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Review Article

COMMUNITY-BASED PHYSICAL ACTIVITY PROGRAMS FOR BRAZILIAN ADULTS EVALUATED USING THE RE-AIM FRAMEWORK: A SYSTEMATIC REVIEW

PROGRAMAS COMUNITÁRIOS DE ATIVIDADE FÍSICA EM ADULTOS BRASILEIROS AVALIADOS COM A ESTRUTURA RE-AIM: REVISÃO SISTEMÁTICA

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RESUMO

Esta revisão sistemática teve como objetivo descrever as características metodológicas de estudos que aplicaram a estrutura RE-AIM para avaliar programas comunitários de atividade física em adultos brasileiros. A busca foi realizada em 08 de agosto de 2024, em seis bases de dados (Web of Science, PubMed, Scopus, Embase, LILACS e SciELO). Foram incluídos estudos originais que utilizaram a estrutura RE-AIM para avaliar programas comunitários de atividade física com adultos, sem condições específicas de saúde. Identificaram-se 1.563 artigos, dos quais seis foram incluídos na síntese, conduzidos principalmente na região sul, com intervenções também no sudeste e nordeste, predominando amostras de mulheres com idade média entre 40 e 70 anos. Os resultados indicaram desafios no alcance e na manutenção das intervenções, sobretudo em populações vulneráveis. Em contrapartida, programas integrados ao sistema de saúde e com suporte institucional contínuo apresentaram melhores índices de adesão. Em suma, futuras pesquisas são relevantes para aprofundar a compreensão dos fatores que influenciam a sustentabilidade das intervenções em atividade física e a relação entre políticas públicas e programas comunitários. A adoção de estratégias de automonitoramento, suporte contínuo e engajamento institucional se destacam como elementos para assegurar a manutenção de comportamentos saudáveis e a efetividade das intervenções ao longo do tempo.

Palavras-chave: Exercício físico; Atividade motora; Práticas corporais.

ABSTRACT

This systematic review aimed to describe the methodological characteristics of studies that applied the RE-AIM framework to evaluate community-based physical activity programs in Brazilian adults. The search was conducted on August 8, 2024, in six databases (Web of Science, PubMed, Scopus, Embase, LILACS, and SciELO). Original studies that used the RE-AIM framework to evaluate community-based physical activity programs involving adults without specific health conditions were included. A total of 1,563 articles were identified, of which six were included in the synthesis. These studies were predominantly conducted in the southern region of Brazil, with interventions also implemented in the southeastern and northeastern regions, mainly involving female participants with an average age between 40 and 70 years. The findings highlighted challenges in reaching and sustaining interventions, particularly among vulnerable populations. Conversely, programs integrated into the healthcare system and supported by ongoing institutional backing demonstrated higher adherence rates. In summary, future research is crucial to deepen the understanding of factors influencing the sustainability of physical activity interventions and the relationship between public policies and community-based programs. The adoption of self-monitoring strategies, continuous support, and institutional engagement stand out as key elements to ensure the maintenance of healthy behaviors and the long-term effectiveness of interventions.

Keywords: Physical exercise; Motor activity; Body practices.

Introduction

The regular practice of 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity activity per week contributes to maintaining health and promoting well-being[1]. Recent data estimate that 27.5% of the global adult population does not meet the recommended levels of physical activity[2]. This scenario presents an ongoing challenge for public health, requiring coordinated efforts to promote active lifestyles[2,3].

In response to this issue, the World Health Organization (WHO) recommends a series of strategic actions, such as encouraging active transportation, creating urban environments conducive to sports participation, and integrating sustainable community programs[3,4]. These

interventions are essential to reducing the burden of non-communicable chronic diseases (NCDs), including hypertension, obesity, and diabetes, which are among the leading causes of morbidity and mortality worldwide[5].

Community-based and urban programs aimed at promoting regular physical activity have greater potential for sustainability and population-level impact. In addition to reducing the incidence of non-communicable chronic diseases, such programs align with other public policies aimed at sustainable development and are consistent with the United Nations Sustainable Development Goals (SDGs)[6]. Nevertheless, there is still a lack of systematic syntheses that comprehensively analyze the implementation, effectiveness, and sustainability of these interventions in the Brazilian context.

In Brazil, the promotion of physical activity has been prioritized through public policies such as the National Health Promotion Policy (PNPS), which guides the development of actions to reduce physical inactivity and foster healthy habits[7,8]. Community programs such as the "Gyms da Cidade Program" and "Health Gyms" exemplify interventions aimed at promoting population health through accessible opportunities[9-11]. The effectiveness of these initiatives depends on continuous monitoring of their implementation, coverage, and sustainability, especially in contexts of political and economic instability[12].

The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance) was developed to evaluate interventions in different contexts by reconciling internal and external validity, considering both individual and organizational impacts[13]. At the individual level, "reach" assesses the proportion and representativeness of participants involved in the intervention. "Effectiveness" examines the benefits achieved in terms of health and well-being. At the organizational level, "adoption" evaluates the engagement of organizations in implementing the program, while "implementation" verifies whether the intervention was applied as planned. "Maintenance" examines the continuity of the intervention's effects on participants and the sustainability of the program over time[14].

Applying the RE-AIM framework allows managers to understand facilitating factors and barriers that influence the implementation and sustainability of interventions[15]. In the literature, this approach has been used to evaluate physical activity interventions in various contexts and populations[16,17]. However, although the model has been validated and adapted for the Brazilian context[14], studies specifically investigating its application in community-based physical activity programs in Brazil remain scarce[18].

This gap highlights the need for studies that investigate not only the immediate impact but also the long-term sustainability of such interventions. Based on these theoretical assumptions, this study aimed to describe the methodological characteristics of studies that applied the RE-AIM framework to evaluate community-based physical activity programs in Brazilian adults.

Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[19] and was registered in the PROSPERO database (CRD42024572552).

Search Strategy and Data Collection

The inclusion criteria were developed based on the PICO strategy (participant, intervention, comparison, and outcome)[20], considering the following research question: What are the methodological characteristics of studies that used the RE-AIM framework to evaluate community-based physical activity programs in Brazilian adults?

Since this study did not impose restrictions regarding control groups, the "Comparison" criterion was made flexible. The following criteria were established: (I) Participants: Brazilian adults, without disabilities, health conditions, or specific diseases, with direct participation in community-based physical activity programs; (II) Intervention: community-based physical activity programs implemented in Brazil and evaluated using the RE-AIM framework, aiming to increase physical activity levels, regardless of the format (in-person or remote) and approach (individual or group-based); (III) Comparators: control groups were not required; (IV) Outcome: physical activity levels, measured by questionnaires or motion sensors, in different contexts; (V) Study design: original studies that used the RE-AIM framework to evaluate physical activity programs.

Searches were conducted in six electronic databases (Web of Science, PubMed, Scopus, Embase, LILACS, and SciELO), covering the literature up to August 8, 2024. The search strategy used the following descriptors: "RE-AIM" AND ("physical activity" OR "physical exercise") in English, and "RE-AIM" AND ("atividade física" OR "exercício físico") in portuguese.

The screening of studies was independently conducted by two researchers (JC, TMV), who reviewed titles, abstracts, and full texts. In cases of disagreement, a third researcher (LMV) was consulted to resolve issues and reach a consensus. After selecting the studies, the data were organized using Mendeley® software, version 1.19.5, with duplicates removed. Data extraction was also performed independently by the same two researchers and supported by a specialist in public policy analysis (GMCC). A critical review of the eligibility process was conducted by (LMV and BP), ensuring data accuracy and consistency.

The extracted information was recorded in Microsoft Excel® and Microsoft Word® spreadsheets and categorized for both quantitative and qualitative analysis. The variables considered included: (I) Descriptive characteristics (authors, study location, sample, mean age of the target population, year of data collection, study design, instruments, and implementation setting), and (II) Outcomes related to the RE-AIM model components.

The descriptive synthesis was divided into five categories: (I) reach; (II) adoption; (III) effectiveness; (IV) implementation; and (V) maintenance. The risk of bias of the included articles was assessed by two researchers (JG and TMV) using an adapted version of the Effective Public Health Practice Project (EPHPP) tool, as described in the literature[21,22]. Seven methodological domains were assessed: "selection bias," "control for confounders," "data collection methods," "withdrawals and dropouts," "intervention integrity," "analysis protocol," and "use of intention-to-treat." Any disagreement in the assessment was resolved by consensus among the reviewers.

Results

Searches in the electronic databases resulted in the identification of 1,563 potentially relevant articles, of which 943 were removed due to duplication (Figure 1). A total of 617 articles were screened by title and abstract, of which 605 were excluded, resulting in 12 articles selected for eligibility assessment. Of these, six studies were excluded due to thematic inadequacy.

The included studies were conducted in various regions of Brazil, with a greater concentration in the South (n = 4), in addition to one intervention in the Southeast (n = 1) and one in the Northeast (n = 1), as shown in Chart 1. In the South, the studies were carried out in primary care centers and higher education institutions [24, 25, 18, 27]. In the Southeast, Baba et al.[23] evaluated programs implemented in urban centers focused on primary care and the Health Academy Program. In the Northeast, Rocha et al.[27] applied an intervention through the Family Health Strategy aiming to promote physical activity among older adults.

Most participants had a mean age between 40 and 70 years, with a predominance of women in the analyzed samples[18,23,24,27]. The interventions, conducted in health centers and universities, reflected variations in the implementation of physical activity programs, taking into account the different regional realities of Brazil.

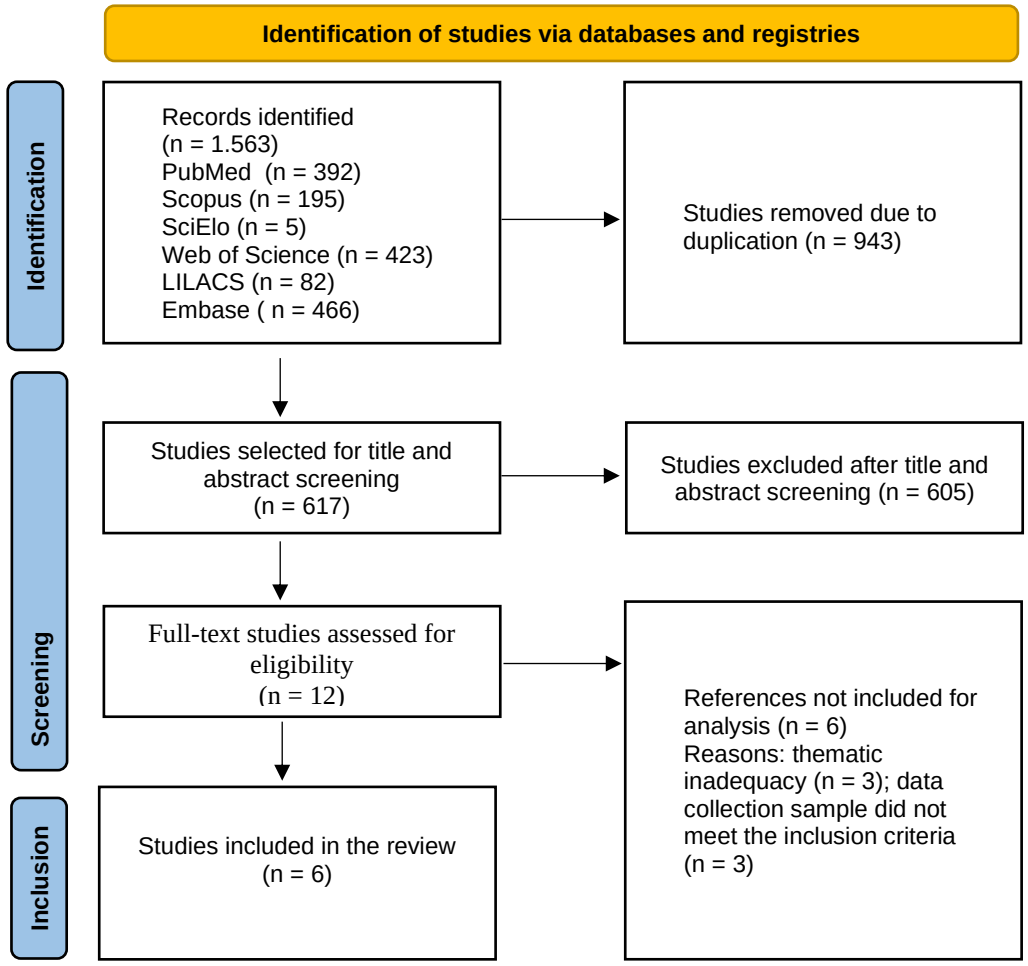

Figure 1. Flowchart of the study selection process for the systematic review
Source: authors

Chart 1. Characteristics of the analyzed studies (n = 6)

References / Authors	City–State (Year of data collection)	Sample – Mean age (%F)	Implementation setting
Baba et al. (2017)[23]	São Carlos-SP (2014–16)	195 – 48 years (88)	Primary Health Care Centers
Benedetti et al. (2020)[24]	Florianópolis-SC (2012)	114 – 70 years (81)	Primary Health Care Centers
Binotto et al. (2015)[25]	Irati-PR (2012)	40-≥70 years (NI)	State University of Central-Western Paraná
Rocha et al. (2024)[26]	Jequié-BA	48-60 years (NI)	Family Health Strategy
Sandreschi et al. (2015)[18]	Florianópolis-SC (2013-2014)	200-67 years (78)	State University of Santa Catarina
Souza et al. (2020)[27]	Florianópolis-SC (2017)	35-≤40 years (71)	State University of Santa Catarina

Note: %F = percentage of women in the sample. NI = not informed.
Source: authors

Chart 2. Summary of measurement instruments used, study design, and outcomes related to the RE-AIM framework components (n = 6)

Study	Instruments	Study design	Primary outcome
Baba et al. (2017)[23]	International Physical Activity Questionnaire (IPAQ), Accelerometer, Focus groups	Quase - experimental	To evaluate a Guided Walking Program in a context of high social vulnerability using the RE-AIM framework.
Benedetti et al. (2020)[24]	Interviews, Focus groups, Physical fitness tests, Accelerometer, WHOQOL-BREF and WHOQOL-OLD	Randomized controlled	To assess the potential of public community health centers to offer traditional exercise classes and behavioral change programs to promote physical activity among older Brazilian adults.
Binotto et al. (2015)[25]	Interviews, Institutional documents	Quantitative and qualitative	To evaluate the Open University for the Elderly program at the State University of Central-Weste (Irati campus) using the RE-AIM model.
Rocha et al. (2024)[26]	Functional assessment, Cognitive tests.	Experimental	To implement a physical exercise program for users of the Family Health Strategy in Jequié, Bahia, Brazil, aiming to increase leisure-time physical activity (LTPA) in the local population.
Sandreschi et al. (2015)[18]	Senior Fitness Test, Diagnostic records, Interviews	Quantitative and qualitative	To evaluate a university extension program for physical activity among older adults using the RE-AIM model.
Souza et al. (2020)[27]	Accelerometer, Interviews, Anthropometric measurements, WHOQOL-BREF	Quasi-experimental	To assess the reach and effectiveness of the VAMOS Program (version 2.0) among technical and administrative staff at the Federal University of Santa Catarina.

Source: authors

As illustrated in Figure 2, the domains "data collection methods" and "analysis protocol" stood out for presenting the greatest methodological strengths, with all studies assessed as having a low risk of bias[23,24,25,26,18,27].

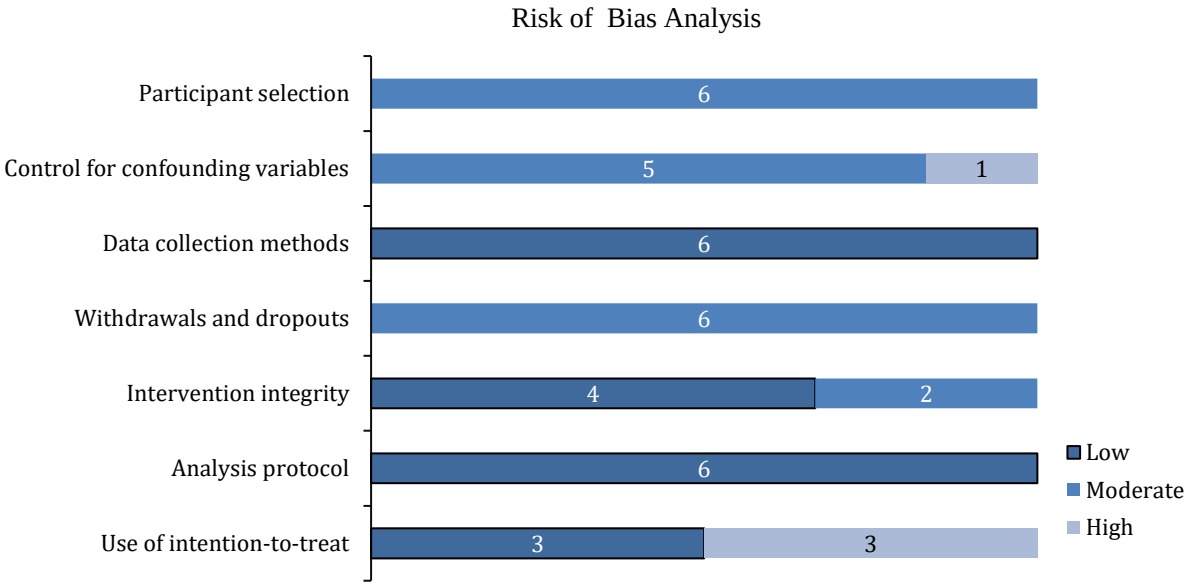

Figure 2. Risk of bias analysis of the included interventions (n = 6).
Source: authors

The use of validated instruments, such as accelerometers and questionnaires, combined with the application of robust statistical analyses, ensured the accuracy and reliability of the results. On the other hand, the "participant selection" domain was considered the most fragile, presenting a moderate risk in all evaluated studies[18,23,24,25,26,27]. This reflects the use of convenience sampling and specific populations, such as public servants and older adults[18,25,26,27], which limits the generalizability of the findings. Controlling for confounding variables also proved to be challenging, showing a moderate risk in most studies[18,24,25,26,27]and a high risk in one of them[23], indicating shortcomings in controlling for external factors.

The “intervention integrity” domain was classified as moderate in three studies[23,25,26] due to the lack of clarity regarding consistent protocol delivery and control between groups. Withdrawals and dropouts were also rated as moderate in all studies[18,23,24,25,26,27], with some interventions applying an intention-to-treat analysis[23,27], while others opted for per-protocol analysis[25,18], which may have compromised the internal validity of the results.

Discussion

The results indicated patterns and challenges within each dimension, offering practical insights that may strengthen future interventions and highlight the relevance of public policies in the context of health promotion initiatives. To this end, the findings were anchored in each component proposed by the RE-AIM framework (reach, adoption, effectiveness, implementation, and maintenance).

Reach

Reach was assessed using self-administered questionnaires[18,23,24,25,26,27]. Some studies[23,25] reported difficulties with participant engagement, highlighting challenges related to recruitment and program dissemination, especially among lower-income groups.

These findings are supported by the systematic review by Linder et al.[17], which identified additional barriers faced by individuals in situations of socioeconomic vulnerability, such as transportation difficulties and limited access to information, reflecting similar obstacles in the evaluated programs. In the Brazilian context, factors such as low educational attainment, limited income, and regional inequalities also strongly impact adherence to regular physical activity[28,29], reinforcing the need for strategies specifically targeting these social determinants of health.

Binotto et al.[25] observed that even when individuals were aware of the interventions, factors such as the distance to the program site and cultural issues related to aging compromised both adherence and the effectiveness of the proposed activities.

On the other hand, programs with an outreach-oriented nature[18,27] showed positive results in participant adherence. The involvement of older adults in the Family Health Strategy was also highlighted[26], although logistical and cultural barriers limited participation, emphasizing the need for continuous adjustments to maximize reach and effectiveness.

The findings underscore the need for personalized approaches and more effective dissemination strategies to improve adherence, especially among vulnerable populations[15,30,31]. Engaging community leaders and using digital platforms to enhance communication may increase the impact of interventions[15]. Moreover, integrating initiatives into the health care system as observed by Benedetti et al.[24] proved to be an effective strategy for fostering greater engagement and adherence to the proposed programs.

Adoption

Adoption was assessed through self-administered questionnaires[18,23,24,25,26,27]. In some cases, institutional adoption was limited[24,25], with low participation of health professionals and restricted integration with local policies. In the university context, Sandreschi et al.[18] reported moderate adoption, characterized by the involvement of faculty and students, but also by difficulties in expanding the program to other areas of the institution.

In contrast, Souza et al.[27] highlighted a more positive experience with the "VAMOS" program, implemented at the Federal University of Santa Catarina. The participation of public servants was relatively favorable, supported by institutional backing and targeted incentives for participants. The authors noted that, in general, when there is institutional support, the likelihood of adoption increases, promoting greater engagement and positive lifestyle changes.

Beyond institutional aspects, it is important to consider structural factors that hinder adoption, such as the absence of local public policies focused on physical activity, administrative discontinuity across municipal governments, and the low prioritization of this issue on political agendas, all of which weaken the implementation of sustainable actions. As discussed by Silva et al.[32], even with regulatory advances in the field of physical activity and health, governmental attention to the topic remains limited. The number of federal regulations related to physical activity is quantitatively low and often restricted to ordinances and decrees, which are more vulnerable to political discontinuity. This scenario reinforces the need to strengthen public policies and promote strategic action that ensures the stable and continuous inclusion of physical activity in municipal and state agendas.

Effectiveness

Various instruments were applied to measure effectiveness at the individual level, including anthropometric measurements[24,27], accelerometers[24,27], the IPAQ[24], and the WHOQOL-BREF and WHOQOL-OLD scales[24,25,27.]

Consistently, studies[18,24,26,27] reported improvements in participants' quality of life and greater adherence to healthy habits. These results reinforce the positive impact of the interventions in promoting active lifestyles and maintaining healthy behaviors over time.

On the other hand, Baba et al.[23] identified an increase in physical activity, but without statistical significance, suggesting the need for adjustments in program implementation to achieve more substantial results. Binotto et al.[25] highlighted methodological difficulties in outcome assessment, emphasizing the importance of using more specific instruments to measure the effectiveness of interventions.

Implementation

The analyzed studies demonstrated variations in the implementation of the programs. In one case[24], high fidelity in execution was reported, while Baba et al.[23] faced difficulties due to low participant adherence and structural limitations. Implementation tends to be more effective when it is adapted to the local context and to participants' needs[18]; however, it still faces cultural and logistical barriers that can compromise execution[26]. Souza et al.[27] emphasized the importance of continuous monitoring and flexibility during the intervention to ensure its success.

These findings suggest that the implementation of community programs is more effective when adapted to local realities, considering the cultural and social specificities of the target population[15]. Additionally, the cultural adaptation of interventions and the provision of technical support during implementation stand out as key elements that facilitate ongoing adjustments and enhance the effectiveness of actions[33].

Maintenance

Maintenance proved to be one of the greatest challenges in the analyzed studies[18,23,24,25,26,27]. In one of the programs, Baba et al.[23] reported that the intervention was discontinued after four months due to low participant adherence and lack of institutional support, highlighting difficulties in sustaining the actions.

Sandreschi et al.[18] reported that only 52.5% of participants remained active during vacation periods, highlighting the difficulty of maintaining physical activity outside the formal setting. The importance of integrating actions into public policies and applying behavioral strategies was also emphasized, although such efforts do not always ensure long-term sustainability[24,26]. On the other hand, some studies[25,27] focused on other aspects of the interventions and did not address maintenance as a central focus of their investigations.

The results reinforced the need to incorporate evidence-based behavior change techniques to ensure the long-term maintenance of outcomes. Continuous social support and the creation of support networks among participants are recommended strategies to increase the likelihood of success[34].

In addition to these aspects, the findings of this review allowed for the formulation of hypotheses regarding contextual and methodological factors that may influence outcomes. Low reach among vulnerable populations is not solely due to shortcomings in dissemination but also to structural barriers, such as urban insecurity and financial constraints. Challenges in institutional adoption and implementation may be associated with high turnover among managers, the absence of local public policies focused on physical activity, lack of ongoing staff training, and the absence of intersectoral integration.

Another point was the variability in effectiveness across the studies, possibly related to the heterogeneity of assessment instruments and the degree of fidelity in implementation. For

example, interventions that used accelerometers and objective measures showed more robust results compared to those based solely on self-report.

With regard to maintenance, continuity relies heavily on political and financial support, but also on the strengthening of community networks and the empowerment of participant, areas still underexplored in Brazil and deserving of greater attention in future studies.

Therefore, the gaps identified in this review point to the need for studies that include: (1) more robust methodological designs addressing all dimensions of the RE-AIM framework, including longitudinal studies; (2) greater attention to sample representativeness; and (3) integration of participatory strategies that engage the beneficiaries themselves in the planning and implementation of the interventions.

Limitations and Practical Implication

The descriptive analysis provided an in-depth and contextualized view of the use of the RE-AIM framework in community-based physical activity programs in Brazil. However, the searches were limited to specific databases, and the results reflect only the studies accessible during the data collection period.

The RE-AIM framework has proven to be a promising analytical tool for assessing the impact and sustainability of physical activity interventions. This study may offer valuable insights to the scientific community by identifying gaps and highlighting factors associated with successful interventions. By consolidating practical evidence, the descriptive synthesis offers perspectives for improving future methodologies, strengthening program implementation, and contributing to the development of more effective and sustainable public policies for promoting physical activity and well-being in community projects and programs.

Conclusions

The application of the RE-AIM framework has proven to be an effective approach for systematically evaluating community-based physical activity interventions in the Brazilian context. The challenges observed across the dimensions of reach, adoption, effectiveness, implementation, and maintenance highlight the need to focus on factors such as the engagement of vulnerable populations and the alignment of interventions with existing public policies.

The implementation of self-monitoring strategies, continuous support, and institutional involvement emerge as key components to ensure the maintenance of healthy behaviors and the long-term effectiveness of interventions. Therefore, it is essential that future studies broaden their investigative scope by exploring in greater depth the factors that influence the sustainability of interventions over time and the connection between public policies and community programs. Addressing these gaps may lead to the development of more structured and effective guidelines, ensuring the success of initiatives and promoting health and well-being in a sustainable manner.

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