the initial expectation[13]. So far, it is known that the promotion of PA is one of the health priorities in localities where the program was implemented and the impact of the program on the short-term PA levels of the population is not yet known[36]. In addition, important aspects of the program, such as the profile of participants, population adherence to the program, types of interventions in the local context (type II evidence), cost-effectiveness, and health-related benefits (type III evidence). Therefore, the use of the SBPE principles could increase the knowledge about

the success and effectiveness of program.

Another point to be highlighted is the need to bring researchers closer to those responsible for implementing and evaluating PA programs, which can be accomplished through professional training and planning of local actions to promote PA. Currently, there is disconnection between science and decision makers in the area of PA promotion[37], which may be partially related to the reduced network of contacts between these actors[38]. Moreover, the barriers perceived by institutions responsible for implementing PA programs, excessive bureaucracy, lack of time, difficulties between organizations and different goals of organizations with scientific studies) may also hamper this process[39]. On the other hand, information about the assessment of the economic benefits of interventions has been important aspects for the implementation of interventions[37,40]. This set of information reinforces the need to improve the process of management of PA promotion programs, and points to an opportunity for action. In this sense, EBPH can substantially increase the EBDM capacity of managers of such programs.

CONCLUSION

EBPH can be used by identifying the stages and elements that make up this process. These stages comprise concepts, approaches and methods widely disseminated in the public health area and that are beginning to be used for the promotion of PA in Brazil. Thus, further studies using the seven SBPE phases presented in this article should be carried out. This action could improve the use of EBDM, facilitating access to up-to-date scientific evidence, improving communication between decision-makers and researchers, and increasing investment in the qualification of health professionals and PA. It is hoped that the stages and elements that make up EBPH can be widely adapted and diffused among the main actors of PA promotion in Brazil.

COMPLIANCE WITH ETHICAL STANDARDS

Funding

This study was financed in part by "Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil" (CAPES) – Finance Code 001.

Ethical approval

The article was written in accordance with standards set by the Declaration of Helsinki.

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

LAB participated in the study design, literature review, writing and final

version of the manuscript. CRR participated in the study design, writing and final version of the manuscript. RSR participated in the study design and critical review of the manuscript. All authors read and approved the final version of the manuscript.

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