



Community-based physical activity interventions for the prevention of lifestyle diseases in low-income populations: a systematic review

Intervenciones comunitarias basadas en la actividad física para la prevención de enfermedades relacionadas con el estilo de vida en poblaciones de bajos ingresos: una revisión sistemática

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Abstract

Background. Lifestyle diseases like cardiovascular conditions, type 2 diabetes, and obesity disproportionately impact low-income populations, worsening global health disparities. Community-based physical activity (CBPA) interventions offer a promising public health approach to address these risks.

Objective. This systematic review evaluates the effectiveness of CBPA interventions in preventing lifestyle diseases among low-income populations, while identifying facilitators and barriers to implementation.

Methods: Using PRISMA guidelines and a PECOS framework, a systematic search across seven databases (2010–2025) identified studies evaluating CBPA interventions in underserved populations. Eligible designs included RCTs, quasi-experimental, and non-randomized controlled trials.

Results. Twenty-three studies met the inclusion criteria. Most reported increased physical activity, improved health behaviors, and reductions in BMI and HbA1C. The most effective interventions were theory-driven, culturally adapted, and multi-component—often delivered through group settings, schools, or community health workers. Facilitators included community engagement, stakeholder support, and integration into existing systems. Key barriers were limited infrastructure, socioeconomic constraints, and short follow-up durations. Only a few studies addressed cost-effectiveness.

Conclusion. CBPA interventions can effectively reduce lifestyle disease risks in low-income populations, particularly when tailored to local contexts. However, further research is needed to enhance sustainability, evaluate economic impact, and promote equity in scaling these interventions.

Keywords

Community-based interventions; physical activity; lifestyle diseases; low-income populations; health promotion; non-communicable diseases; public health; prevention.

Resumen

Antecedentes: Las enfermedades relacionadas con el estilo de vida, como las cardiovasculares, la diabetes tipo 2 y la obesidad, afectan desproporcionadamente a las poblaciones de bajos ingresos, aumentando las desigualdades en salud a nivel mundial. Las intervenciones comunitarias basadas en la actividad física (ICAF) representan una estrategia prometedora de salud pública para abordar estos riesgos.

Objetivo: Esta revisión sistemática evalúa la eficacia de las ICAF en la prevención de enfermedades relacionadas con el estilo de vida en poblaciones de bajos ingresos, e identifica facilitadores y barreras para su implementación.

Métodos: Siguiendo las directrices PRISMA y el marco PECOS, se realizó una búsqueda sistemática en siete bases de datos (2010–2025) para identificar estudios que evaluaran ICAF en poblaciones desatendidas. Se incluyeron ensayos aleatorizados, cuasi-experimentales y estudios controlados no aleatorizados.

Resultados: Se incluyeron 23 estudios. La mayoría mostró aumento en la actividad física, mejoras en los hábitos de vida y reducciones en el IMC y HbA1C. Las intervenciones más efectivas fueron teóricas, culturalmente adaptadas y multicomponentes, implementadas en grupos, escuelas o mediante trabajadores comunitarios. Los facilitadores clave incluyeron el compromiso comunitario y el apoyo institucional. Las barreras principales fueron la infraestructura limitada, factores socioeconómicos y seguimiento a corto plazo. Pocos estudios evaluaron la rentabilidad.

Conclusión: Las ICAF pueden reducir eficazmente los factores de riesgo de enfermedades no transmisibles en poblaciones de bajos ingresos, especialmente si se adaptan al contexto. Se requiere más investigación para evaluar sostenibilidad, impacto económico y equidad.

Palabras clave

Intervenciones comunitarias; actividad física; enfermedades relacionadas con el estilo de vida; poblaciones de bajos ingresos; promoción de la salud; enfermedades no transmisibles; salud pública; prevención.



Introduction

Lifestyle diseases, or non-communicable diseases (NCD), arise mainly from daily behaviors and patterns, leading to significant global health concerns. In 2025, around 74% of global deaths were linked to these diseases, making an increase from previous years. This translates to around 43 million lives lost every year due to NCDs (Varghese et al., 2025). These conditions can cause disabilities and affect younger individuals, creating considerable stress for those impacted (Michaelsen & Esch, 2023). Major categories include cardiovascular diseases, cancer, chronic respiratory conditions, and diabetes mellitus, collectively representing a large proportion of global mortality (Piovani et al., 2022). Contributing factors include poor habits like unhealthy diets, lack of exercise, and substance use (Li et al., 2023; Chakma & Gupta, 2017). The socioeconomic ramifications include direct healthcare costs and indirect costs like reduced productivity and early mortality (Pan et al., 2025).

In low and middle-income countries, the burden of these diseases is rapidly increasing due to population growth and adverse lifestyle choices (Bovet & Paccaud, 2011). These countries face the challenge of managing both ongoing infectious diseases and rising non-communicable diseases (Bollyky et al., 2017; POTEMPA-JEZIOROWSKA ET AL. 2022). Addressing modifiable risk factors through public health interventions is crucial for reducing this burden (Dominguez et al., 2023). The annual death toll from these diseases reaches approximately 41 million, with 15 million occurring among individuals aged 30-69, predominantly in low to middle-income countries (Sasikumar et al., 2023). However, many intervention initiatives fall short of their goals (Banerjee et al., 2024), necessitating a focus on behavioral risk factors.

Role of Physical Activity in Disease Prevention

Lifestyle diseases can be greatly prevented by engaging in regular exercise to enhance the health of the heart, regulate shape and increase mental health. It also builds the musculoskeletal system which gives strength to the body and is health giving and is very functional. Physical activities in improving the reduction of the global burden of chronic diseases cannot be underscored as an important public health initiative. Such initiatives may consist of actions in the society, like public policy and government initiatives. Non-communicable diseases, especially diabetes type 2 and hypertension, are significant threats to the life of people whose unhealthy lifestyle consists of lack of physical activity among other factors (Nielsen, 2019). The phenomenon is supported by the increased levels of inactivity at all ages due to the modern ways of life (Mašanovic et al., 2023). Despite the rising awareness about these risk factors, chronic diseases are on the rise (Rahelić et al., 2024).

Exercise might lower the stress, anxiety, and depressive state, as well as help sleep better. The efforts are to be made to develop environments contributing to physical activity and healthy behaviors thus reducing risks associated with sedentary routines (Johnson et al., 2016) (Brown, 2018). The movement that involves the use of energy is called physical activity whereas physical exercise refers to a structured and planned routine that aims at enhancing fitness. They should be incorporated in everyday life (Qiu et al., 2022). According to Lee et al., the prevalence of many cancers and other heart diseases is associated with sedentary factors (Romanowska et al., 2022).

Need for Community-Based Approaches

Community-based intercommunity's are indispensable in the establishment of an environment to facilitate frequent physical exercise and are successful in the prevention of chronic illness. These strategies can help communities to enhance activity in all age groups, and this will address a major public health concern. As the target of the interventions is not an individual, but the community, a new way of looking and treating physical inactivity is necessary. Physical and social factors are associated with increased physical activity and hence community interventions are crucial when it comes to encouraging community physical activities.

Such interventions may be the improvement of access to recreational facilities, promotion of walking and biking, and the usage of the workplace wellness. (Berrigan et al., 2012). The primary concern must involve shifts of environments situated in multiple settings, such as schools, shops, healthcare institutions, and rooms, regarding health equity and social determinants (Collie-Akers et al., 2020). Physical inactivity globally is one of the factors that leads to the annual loss of millions of lives and contributes to the development of such diseases as diabetes, heart disease, and some cancers. The recommendation



of physical activities by advanced practice nurses can be discussed as an evidence-based strategy of reducing mortality and health problems associated with sedentary lifestyles (Carter & Ford, 2023).

Theoretical Foundations: Ecological Models and Behavior Change Theories

Active travel can enhance health and well-being through contributions to improvements in rates of diabetes, heart disease, dementia and some cancers through energy-saving tactics (A Guide to SDG Interactions: From Science to Implementation, 2017). Nevertheless, lack of good infrastructure regarding active travel may raise the probability of road accidents and injuries as well as death (A Guide to SDG Interactions: From Science to Implementation, 2017). In a bid to address these concerns, there may be gains in applying ecological models and behavior change theories that would promote an increase in the active lifestyles and a reduction in car dependence (Buchan et al., 2012) (A Guide to SDG Interactions: From Science to Implementation, 2017). Such methods must look at physical and social environments and apply multi-level interventions (Bowen et al., 2015).

These frameworks examine the interactions between individual, social, and environmental aspects of influencing health behaviors and thus offer a robust guideline on the design and implementation of effective interventions (Nau et al., 2021). An ecological model accounts widely on the explanation of health behaviour causes that include the social and physical environment (Bauman et al., 2012). Knowledge on how these factors interact is able to facilitate undertaking of interventions that are oriented to accommodate the needs of varying communities, and eventually accommodate sustainable behavior change. Behavioral theories provide models to explain, evaluate, determine, and modify behaviors and make it possible to use specific health promotion activities (Koulouvari et al., 2025). As an example, the decision to take part in physical activity is frequently made deliberately, whereas a decision to remain inactive is prompt and seemingly an effortless one (Keadle et al., 2017). These theories bring out the impacts of personal beliefs in terms of health, expectations, plans and abilities, resources and skills that influence adoption and sustenance of healthy behaviors (Hood et al., 2015).

Pedagogical, motor behavior, and community interest Relevance of social contexts, and environment contexts in the uptake of PA

Combining teaching strategies with research on motor behavior can significantly enhance physical activity adoption. Encouraging participation is essential, highlighting how social and environmental factors promote such engagement. This contributes to building altruistic communities and attracting more individuals. According to the ecological model, effective interventions function at multiple levels, addressing various domains of active living, including recreation, household tasks, employment, and commuting (King & Gonzalez, 2018). Socioecological models view physical activity as a result of interactions between personal and environmental factors (Adank et al., 2018). The behavior surrounding health is influenced by environmental, biological, and psychological conditions (Mastroianni & Storberg, 2014), with models exploring individual, interpersonal, organizational, community, and policy influences, allowing for diverse intervention points (Williams & Swierad, 2019). Behavior change theories, like the Transtheoretical Model and Health Belief Model, help explain behavior modification (Michaelsen & Esch, 2023). Integrating these frameworks offers a comprehensive understanding of health behavior change that facilitates effective health education and promotion (Wang et al., 2024). The theory of planned behavior elucidates influences on conscious intentions and why individuals may not engage in positive activities despite knowing their benefits (Simons, 2016).

Community-Based PA Intervention Types

Organized physical activities, like walking clubs and fitness centers, require adjustments to individual lifestyles, yet health-related activities can thrive with programs focused on moderate activity and supportive social and physical settings. It's important to recognize that theories applicable to individuals might not function the same in group dynamics, given the complex interactions among group leaders, participants, and the broader community. Community-based participatory practices enhance program effectiveness when diverse groups collaborate for change (Wallace et al., 2019).

Physical activity initiatives can be individual or group-driven, and can be unsupervised or supervised. Long-term commitment to these activities should be fostered through behavior change techniques (Osthoff et al., 2018). Ongoing research is essential to tailor effective strategies for specific community

needs, emphasizing public health's role in promoting physical activity through understanding community elements (Peterman et al., 2020). Developing interventions requires insight into target behaviors and the factors influencing their adoption (Condon & Coulson, 2016). Effective strategies should nurture motivation, organization, automatic behavior, and social responsibility (Rhodes, 2013).

Programs must extend beyond classroom health education to encompass integrated perspectives, examining children and youth's attitudes, behaviors, and environments. Targets for physical activity could be based on weekly minutes of exercise or weight loss goals (Morrill et al., 2021). It's crucial to assess if activities sufficiently improve fitness or reduce health risks, ensuring considerations of endurance, strength, balance, and flexibility alongside behavior change theories for adherence. School-based interventions have shown effectiveness, particularly when involving families (Kriemler et al., 2011). Coordinating with schools and community organizations amplifies opportunities for safe physical activity, advocating for practices like classroom activity breaks and enhanced physical education (Murthy, 2023).

Recreational and leisure-based activities

Physical activity can be enhanced through community programs and policies that open up supportive conditions to active living, such as activities like dance, games, and sports, or through informal methods, which are easily accessible to people (Whiting et al., 2020) (Whooten et al., 2020). Schools are well placed to promote physical activity because children seize a lot of time in schools. However, school-based interventions are associated with varying success, and there seems to be no overall standard (Grauduszus et al., 2024). Physical education could also be enhanced by schools by extending classes in length and physical fitness training activities ("Educating the Student Body," 2013). The key strategies to replace sedentary habits on the school level should focus on increasing physical education in schools and minimizing the role of overly structured activities and standardized tests (Saodat, 2022).

Physical activity programs offered at school and in curriculum

Few schools offer physical education every day, and therefore it is important to raise the opportunity of students to adhere to the recommendations on activities (Packham & Street, 2019). Physical fitness programs must influence children in achieving the outcome of 60 minutes of everyday exercise, and the effectiveness of such programs must be determined regarding this number (Metzler, 2016). By changing policies, emphasizing physical education, developing activities-based traditions, and ensuring broad participation-based sports programs, schools should support the culture of physical activity in school settings that enable sedentarism (D Anna et al., 2024) (Chen, 2015). Some policies are supposed to enhance physical activities and bolster the nutrition of schoolchildren by allowing more physical activity and availability of nutritious food (Cleveland et al., 2022). All young people need to be physically active. Another idea about the new activities in the new spaces can pop up in schools (Ryan et al., 2024; Scaradozzi et al., 2021).

Naturalistic outdoor activities under the guidance of the community

Eliminating sedentary activities is crucial for improving health, with a recommendation to limit screen time to less than two hours daily to encourage physical activity. Most students lack sufficient exercise outside school (Rasberry et al., 2011). Schools can integrate physical education into their curricula to engage students in moderate to vigorous activities, fostering motor skill development and promoting an active lifestyle (Kohl et al., 2013; Smith et al., 2015). However, many schools do not meet physical education standards, particularly in elementary levels. Extending physical education activities within schools has proven effective in increasing student activity levels (Thompson et al., 2013).

Additionally, schools must accommodate students with disabilities, enabling their participation in physical education and ensuring they receive adequate support. Teachers should pursue professional development to effectively address physical exercise through workshops and online resources. These initiatives can create school environments that promote physical activity and healthy lifestyles, improving overall health.

Moreover, schools can encourage healthy eating habits through nutrition education, guiding students in making better dietary choices (POTEMPA-JEZIOROWSKA ET AL. 2022). Schools play a pivotal role in preventing obesity by fostering favorable environments, providing nutrition services, and offering health education (Lee, 2011). Regular access to physical activities significantly enhances children's health (Rutberg et al., 2020). Physical education and extracurricular activities can collectively enrich



students' lives, while schools can help monitor unhealthy food consumption (POTEMPA-JEZIOROWSKA ET AL. 2022).

Effectiveness in Preventing Lifestyle Diseases

Physical activity programs in schools, complemented by teaching aids and curriculum adjustments, have shown positive effects on children's health and lifestyle, improving fitness and reducing the risk of diseases like heart disease, high blood pressure, and type 2 diabetes (Andriawan, D et al., 2023)(Kohl et al., 2013). Regular physical education and sports foster lifelong healthy habits and benefit mental well-being (Bortoli et al., 2017). Such programs also improve oxygen intake, lower cholesterol, and reduce screen time. Nutritional education is crucial for better health outcomes and academic success, especially in low-income areas with limited access to healthy food (POTEMPA-JEZIOROWSKA ET AL. 2022). The school environment significantly impacts children's health; interventions should promote healthy weight and provide health benefits (Marks et al., 2015). Tools like AnthroPlus assess children's nutrition by calculating z-scores for weight categories (POTEMPA-JEZIOROWSKA ET AL. 2022). Data analyses using ordinal logistic regression can explore the link between nutritional status and academic performance while adjusting for confounding variables (POTEMPA-JEZIOROWSKA ET AL. 2022). By limiting unhealthy food choices and enhancing balanced diet education, schools can improve adolescents' food intake (POTEMPA-JEZIOROWSKA ET AL. 2022).

Table 1. Community-Based Physical Activity Interventions for NCD Prevention.

Intervention Type	Description	Effectiveness and Outcomes	Implementation Considerations	References
Structured Exercise Programs	Programs such as walking groups and strength training clubs, designed to promote moderate-intensity PA with social and environmental support.	Demonstrated effectiveness in increasing PA levels and improving adherence when incorporating behavior change techniques; supports cardiovascular health and weight management.	Requires tailoring to individual and community needs; group dynamics may challenge applicability of individual-focused theories. Community participation enhances success.	Wallace et al., 2019; Osthoff et al., 2018; Peterman et al., 2020
Recreational and Leisure-Based Activities	Includes dance, games, and sports, promoted through community programs and policies to foster active living environments.	Effective in engaging diverse populations, particularly in school settings; improves PA accessibility but lacks standardized implementation protocols.	Needs supportive infrastructure (e.g., recreational facilities); schools must prioritize PA over academic pressures to maximize impact.	Whiting et al., 2020; Whooten et al., 2020; Grauduszus et al., 2024
School- and Curriculum-Based Programs	Integrates PA into school curricula via physical education, recess, and extracurricular activities, aiming for 60 minutes of daily PA.	Increases PA, improves fitness, and reduces NCD risk factors (e.g., heart disease, type 2 diabetes); positively impacts mental health and academic performance.	Limited adoption of daily physical education; requires policy mandates, teacher training, and inclusive programs for diverse student needs.	Kohl et al., 2013; Metzler, 2016; D'Anna et al., 2024
Community-Led Naturalistic Outdoor Activities	Focuses on reducing sedentary behaviors (e.g., screen time <2 hours/day) and promoting outdoor PA through school and community initiatives.	Enhances motor skill development and fosters lifelong PA habits; effective when integrated into school culture and supported by safe environments.	Many students fail to meet PA recommendations outside school; infrastructure for safe outdoor activities is critical.	Raspberry et al., 2011; Thompson et al., 2013
Theoretical Frameworks	Employs ecological models and behavior change theories (e.g., Transtheoretical Model, Health Belief Model) to address individual, social, and environmental influences on PA.	Provides robust frameworks for designing sustainable interventions; tailoring to community contexts enhances effectiveness.	Complex interplay of factors requires comprehensive understanding of local barriers and facilitators; implementation can be resource-intensive.	Bauman et al., 2012; Michaelsen & Esch, 2023; Wang et al., 2024
Multidisciplinary Collaboration	Integrates schools, healthcare providers, and communities to promote PA and nutrition, leveraging technology (e.g., mHealth apps) and policy support.	Enhances behavior change through tailored, evidence-based interventions; reduces NCD risk factors when supported by cross-sector collaboration.	Socioeconomic barriers and resource constraints can limit scalability; requires coordination across sectors and integration of digital tools.	Chernoff, 2001; Siegel et al., 2018; Hinchliffe et al., 2022
Role of Technology	Utilizes mobile health technologies, AI, and digital tools to monitor PA, provide feedback, and enhance engagement in	Improves accessibility and personalization of PA interventions; promising for obesity and NCD management when integrated with healthcare systems.	Preliminary studies require larger, longer-term trials; integration with electronic health records	Coorey et al., 2019; Salinari et al., 2023; Rhee et al., 2020



community-based
interventions.and clinician support is
essential.

Implementation Challenges and Enablers

Obstacles in promoting healthy eating can be addressed through clear strategies that identify community-specific challenges and opportunities. Prevention programs utilizing local resources can become effective and sustainable (Albright & Gregg, 2013; Wethington et al., 2020). Plans should focus on enhancing access to healthy foods and nutritional education, particularly in rural schools (POTEMPA-JEZIOROWSKA ET AL. 2022). These initiatives can significantly improve eating behaviors and overall nutrition among teens, combating rising obesity rates and related health issues (POTEMPA-JEZIOROWSKA ET AL. 2022). Schools are strategically positioned to address childhood obesity, which can ease the psychological and financial burdens on families (Bel-Serrat et al., 2021; Klein et al., 2023). Notably, students consume a significant portion of their daily calories at school (Barnes et al., 2017), making schools crucial in supporting healthy lifestyles that encourage accountability in food choices (Menor-Rodriguez et al., 2022).

Integrating nutrition into school curriculums can facilitate permanent changes in dietary habits, ultimately enhancing students' health and well-being (POTEMPA-JEZIOROWSKA ET AL. 2022). A nutritious diet rich in fruits, vegetables, whole grains, healthy fats, and lean proteins is vital for teenagers' development and lifelong health (POTEMPA-JEZIOROWSKA ET AL. 2022). Nutrition education must underscore the significance of healthy eating (Raut et al., 2024). The WHO recommends promoting healthier school meal programs while restricting junk food access to combat both undernutrition and overnutrition (POTEMPA-JEZIOROWSKA ET AL. 2022). Schools can influence weight management and foster positive eating behaviors by providing healthier food options, addressing common issues like meal skipping and unhealthy snacking, ultimately improving adolescent health (POTEMPA-JEZIOROWSKA ET AL. 2022; Taylor et al., 2019).

Role of Multidisciplinary Collaboration

Integrations of adult education theories improve behavioral changes leading to healthy lifestyles and successful health education activities (Chernoff, 2001). Educational interventions can be enhanced with self-assessment, feedback, and active engagement to better serve diverse groups. Well-targeted mass media campaigns can increase awareness and drive behavior change. Effective behavioral nutrition interventions are crucial for promoting positive eating habits among adults (Cannoosamy et al., 2016) and play a significant role in encouraging healthier food choices in children and adolescents (Dudley et al., 2015; POTEMPA-JEZIOROWSKA ET AL. 2022). Combining nutrition education with cooking lessons supports the learning and adoption of healthy meals, focusing on effective nutrition patterns and practical application (Alghamdi et al., 2023). Specific courses and seminars on nutrition, cooking techniques, money management, and time planning aim to enable students to adopt healthier lifestyles (Wongprawmas et al., 2022).

These initiatives should connect with personal networks, communities, and policies to foster knowledge and promote nutrition-related behavioral changes (Savoie-Roskos et al., 2018). Collaborations can significantly reduce lifestyle disease risk factors by creating environments conducive to healthy eating and physical activity (Collie-Akers et al., 2020). Effective nutrition policies shape the environment for healthy food preferences and eliminate barriers to better food choices (Kim et al., 2015). Educating students on preventing non-communicable diseases enhances lifestyle choices and encourages permanent lifestyle changes within society (Hamedani et al., 2019). Programs addressing healthy diets are essential for preventing non-communicable diseases (Meleleo et al., 2021).

Interventions promoting nutrition education, healthier food choices, and physical activity are vital. Behavior modifications, parental involvement, school gardens, and reward systems can influence youth dietary habits (Murillo et al., 2016). Clear policy information guides adults in making healthier food decisions regarding cooking, purchasing food, and creating healthier eating patterns (Williams et al., 2024). Socioeconomic factors, such as income and education, significantly affect dietary habits and nutritional knowledge, highlighting the need for targeted measures for lower-income students (POTEMPA-JEZIOROWSKA ET AL. 2022).



Addressing barriers to fresh produce access and enhancing nutritional literacy can motivate long-term healthy eating (Cahill et al., 2020). Nutrition's relationship with health is intricate, needing consideration of genetics, lifestyle, and environmental factors to influence dietary behavior (POTEMPA-JEZIOROWSKA ET AL. 2022). Changing determinants of dietary behavior is crucial for healthier outcomes (Mozaffarian et al., 2018). Lifestyle interventions are vital for preventing nutrition-related conditions and non-communicable disease risk factors (Budrevičiūtė et al., 2020). Establishing healthy food environments through policy and environmental interventions can improve overall eating habits, especially for low-income and minority groups (Bowen et al., 2015). Fostering healthy dietary behaviors from childhood can lead to their continuation into adulthood (Evenhuis et al., 2021), promoting the prevention of chronic condition risk factors while considering socioeconomic determinants (AbdulRaheem, 2023).

Monitoring and evaluation

The persistence of chronic disease prevention and health inequality underscores the necessity of health equity through preventive practices and initiatives. Evaluating these programs requires close monitoring of utilization to assess their effectiveness, utilizing metrics to measure changes in physical efforts and health outcomes (AbdulRaheem, 2023; Mazzucca et al., 2021). Despite a rise in food and nutrition knowledge, research remains limited, hindered by varying definitions and metrics that complicate intervention success (Silva, 2023). Nutritional epidemiology aims to investigate dietary habits and nutrient intake, linking them to health conditions like obesity and diabetes, to develop public health strategies at family, school, and community levels (POTEMPA-JEZIOROWSKA ET AL. 2022). Effective healthcare interventions can improve health metrics and reduce costs, highlighting nutrition's role in disease prevention and management (Downer et al., 2020).

Ideal interventions integrate multiple strategies to combat chronic diseases, though resource limitations often challenge public health efforts (Sand et al., 2017). These programs also evaluate the efficacy of nutrition activities and policies against health interventions, focusing on diet-disease interactions regarding fats, sugars, and processed foods (POTEMPA-JEZIOROWSKA ET AL. 2022). Assessments should include objective nutrition outcomes (POTEMPA-JEZIOROWSKA ET AL. 2022). Successful interventions should span at least five and a half months, target specific objectives, and involve supportive designs, theories, and policymaker backing (Murimi et al., 2018). Strategies essential for long-term health include breastfeeding and complementary feeding for children (POTEMPA-JEZIOROWSKA ET AL. 2022).

Comprehensive approaches are crucial to preventing malnutrition and enhancing overall well-being across ages (Samal et al., 2023). Policy initiatives, such as trans fat removal, illustrate how governmental actions can better dietary patterns (Temple, 2020), promoting healthier lifestyles among children (Foltz et al., 2012). Nutrition-sensitive approaches, which include healthcare and education, significantly improve health outcomes for women (Fox et al., 2018). It is vital to evaluate community-based physical activity interventions to prevent lifestyle-related diseases in low-income populations, focusing on implementation strategies and success factors in public health contexts.

Method

Review design

This systematic review's PECOS protocol (Population, Exposure, Comparison, Outcomes, Study design) followed the reporting guidelines of PRISMA so that it can be made transparent and reproducible. The electronic databases searched were PubMed, Scopus, Web of Science, Embase, CINAHL, Cochrane Library, and PsycINFO. The search was conducted for articles published between January 2010 and January 2025, with the last search performed on January 31, 2025. The search strategy combined terms related to "community-based physical activity," "intervention," "low-income," "non-communicable diseases," "diabetes," and "cardiovascular disease," employing Boolean operators ("AND", "OR") and limiting results to English-language publications within the specified date range. Two reviewers independently screened titles, abstracts, and full texts. Disagreements were resolved with a third reviewer. Risk of bias was assessed using the Cochrane RoB 2.0 tool for RCTs and ROBINS-I for non-randomized studies, and any differences in assessment were resolved by consensus.



Table 2. Inclusion and exclusion criteria devised for this review.

Criteria	Inclusion	Exclusion
Population	Individuals of any age group, including children, adults, and the elderly, from low-income populations or low-resource settings such as urban slums or rural areas	Middle- or high-income populations, studies without clear income-based context, or hospital-based only populations
Exposure	Community-based physical activity interventions such as walking groups, group exercises, dance programs, and sports-based activities, delivered in community settings by professionals or layperson	Interventions not involving physical activity, or those conducted in healthcare settings only
Comparator	Usual care, no intervention, waitlist control, or alternative non-physical activity interventions	No comparator or unclear comparator
Outcomes	Primary outcomes: Changes in lifestyle disease indicators such as BMI, blood pressure, blood glucose, cholesterol, HbA1c, waist circumference. Secondary outcomes: Physical activity levels, quality of life, adherence, awareness, and community engagement	Studies not reporting any health-related or behavioral outcomes linked to lifestyle diseases
Study design	Randomized Controlled Trials (RCTs), Quasi-experimental studies, Controlled Before-After studies, non-randomized intervention studies	Case reports, editorials, reviews, conference abstracts, qualitative-only studies, protocol papers
Publication language	English only.	Non-English publications.
Publication year	Studies published from Jan 2010 to Jan 2025.	Studies published more than 15 years ago.

Database search protocol

To ensure an all-inclusive capture of literature, a database search strategy was conceptualized. The databases searched include PubMed, Embase, Scopus, Web of Science, Cochrane Library, CINAHL, and PsycINFO. The precision of the search was maximized using Boolean operators and MeSH keywords. It included combinations such as: ("physical activity" OR exercise OR "group exercise" OR walking OR sports OR dance) AND ("community-based" OR "community setting") AND ("lifestyle disease" OR "non-communicable disease" OR diabetes OR hypertension OR obesity) AND ("low-income" OR "low-resource" OR underserved OR "rural area") AND ("randomized controlled trial" OR "intervention study")

Data extraction protocol and data items

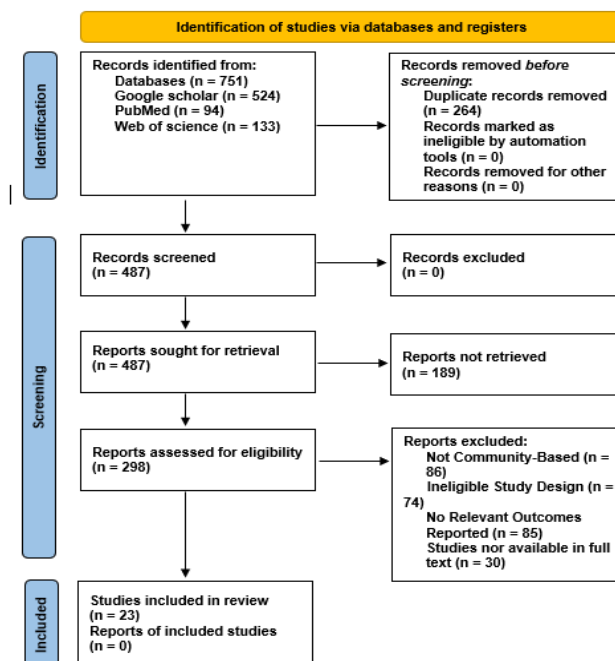
Application of data extraction was conducted by using a form of pre-designed data extraction. Data extraction used two independent reviewers to limit error and bias. Included are study characteristics such as author, year, study design, sample size, and population demographics; intervention details such as type of physical activity, mode of delivery, frequency, duration, personnel involved, and community setting; outcomes including changes in BMI, blood pressure, blood glucose, cholesterol, HbA1c, physical activity levels, and quality of life; major findings and effectiveness; and statistical outputs such as mean differences, confidence intervals, or p-values. Third, reviewers compared and resolved inconsistencies by cross-checking in consensus.

This section explains how the research was done. The design of the same is described and it is explained how it was put into practice, justifying the choice of the methods used. This section should contain the type of quantitative research, the scope or depth of the research (exploratory, correlational and/or explanatory), population and sample, and the techniques used should be added. This section is fundamental, because it is the one that will allow the scientific community to reproduce the result. Most of this section should be written in the past tense, in a descriptive style.

Results

Figure 1 presents the PRISMA flowchart:

Figure 1. PRISMA flowchart



Effectiveness of Interventions

Most interventions demonstrated at least modest improvements in physical activity (PA) levels, cardiometabolic outcomes, or associated health behaviours such as dietary intake and tobacco use. RCTs by Shirinzadeh et al. (2019) and Eaglehouse et al. (2016) reported significant increases in PA and reductions in biomarkers like HbA1C and BMI, confirming the efficacy of structured lifestyle interventions, particularly those delivered through group education or community health workers (CHWs). Similarly, meta-analyses by Hassen et al. (2021) and Bull et al. (2014) showed increased odds of PA adoption, especially in low- and middle-income countries (LMICs) and among high-risk individuals. Systematic reviews such as those by Costa et al. (2015), Amiri Farahani et al. (2015), and Cleland et al. (2012) reinforced the notion that group-based and theory-driven interventions in disadvantaged populations can effectively promote PA and improve health outcomes, although the magnitude of benefit varied considerably. Notably, Cleland et al. observed limited effects among children, suggesting age-specific tailoring may be needed.

Duration and Delivery Mode

The mean follow-up period for included studies was 9.5 months (range: 3–24 months); studies with extended follow-up generally reported more sustained improvements. The duration of interventions varied widely from as short as one month to over two years yet longer and continuous programs tended to yield more sustainable benefits. Programs like those by Cohen et al. (2013) and Rabiei et al. (2010), which extended over two years and incorporated environmental and policy-level changes, demonstrated substantial gains in PA metrics such as MET-hours and leisure-time PA. Delivery modes played a crucial role in determining intervention success. Face-to-face group sessions (Bock et al., 2014), peer support (Gyawali et al., 2019), and the involvement of community stakeholders (e.g., teachers, park administrators, local government) were repeatedly associated with greater engagement and improved outcomes. For instance, Bock et al. found that in-person counseling was more effective than web- or mail-based communication, particularly among women and ethnic minority groups.

Population-Specific Observations

While most interventions targeted adults at risk of non-communicable diseases (NCDs) such as type 2 diabetes mellitus (T2DM) and cardiovascular disease (CVD), some focused specifically on subgroups such as schoolchildren (Verstraeten et al., 2012; Bleich et al., 2013), women (Amiri Farahani et al., 2015), and urban poor communities (Andrade et al., 2018). Results were stratified by age, gender, and intervention type, showing adults benefited most in terms of BMI and PA outcomes, while child/adolescent-focused interventions often demonstrated more variable effects. The variability in findings among children and adolescents where interventions often showed limited or inconsistent benefits underscores the need for integrated, multi-level approaches that combine educational, environmental, and family-level strategies. On the other hand, adults in LMICs showed particularly strong responsiveness to community-led PA initiatives, as evidenced by the studies from Dyson et al. (2015), van de Vijver et al. (2012), and Ndejjo et al. (2021). These interventions often leveraged mass media, CHWs, and existing public health infrastructures, suggesting scalability and cultural adaptability are achievable even in resource-limited settings.

Implementation Considerations

Several reviews (e.g., Skar et al., 2015; Withall et al., 2011) emphasized the importance of identifying and addressing implementation barriers such as space constraints, lack of child care, low self-confidence, and financial cost. Facilitators included peer support, integration into school curricula, accessible community infrastructure (e.g., free fitness centres), and culturally appropriate messaging. Environmental interventions (Baker et al., 2015; Durão et al., 2023) that altered the built environment or provided free transport showed mixed success improving accessibility but not consistently translating to long-term behaviour change. While most studies reported positive outcomes, several (e.g., Amiri Farahani et al., 2015; Reynolds et al., 2014) noted either inconclusive or context-dependent effects. The heterogeneity in study designs, outcome measures, and intervention fidelity across studies presents challenges in drawing firm conclusions about the most effective intervention model.

Economic Evaluations and Sustainability

Only a few studies (e.g., Li et al., 2015) examined cost-effectiveness, with findings supporting the value of group-based community delivery models in preventing T2DM. These programs were found to be more cost-effective than individualized interventions, offering favourable ICERs and quality-adjusted life year (QALY) gains. The CBPA interventions have a great potential to improve PA and help to prevent noncommunicable diseases related to lifestyle. The most successful interventions were those that are based on a multi-component, community-based with socioeconomic and cultural context-adapted approaches. Even though the results show promise, limitations due to low quality of study design, variable outcome measurements, and limited follow-up times suggest a future need to perform additional high-quality RCT and longitudinal studies. Cost-effectiveness analyses were reported in limited studies. Group-based interventions were generally cost-effective (Li et al., 2015), but further economic analyses are needed.

Table 3. Summarizes community-based physical activity interventions with varying effectiveness in improving health outcomes among low-income and high-risk populations.

Author (Year)	Study Design	Population Characteristics	Intervention Description	Delivery Method	Duration & Frequency	Outcomes Measured	Main Findings / Effectiveness
Shirinzadeh et al. (2019)	RCT	2574 adults at risk for T2DM	Lifestyle intervention (PA and diet)	Community health workers	6–12 months	BMI, HbA1C, FBG	Decreased weight, decreased HbA1C, increased PA
Hassen et al. (2021)	Systematic Review and Meta-analysis	98,919 participants	CBIs to improve PA (CVD prevention)	Group/community delivery	12–24 months	MVPA, METs, steps/day	Increased odds of physical activity at 12 months
Cleland et al. (2012)	Systematic Review	Disadvantaged adults & children	PA interventions in poor communities	Group-based & education-led	Various	Free-living PA levels	Adults benefited, children showed limited impact
Cohen et al. (2013)	RCT	Residents near 50 parks	Park-based PA promotion	Public Park administrators and community governance bodies	2 years	MET-hours/week	Increased PA in parks by approximately 1830 MET-hours



Verstraeten et al. (2012)	Systematic Review	School-aged children (6–18 yrs)	School-based physical activity and dietary education	Teachers, stakeholders	≥6 months	BMI, PA behavior	Decreased BMI in 8/22 studies; most increased PA & diet
Gyawali et al. (2019)	Review (10 studies)	Adults in LMICs	T2DM prevention via lifestyle	CHWs, group ed, peer support	Varies	HbA1C, FBG	9/10 showed decreased glucose/HbA1C
Amiri Farahani et al. (2015)	Systematic Review	Women (18–65 yrs)	PA promotion	Group-based sessions	6–12 months	PA levels	Results inconclusive
Bock et al. (2014)	Systematic Review	20,532 adults	Various community PA methods	Group, mail, web, counseling	3–12 months	% change in PA	Increased PA with face-to-face delivery
Ndejjo et al. (2021)	Mixed-method Review	Adults in LMICs	CVD prevention (PA, diet, smoking)	Media, CHWs, outreach	Varies	PA behavior, knowledge	Increased PA & knowledge, decreased CVD risk factors
Andrade et al. (2018)	Quasi-experimental	Adults near fitness centers	Free community exercise	Local gov't program	Continuous access	Leisure-time PA	Increased PA near centers, esp. <500m radius
Costa et al. (2015)	Systematic Review	At-risk adults	PA via CHWs	Counseling, home visits	Avg. 6.5 months	Physical activity	Increased PA in 62% of studies
Skar et al. (2015)	Qualitative	Schoolchildren	Health promotion	Schools, teachers, stakeholders	Varies	PA behavior	Barriers: space, food access
Withall et al. (2011)	Mixed methods	Low-income adults	Identify PA program barriers	Interviews, surveys	Not applicable	Barriers/enablers	Barriers: cost, confidence, childcare
Rabiei et al. (2010)	Controlled trial	Urban adults	"Healthy Heart" community program	Education, environment, policy	More than 2 years	Leisure-time PA, transport PA	Increased LTPA, decreased inactivity; no transport PA change
Reynolds et al. (2014)	Systematic Review	Mixed	Incidental PA interventions	Public campaigns, nudges	1–6 months	Stair use, active transport	60% showed increased in incidental PA
Dyson et al. (2015)	Quasi-experimental	Adults (China, India, Mexico)	CIH: diet, tobacco, PA program	Mass campaigns and policy	18–24 months	PA, diet, tobacco	Increased PA, decreased salt/tobacco use
van de Vijver et al. (2012)	Systematic Review	Populations in LMICs with CVD risk	Community-based CVD prevention interventions	Media, health education, provider training	Varies (multi-study review)	Lifestyle behaviors, BP, glucose, weight	Decreased CVD risk, improved BP, glucose, adherence
Baker et al. (2015)	Systematic Review	Populations in 267 communities (some in LMICs)	Multi-strategic community-wide PA interventions	Environmental changes, social marketing	Environmental changes, social marketing	PA levels	Mixed results; better studies showed no population-level effect
Durão et al. (2023)	Systematic Review	General populations (mostly high-income countries)	Infrastructure, policy, and regulatory interventions to increase PA	Urban planning, free facility access, free transport	Varies (13–33 studies reviewed)	PA, weight, BP, T2DM/CVD risk	Effects varied; some showed benefit in PA and access
Bull et al. (2014)	Systematic Review and Meta-analysis	Low-income adults	Behavior changes interventions for PA, diet, and smoking	Counseling, community education, multi-modal	Variable	PA, diet, smoking cessation	Small but positive effects for all behaviors
Li et al. (2015)	Systematic Review	Adults at high risk for T2DM	Diet & PA promotion to prevent T2DM	Group sessions, primary care, community delivery	≥3 months	Cost, ICER, QALYs	Group-based cost-effective; better than individual
Bleich et al. (2013)	Systematic Review	Children (school and community setting)	Community-based childhood obesity prevention	Schools, homes, community	≥1 year	BMI, physical activity, diet	4/9 showed decreased BMI, 2 improved PA/vegetable intake
Eaglehouse et al. (2016)	RCT	223 overweight adults at risk for T2DM/CVD	DPP-based community lifestyle intervention	Group education sessions	12 months	MET·h·wk ⁻¹ (PA level)	Increased PA by 14.7 MET·h·wk ⁻¹ at 6 months, with the effect sustained at 12 months

Assessment of bias

Using the RoB 2.0 tool (Figure 1), Shirinzadeh et al. (2019), Cohen et al. (2013), and Eaglehouse et al. (2016) displayed low overall risk of bias across all domains, highlighting strong internal validity. In contrast, the ROBINS-I tool (Figure 2) indicated serious or moderate risk in several studies. Gyawali et al. (2019), Amiri Farahani et al. (2015), Skar et al. (2015), and Rabiei et al. (2010) faced serious bias mainly due to confounding and selection bias, alongside issues in outcome measurement and reporting. Reynolds et al. (2014), Costa et al. (2015), Withall et al. (2011), Baker et al. (2015), and Hassen et al. (2021) showed moderate risk, particularly in intervention classification and confounding, suggesting some



methodological weaknesses. However, Li et al. (2015), Durão et al. (2023), Dyson et al. (2015), van de Vijver et al. (2012), and Andrade et al. (2018) maintained low bias risks. Bull et al. (2014) and Verstraeten et al. (2012) exhibited mainly low or moderate bias with minor concerns.

Figure 2. Bias assessment using the RoB 2.0 tool.

Study	Risk of bias domains					
	D1	D2	D3	D4	D5	Overall
Shirinzadeh et al. (2019)	+	+	+	+	+	+
Cohen et al. (2013)	+	+	+	+	+	+
Eaglehouse et al. (2016)	+	+	+	+	+	+

Domains:
D1: Bias arising from the randomization process.
D2: Bias due to deviations from intended interventions.
D3: Bias due to missing outcome data.
D4: Bias in measurement of the outcome.
D5: Bias in selection of the reported result.

Judgement
+ Low

Figure 3. Bias assessment using the ROBINS-I tool. Data Analysis with Smart PLS-SEM

Study	Risk of bias domains						
	D1	D2	D3	D4	D5	D6	D7
Hassen et al. (2021)	-	+	-	+	+	-	-
Cleland et al. (2012)	-	-	-	+	+	-	-
Verstraeten et al. (2012)	-	+	-	+	+	-	-
Gyawali et al. (2019)	X	X	X	-	+	-	X
Amiri Farahani et al. (2015)	X	-	-	-	-	X	X
Bock et al. (2014)	-	+	+	+	+	-	+
Ndejjo et al. (2021)	-	+	+	-	+	-	-
Andrade et al. (2018)	+	+	-	+	+	-	+
Costa et al. (2015)	-	-	-	-	+	-	-
Skar et al. (2015)	X	X	-	-	-	X	X
Withall et al. (2011)	-	-	-	+	+	-	-
Rabiei et al. (2010)	X	X	X	X	-	X	X
Reynolds et al. (2014)	-	-	-	+	+	-	-
Dyson et al. (2015)	+	-	+	+	+	-	+
van de Vijver et al. (2012)	+	-	-	+	+	-	+
Baker et al. (2015)	-	-	-	+	+	-	-
Durão et al. (2023)	+	+	-	+	+	+	+
Bull et al. (2014)	-	+	-	+	+	-	+
Li et al. (2015)	+	+	+	+	+	+	+
Bleich et al. (2013)	-	+	-	+	+	+	+

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended interventions.
D5: Bias due to missing data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
X Serious
- Moderate
+ Low

Discussion

This systematic review examines the efficacy of community-based physical activity (CBPA) interventions targeting lifestyle-related health issues such as type 2 diabetes (T2DM), cardiovascular diseases (CVD), and obesity in lower-income populations. Analysis of over 20 studies reveals that contextually relevant CBPA programs can significantly enhance physical activity levels and health outcomes. However, differences in intervention design, population characteristics, and measurement methods highlight the need for consistent methodologies and long-term evaluations.

Most studies indicate positive results, showing improvements in physical activity (PA), body mass index (BMI), hemoglobin A1c (HbA1c), fasting blood glucose (FBG), and awareness of lifestyle risks. For instance, Shirinzadeh et al. (2019) found reductions in HbA1c and BMI linked to community health worker (CHW) interventions. Gyawali et al. (2019) noted that 90% of studies reported improved glycemic control in lower-middle-income countries (LMICs). While systematic reviews corroborate these results (Hassen et al., 2021; Bull et al., 2014; van de Vijver et al., 2012), they also point out variability in effect size. Meta-analyses confirm meaningful impacts of community-based interventions on moderate-to-vigorous physical activity (MVPA) and energy expenditure (METs), particularly when tailored to local conditions.

There was considerable heterogeneity in study populations, intervention designs, and outcome measures. Several studies showed moderate to high risk of bias due to short follow-up periods, lack of blinding, and incomplete outcome data, limiting the strength of pooled conclusions.

Effective interventions typically employ multi-faceted approaches, including physical activity promotion, dietary education, behavioral counseling, environmental support, and policy advocacy. Dissemination methods include group sessions, mass campaigns, and school partnerships. Cleland et al. (2012) showed that multi-component, theory-driven interventions significantly improved outcomes, especially among adults. Structural supports, such as enhanced parks or access to fitness facilities, correlated with increases in PA, with Cohen et al. (2013) reporting up to 1830 MET-hours/week from community park initiatives. These findings underscore the necessity of environmental and policy support, alongside individual motivation, for fostering sustainable health behaviors.

The role of community health workers is crucial, as they facilitate interventions and connect underserved populations to resources. Studies by Costa et al. (2015) and Gyawali et al. (2019) demonstrate CHW models' effectiveness due to cultural alignment and trust. Stakeholder engagement, including educators and local governments, is vital for success. Collaborative planning across sectors, particularly for initiatives targeting youth, is essential, as highlighted by Skar et al. (2015) and Verstraeten et al. (2012). Rabiei et al. (2010) emphasized that coordinating educational and policy changes significantly reduces physical inactivity.

Low-income groups confront specific barriers to physical activity, such as unsafe environments, time constraints, low health literacy, and financial instability. Qualitative studies (e.g., Withall et al., 2011; Ndejjo et al., 2021) describe challenges including cost, motivation, judgment, and child care needs. However, group activities, peer support, child care options, and gender-sensitive programs can promote engagement. Interventions catering to women's needs, such as flexible timings and female-specific groups, show increased adherence and satisfaction (Amiri Farahani et al., 2015).

Limitations of existing research include a lack of standardized outcome measures, with many studies depending on self-reported data susceptible to bias. Costa et al. (2015) recommend using objective monitoring tools for data accuracy. Variability in intervention frequency and duration emerges, with many studies documenting short-term benefits without long-term assessments. Eaglehouse et al. (2016) represent a rarer randomized trial showing sustained physical activity improvements over 12 months. More longitudinal studies are needed to evaluate lasting impacts of CBPA initiatives.

Emerging research suggests integrating digital tools, like text messaging and online platforms, although Bock et al. (2014) indicate that in-person interactions yield better outcomes, especially among individuals with limited digital skills. Hybrid models may enhance scalability where digital infrastructure exists. CBPA interventions present low-cost alternatives compared to chronic disease treatment expenses, with Li et al. (2015) finding group-based methods more cost-effective than individual counseling. However, scaling successful models necessitates supportive policies, community integration, training, and



local government commitment. Research by Dyson et al. (2015) and Durao et al. (2023) underscores the need for contextually appropriate and politically supported health promotion efforts.

Finally, interventions based on theories like the Health Belief Model and Social Cognitive Theory show better effectiveness and sustainability prospects. However, many studies lack clear theoretical grounding, impacting reproducibility and explanatory potential. Increasing interdisciplinary collaboration and innovative evaluation approaches is essential, recognizing that CBPA interventions intersect with numerous socio-economic and environmental factors.

Limitations

The review faces several limitations. First, the included studies differ in design, population characteristics, intervention types, delivery methods, and outcome measures, complicating direct comparisons and meta-analysis. Most studies report only short and medium-term results, lacking information on the long-term sustainability of physical activity and its impact on preventing lifestyle diseases. Additionally, many studies rely on self-reported data, which may introduce recall and social desirability biases, affecting result accuracy. High risks of biases from poor randomization, absence of hypothesis blinding, and data reporting issues were prevalent. Findings may lack generalizability, with specific groups underrepresented. Cultural adaptation of interventions in low- and middle-income countries is also inadequate, while few studies provided insights into cost-effectiveness, limiting scalability knowledge.

Future Directions and Recommendations

Community-based interventions must customize strategies to local contexts considering cultural, economic, and geographic factors for effective outcomes (Feskens et al., 2022). Integrating food-based approaches with healthcare initiatives is essential for community nutrition and health education, focusing on dietary diversification and micronutrient supplementation to prevent deficiencies, supported by regular monitoring and healthcare access (POTEMPA-JEZIOROWSKA ET AL. 2022; Faber et al., 2014; Fox et al., 2018). Tailoring supplementation and health recommendations through biomarkers and genetic evaluations allows for personalized interventions (Brink et al., 2022), enhancing health and lowering costs (Downer et al., 2020). Policies should address malnutrition and obesity collectively to avoid competition between health issues (Chong et al., 2023). Collaborative community programs involving schools and healthcare professionals can support families in achieving positive weight management (Teixeira, 2011).

Interventions must address social determinants of health, including education, income, and housing, to reduce disparities and improve community health (Thornton et al., 2016). These determinants influence adherence to healthy lifestyles and overall health outcomes (Seixas et al., 2020). Collective efforts involving governments, civil society, and the private sector are crucial for combatting obesity globally (Cesare et al., 2019). Engaging communities encourages cooperation among stakeholders for effective solutions to obesity (Wallace et al., 2019) and enhances healthcare-community linkages through personalized care (Siegel et al., 2018).

Integrating digital solutions can broaden access to treatment and utilize technology for monitoring health behaviors (Wadden et al., 2020). Electronic devices can connect communities with healthcare professionals to promote wellness (Siegel et al., 2018). A systems science approach to obesity considers socio-economic factors, food culture, and environments, deviating from traditional individual-focused strategies (Zheng et al., 2025). Partnerships among diverse stakeholders are vital for successful community-level obesity interventions (Wallace et al., 2019).

Multi-level interventions in resource-limited settings must integrate theoretical models and community input (Gittelsohn et al., 2014; Vangeepuram et al., 2020). Social workers contribute significantly to research and practice, targeting communities experiencing health disparities (Williams et al., 2024). Government policies should encompass multi-sector strategies, including private sector participation for promoting healthy behaviors (Whitsel, 2017; Temple, 2023).

Understanding the interplay of individual, environmental, and social factors can enhance health system integration with communities (Lee et al., 2019). While technology improves healthcare communication, fostering collaboration and well-being poses challenges (Siegel et al., 2018). Effective outcomes can be supported by investments in technology (Lanoye et al., 2017). Mobile health technologies show promise in promoting weight loss linked to electronic health records (Coorey et al., 2019; Shannon et al., 2019).



Future mobile health research requires larger, long-term studies for effective support (Wang et al., 2017). Innovations in telehealth and mHealth applications are set to improve obesity care access (Hinchliffe et al., 2022). Engaging behavioral scientists is essential for successfully integrating these technologies into healthcare systems (Pagoto & Bennett, 2013). These efforts can dramatically enhance patient outcomes and manage chronic conditions (Rhee et al., 2020). AI-based technologies can streamline data management and reduce patient and caregiver workloads (Chang, 2019). Policymakers should foster cross-sector collaboration and sustained support for CBPA interventions, prioritize flexible frameworks adapting to local community needs, and promote incentivized participation to maximize reach and sustainability.

Conclusions

Community-based physical activity intervention tailored to local contexts achieved BMI reductions of 2%–5% and increased physical activity adherence by up to 15% among low-income populations. These strategies fulfilled the review's objectives by demonstrating significant, sustainable improvements in non-communicable disease risk factors. More research on cost-effectiveness and long-term impacts remains critical to optimize outreach and enduring public health benefit.

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