

BMJ Open Interventions based on environmental determinants for nutritional and physical activity behaviours in Colombia: a scoping review

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ABSTRACT

Objective To identify, systematically, the interventions based on environmental determinants to improve the nutritional and physical activity (PA) habits available in Colombia.

Design A scoping review was performed according to the guidelines of the Joanna Briggs Institute.

Study selection All studies about intervention programmes for PA and nutritional behaviours in Colombia were included.

Methods Searches in Medline/PubMed, Embase, Cochrane, Scielo and Lilacs, using MeSH, Decs and Emtree terms, were performed up to August 2020. Additionally, a manual search was made in specialised national journals. An internet documentary search of the official websites on policies and programmes by departmental, district and municipal secretariats was also performed.

Two reviewers independently screened titles and abstracts. Then, the full texts were reviewed to select documents to be included.

Data management relevant information from selected documents and articles was extracted. A descriptive analysis was considered.

Results Sixty-seven documents and 70 published articles were found. The programmes were identified in 13 initiatives, 7 in the area of PA and 6 with a nutrition focus. They were on physical and social environmental modifications such as the ‘*muévete*’ (‘get moving’) programmes in Bogotá, Quindío and Cartagena; a modification of ‘*ciclovia*’; or bicycle path programmes as well as nutrition programmes in schools, universities and companies.

Conclusion This scoping review identified national programmes and policies in Colombia in the area of nutrition and PA from the environmental perspective in different scenarios: from schools to workplaces and communities. The need to implement such programmes from public and private institutions is also noted, promoting the practice of PA and healthy eating in every scenario in the national territory. New research to determine the impact of these programmes is essential to get a glimpse of the effects of these programmes and the implications for public health.

INTRODUCTION

A very strong environmental perspective is currently seeking to explain how the promotion of health focusing on environmental

STRENGTHS AND LIMITATIONS OF THIS REVIEW

- ⇒ This scoping review compiles, comprehensively, policy and evidence related to interventions based on environmental determinants that promote healthy lifestyles in the South American country of Colombia.
- ⇒ An electronic search for public documents and evidence published in scientific journals was exhaustively carried out.
- ⇒ This scoping review maps available information and contributes to the identification of knowledge gaps providing future research ideas.
- ⇒ The main limitation of this study is that the information collected does not provide insights into the effectiveness of the programmes.

aspects plays an essential role in the promotion of health and the development of public policies¹ (figure 1). The environmental determinants related to physical activity (PA) and diet are factors thought worldwide to have a strong impact on morbidity and mortality,² as this is a public health concern globally, in Latin America and also in Colombia due to the low levels of PA and inadequate nutrition habits among the population.³

Changes in health habits among world populations are mediated by the environment in which they develop; therefore, environmental modifications could bring about changes in these habits.⁴ The WHO has encouraged the development of social programmes or structural modifications, such as outdoor gyms in parks⁵ or nutritional interventions in schools, as a strategy to promote higher levels of PA or healthier nutrition to control chronic diseases.

Global evidence shows that healthy habits, particularly PA and healthy eating habits, are elements in health promotion and prevention that reinforce a systemic response favouring psychological and social aspects in

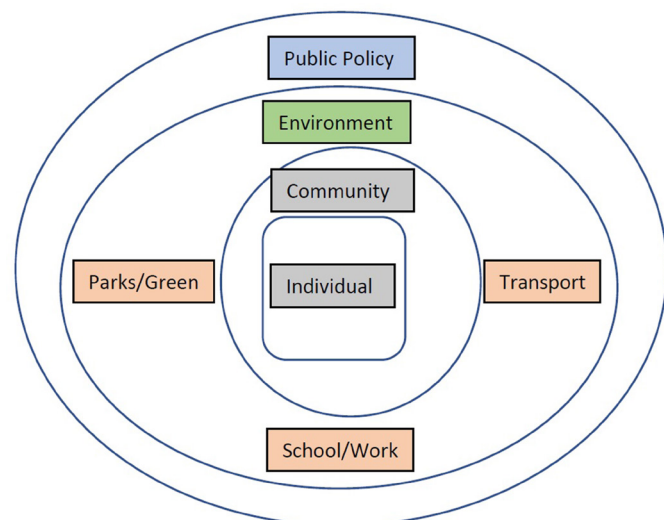


Figure 1 Environmental determinants in ecological models.

encouraging healthy lifestyles.⁵ In Colombia, different environmental strategies have promoted the development of healthy lifestyles in terms of PA and nutrition, but they are not compiled and recognised in the country. Hence, this study aims to identify the interventions based on environmental determinants to improve the nutritional and PA habits available in Colombia and to determine the effect of the intervention on the nutritional and PA habits.

METHODOLOGY

A scoping review was conducted following the guidelines of the Joanna Briggs Institute⁶ regarding search, selection, classification and analysis of the evidence. In addition, the guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) extension for scoping review (PRISMA-ScR) were followed.⁷

Search strategy

Two strategies to find the documents or publish articles were used to identify the intervention programmes published up to August 2020. The first, on official documents about programmes established nationally and departmentally. For this, an internet documentary search of the official pages published on policies and programmes by departmental, district and municipal secretariats was performed. The second was to search on electronic databases Medline/PubMed, Embase, Cochrane, Scielo and Lilacs using MeSH, Decs and Emtree terms. Additionally, a manual search was made in specialised national journals (online supplemental file 1).

Study eligibility criteria

This review focused on Colombia, considering the political-administrative division in departments and regions. Official documents were included that referred to programmes meant to promote PA or healthy nutrition from the environmental perspective. The reports

and programmes implemented on PA and nutrition by district, regional or national secretariats, the Ministry and public and private national governmental organisations that were published and explained in their communications were included. Moreover, articles published in national or international scientific journals were included where programmes were developed in Colombia.

Study selection

Two reviewers independently screened all records by title and abstract. Then, selected documents were read in full text according to the established criteria. In the case of disagreement, a third reviewer made the selection. To optimise the process, Rayyan (Qatar Computing Research Institute) platform was used.⁸

Data extraction

A spreadsheet in Microsoft Excel (Microsoft Office V.365) was designed. The characteristics of the programmes or studies were extracted, as well as the title, authors or those responsible for the document, year and place of publication, outcomes considered and the scope of interventions.

Data analysis

An analysis matrix was created where the characteristics of official documents and publications, discriminating the specific programmes to which they corresponded and the main results are presented. The information appears narratively, accompanied by tables or figures that summarise the information.

Patient and public involvement

Patients or the public were not involved directly in the design, conduct, reporting or dissemination plans of our research.

RESULTS

The selection process for studies and documents is presented in figure 2. Seventy-two official documents were found and 67 documents were selected after the full-text review.^{9–51} From the electronic database search, 2969 articles published in scientific journals were located initially, of which 2849 were excluded for the title and abstract. Of the 120 studies read in full text, 55 articles were excluded. Additionally, five studies were identified by cross-referencing. Finally, 70 scientific articles were included.^{52–124} All these document and articles were related to 13 initiatives on physical and social environmental modifications, 7 in the area of PA and 6 with a nutrition focus (online supplemental files 2; 3).

Characteristics of the official documents included

The 67 official documents included are related to different regions and national entities in Colombia, 14 from the Ministry of Social Protection with a national approach. Nineteen documents from the capital, Bogotá, and the rest from different cities (12 Medellín and 22 from another departments as Cundinamarca, Antioquia,

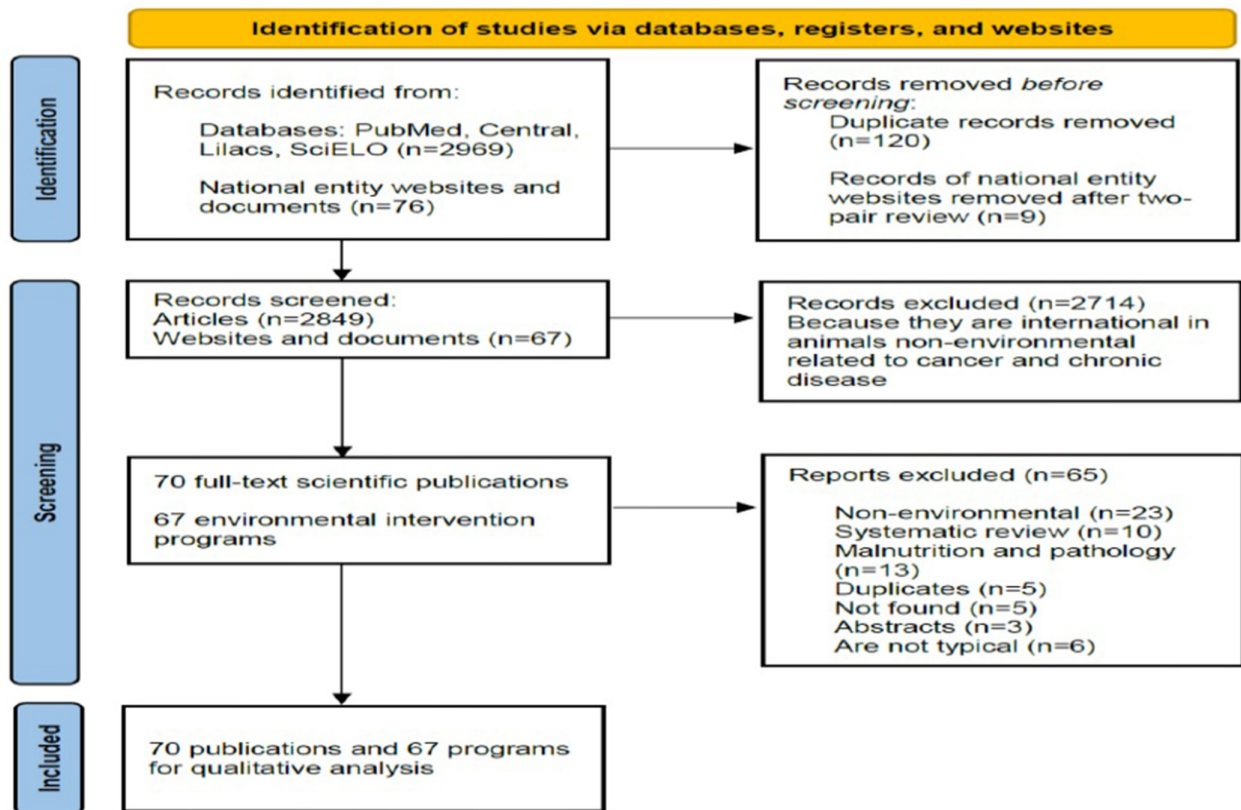


Figure 2 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart for the selection of official documents and scientific articles.

Bolívar, Caldas, Boyacá and Santander). It is important to highlight that these documents were published on the websites of the institutions.

Characteristics of the publications included

Seventy articles included related to environmental strategies for nutrition and PA in several regions of the country were published between 2006 and 2020. Twenty documents focused on programmes executed at a national level. The other ones are focused on the departmental or city level: 35 in Bogota, followed by 15 documents in Medellín, Cali, Barranquilla, Tunja, Cartagena and Popayán. The types of studies found were 35 cross-sectional, 2 longitudinal, 6 reviews, 7 qualitative, 6 mixed, 4 controlled or community trials, 4 cohort, 3 natural experiments, 1 evaluation of technology, 1 modelling and the remaining 4 used other designs not well specified.

Findings on environmental programmes to impact PA

Of the 67 documents and 70 publications found, 55 are about PA. Most focus on environmental, physical or social modifications that promote activity like ‘*muévete Bogotá*’ (move Bogotá),¹⁰ ‘*muévete Quindío*’ (move Quindío) and ‘*Vida Activa Cartagena*’ (active life in Cartagena),¹²⁵ which focus on information, education, communication and intervention strategies, providing advice and support in the formulation of projects within the institutions.

As table 1 shows, these 55 programmes are classified into seven initiatives for different structural modifications

or social programmes: active transportation,¹²⁶ bicycle paths or ‘*ciclovías*’,⁵⁶ neighbourhoods and urban modification,⁵⁸ ‘*Recreovía*’ and community PA,⁶⁰ schooling and curricular or structural modification,⁶¹ as well as modification of parks.⁷⁵ These strategies cover the life cycle, with activities in different contexts such as preschools,⁸⁹ schools,⁶⁵ universities and associations for older adults.¹²⁷ The programmes are undertaken at the community level,^{59 89 128} in districts and associations, and up to the modification of built environments like the modification of roads,⁵⁶ transportation¹⁰¹ and parks.⁶⁰

In the transport area, the most representative programmes are those that stimulate active transport as ‘*ciclovías*’, bicycle paths or bicycles in Bogota,⁹⁷ ‘*ciclovías EnCicla Medellín*’,¹⁷ active citizen transport programmes in Cartagena and Pereira,⁹⁷ with some international evidence like that reported by the IPEN study⁷⁴ of active transport and change of transport in Colombian cities. In terms of infrastructure, the number of kilometres of ‘*ciclovías*’, or the construction of cycle paths and lanes, increased. The main outcomes reported are related to health benefits such as years of healthy life and reduced risk for chronic diseases. Another documented programme is ‘*Transmilenio*’,¹⁰¹ a mass transport system designed to increase PA. The study reports that it increases walking time by >150 min/week (OR 1.5, 95% CI 1.1 to 1.9), and indicates that it is a protective measure due to the use of the transport system and long walk stations.

Table 1 Physical activity programmes at environment level

Programme	Population	Programme characteristics	Environmental perspective according to ecological model
Bicycle paths and bike lanes ¹³ 20 29 30 54–56 66 80 85 97–99	Adults, children	Bicycle path and <i>ciclovía</i> construction programmes in different Colombian cities	Physical social determinants area of transport and built environment
Neighbourhoods and urban modification ^{58 59 62 64 74 76 79 88 120}	Adults, older adults	Neighbourhood environment modification programme to promote physical activity	Physical social determinants area of transport and built environment
<i>Recreovía</i> and community physical activity ^{52 55 68 72 78 80 96 100}	All ages	Active paths programmes to promote physical activity	Physical social determinants area of transport and built environment and social programmes
Schooling and curricular or structural modification ^{61 65 78 89 91 122}	Children and adolescents	School and preschool programmes with changes to curriculum and school activities	Social determinants social programmes
Physical activity and primary healthcare ^{57 89 104 121 123}	Adults, older adults, children and adolescents	Development of physical activity programmes in the framework of primary care	Social determinants social programmes
Active transport ^{53 80 101}	General population	Modification of the type of vehicular transport use to walking or use of alternative transports	Physical social determinants area of transport and built environment
Parks, urban modification and physical activity ^{60 68 75}	General population	Programme of structural modification of parks, construction of outdoor gyms and promotion of their use for physical activity	Physical social determinants area of transport and built environment

The other programme reported in the literature is the ‘*Recreovías*’ of Bogota,⁴¹ considered a leading programme that promotes and generate healthy habits and lifestyles. Other programmes included activities on the street and in parks to stimulate the development of active practices in the community,¹⁰⁰ which yielded favourable results in several participants in the years of its creation, such as an increase in the number of vigorous activities in the participants. Additionally, parks programmes with outdoor gyms¹² or design of healthy programmes for communities were other important strategies reported.

Finally, school programmes were identified with two main proposals: one with the curricular integration

of PA, and the other with the modification of school spaces for the practice of PA during school hours. These programmes seek to encourage students to undertake PA as a primary element in the curriculum or beyond it.

Findings on environmental programmes to impact nutritional habits

Twelve nutrition-related official programmes were identified. Table 2 contains these 12 programmes organised in six groups: schooling and environmental eating programmes, built environment and eating, community food safety, ultra-processed foods programme, food labelling, primary healthcare and community nutrition. Some

Table 2 Nutritional programmes at environment level

Programme	Population	Programme characteristics	Environmental perspective according to ecological model
Built environment and nutrition ⁵⁸	General population	The relation of the built environment and the development of walking in neighbourhoods was evaluated, the proximity of shopping centres and food sites was analysed with the use of transport and walking activities	Physical social determinants built environment
Schooling and environmental nutrition programmes ^{67 73 82 84 94 107 112 113}	Children and adolescents	School, preschool programmes with modification of food programmes, set menus, changes to school snacks and lunches	Social determinants social programmes
Community-level food security ^{70 83 95 148}	General population	The programmes determine the association of food insecurity in the home with demographic characteristics, the food expenditure of the home and consumption in Colombian communities	Social determinants social programmes
Ultra-processed food programme ⁷¹	General population	The type and characteristics of ultra-processed foods. In Colombia, industrialised bread is the most easily assimilated ultra-processed food in the traditional diet, along with snacks and sugary drinks	Social determinants social programmes
Food labelling ^{86 87}	General population	Food labelling system programme and changes in food consumption and food purchases	Social determinants social programmes
APS and community nutrition ^{90 108 114 118 149}	General population	Development of nutrition and healthy eating programmes in the framework of the APS	Social determinants social programmes

of these programmes are included in the 10-year Colombian public health plan,³⁵ specifically the programmes of school-age healthy eating¹²⁹ for public and private schools in the country's capital and other cities such as Medellín and Cali.¹³⁰

School and university programmes were identified in the area of education,⁶⁷ as '*Bogotá sin hambre*' and '*aliméntate Bogotá*' (Bogota without hunger and feed yourself Bogota), school snacks and snack programmes for preschoolers and students¹³¹ where students, teachers and administrators participate in the development of activities that promote healthy nutrition. Healthy eating programmes in community and family surroundings were also identified.⁹⁰ The '*ABC de la alimentación saludable*' (ABCs of healthy eating) is a programme that promotes eating as satisfying energy and nutrient needs at all stages of life. Another line of action is the community-level emphasis given to food security programmes, such as the Antioquia nutritional improvement programmes (MANA),⁸¹ and the school food security programmes in Bogotá⁴¹ and Cali,¹³² which suggest school eating programmes with snacks that fulfil nutritional requirements and replace the nutritional needs not provided by the students' families.

Furthermore, the evidence included concentrated on food labelling⁸⁷ and the benefits of this programme at the national level for weight control and informed food purchases. According to the studies, labelling issues arise because buyers do not consult it or because it is not clear to the person reading it.

On the other hand, the evidence on ultra-processed food programmes⁵¹ and their use at the community level reports that Colombians in more vulnerable urban and rural areas consume this ultra-processed food more with an increase in overweight and obesity. In this same community, the '*Familias en acción*' (Families in Action) is a programme that includes cash transfer to children and mothers who promote healthy lifestyle habits, including a balanced diet.⁸³

Other technical documents found are guidelines on healthy eating¹³³ that evaluate the degree of effectiveness of the '*Programa de Alimentación Escolar (PAE)*' (School Food Programme).

Findings on environmental programmes with a combination of nutrition and PA

Of the programmes and articles found, the HEVS 'Healthy Life Habits Programme' in communities was identified,⁷⁷ which describes community-level guidelines and global recommendations about healthy lifestyles. Another programme from the Colombia Department of Sports (Coldeportes) focuses on the promotion of healthy habits and lifestyles with an emphasis on healthy eating and the regular practice of PA. Finally, two programmes with a strategy for nutrition and PA at the school level encourage a balanced diet and the development of school PA programmes.^{73,91} More details are in [table 3](#).

DISCUSSION

To the best of our knowledge, this is the first scoping review that compiles the programmes established in nutrition and PA from the environmental perspective in Colombia. Seventy scientific articles located in the main databases and 67 official documents published on the websites of the Ministry of Health, district and national secretariats were identified, showing that structural modifications are not centralised health policies since several strategies have been developed in different parts of the country other than the capital, Bogotá, such as Medellín, Cartagena or Cali. The relevance of the data found lies in the importance of the public policies targeting the promotion of PA and healthy nutrition in Colombia. It is worth noting that the programmes established in the areas of nutrition and PA from this perspective are centred on two lines: one on structural modifications in the environment, such as the construction of segregated bike lanes, bicycle paths, outdoor spaces for activity, outdoor gyms or modification of parks, and the other on the design of social programmes for healthy eating, school snacks, food labelling, *recreovías*, curricular changes in schools among others.

According to the finding, it is evident in Colombia that programmes are being developed that target the promotion of PA and healthy nutrition from the environmental perspective by national and departmental entities. It is also evident that a large number of the programmes, their implementation and policies are developed in

Table 3 Physical activity and nutrition at environment level

Programme	Population	Programme characteristics	Environmental perspective according to ecological model
HEVS healthy life habits programmes in communities ^{69 77 92 93 96 117 124}	Adults, older adults	Healthy Life Habits Programmes (HEVS) in Colombia, programme to educate and promote community physical activity in Colombia encouraging minimum activity of 180 min of moderately vigorous activity	Social determinants social programmes
Schooling and environmental food programmes ^{73 91}	Children and adolescents	School, preschool programmes with modification of food programmes, set menus, changes to school snacks and lunches	Social determinants social programmes

different parts of the country as Medellín, Bucaramanga, Cartagena and Cali, but with the greatest development in Bogotá.

There is a myriad of programmes and scientific articles on PA from the environmental perspective, demonstrating that the promotion of this lifestyle is one of the guidelines in the country's public policies. It is undeniable that both, the official documents and the articles, underscore the presence of the environmental perspective with a socioecological position centred on creating programmes. From this perspective worldwide, different studies have been conducted and they conclude the importance of environmental modifications at school level in healthy lifestyles.^{134 135} The systematic review of PA and sedentary lifestyle in Bangladesh¹³⁵ explores the implementation of PA programmes with an environmental focus as in our study, aimed at active transport for school and university students and the relation between the level of PA in urban and rural areas. In addition, the review of PA in Thailand¹³⁶ reports on the use of activity measures in schools, the use of transport and free time through scales and instruments such as those in studies identified in Colombia.

According to the evidence, the programmes to promote PA or balanced eating are approached from different perspectives, the most referenced being those of physical modifications such as parks, schools and bicycle paths in the city, to create integrated spaces to practice the activity,¹³⁷ or those that include social or community programmes with activities on parks or cities.^{138 139} In countries like Australia, Finland, New Zealand, France and the USA, similar strategies for promotion of PA and healthy nutrition have been reported. In the controlled trial by Reilly *et al* in Australia, canteens or school cafeterias were altered to offer products with nutrition labels for sale to school-aged students compared with control groups to establish the change in culture in terms of dietary management and eating patterns.¹⁴⁰ In relation to these programmes, progress is being made in Colombia in relation to developments in other countries, but more research is needed to demonstrate the effectiveness of these programmes in the country.

In this vein, in Montreal, Canada, it was suggested that parks be built close to neighbourhoods to see how proximity to parks increases activity and perception of their use.¹⁴¹ In another Canadian study, the use of forms of active transport walking, bicycle use on paths built in neighbourhoods or the use of a vehicle or bus and its relation to the increase in PA were studied.¹⁴² These two proposals are related to what is identified in this study, specifically the use of the built environment like streets and sidewalks to promote PA, which is reported in the Colombian studies on *muévete Bogotá*,⁷⁸ the *recreovía* or the studies of parks.⁶⁸

In Latin America, evidence from Brazil, Argentina and Chile describes urban modification in cities and parks facilitating walking and the use of free space in neighbourhoods for PA,¹⁴³ similar to the reports in this scoping

review. In addition, the IPEN study for the Americas⁶⁴ reports the environmental modification in neighbourhoods and parks in six South American countries was determined with the subsequent increase in PA levels. Finally, in the natural experiment in Pernambuco, Brazil, an active city programme in 140 cities of the territory to measure the impact of the programme on community PA in free time, in parks and neighbourhoods with education on nutrition and diet and managing exercise,¹⁴⁴ similar to the *Recreovia Bogotá* in this study.

It is important to highlight that the programmes with an environmental perspective are in keeping with global guidelines on the modification of physical spaces and development of social programmes that promote healthy habits.^{145 146} Moreover, it is important to recognise that Colombia is implementing big and diverse programmes, but research with aim to establish the effects and impact of these is needed.

One important aspect of this scoping review is that the programmes implemented and the results reported in the evidence let us understand that environmental actions and modifications in nutrition and PA are being implemented in the entire country. This work can be used to learn about intersectoral public policies that potentially impact health and promote the prevention of chronic diseases.

Finally, a relevant point is that the programmes, both from the PA and nutrition perspectives, are oriented towards changing lifestyles, favouring greater activity in leisure and transport, work and home, as well as an improvement in eating behaviours, with a consequent balance between food intake and caloric expenditure. A multilevel ecological perspective is also observed that involves the concept of physical and social activity, not only from the point of view of the individual but also making the environment relevant.¹⁴⁷

It is important to highlight that the limitations of this study are related to two specific aspects. One is the approach on the review because this only gives a map of the information found but did not assess the impact of the implementation of the programmes. And the other is that despite the multidisciplinary and multisectoral approach of the programmes, the specific contribution of each sector has not been identified.

In conclusion, this scoping review identified national programmes and policies in Colombia in the area of nutrition and PA from the environmental perspective in different scenarios: from schools to workplaces and to communities. The need to implement such programmes from public and private institutions is also noted, promoting the practice of PA and healthy eating in every scenario in the national territory. Given that this is a scoping review that located interventions, but did not evaluate their impact, the next step would be to conduct studies in order to determine the impact of these programmes and the implications for public health.

Research ethics approval

This scoping review is a secondary research involving documents and articles, not people or animals, and therefore no ethical approval was required.

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