

Systematic review of the community environment for physical activity in young people - an update to the Report Card Brazil

Revisão sistemática do ambiente comunitário para atividade física em jovens - uma atualização do Report Card Brasil

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Abstract – The aim of this study was to update a systematic review on the relationship between the environment and physical activity among Brazilian children and adolescents. The search for articles for this review was performed in the MEDLINE, LILACS / BIREME, and SCIELO databases. For this update, only articles published in 2018 and 2019 were used. Descriptors were defined in English and Portuguese. The Boolean used for the advanced search was used, with 3 main blocks: environment, physical activity, and population. Additional filters were used in accordance with the structure of a database. In all, 5 articles were included in this systematic review, 4 with a population-based sample and 1 with a school-based sample. Among the selected studies, 4 were carried out in the southern region of Brazil (2 in Santa Catarina; 1 in Rio Grande do Sul; 1 in Paraná) and the other article was carried out with a national sample. The research period ranged between 2012 and 2017, with a sample size ranging from 38 volunteers to 102,072 participants. The environmental indicators found were road safety, the existence and use of spaces for the practice of physical activity, the characteristics of the school, and the possibility of practice in the school environment. It was concluded that environmental indicators can enhance the practice of physical activity among young Brazilians, requiring public policies that develop environmental projects to promote physical activity.

Keywords: Adolescent; Brazil; Built environment; Motor activity.

Resumo – O objetivo deste estudo foi atualizar uma revisão sistemática sobre a relação entre o meio ambiente e a atividade física em crianças e adolescentes brasileiros. As buscas dos artigos para esta revisão foram feitas nas bases de dados MEDLINE, LILACS/BIREME e SCIELO. Para essa atualização, foi utilizado apenas artigos publicados entre o ano de 2018 e 2019. Os descritores foram utilizados na língua inglesa e portuguesa. Foi utilizado operadores booleano para a busca avançada, com 3 blocos principais: ambiente, atividade física e população. Filtros adicionais foram usados de acordo com a estrutura da base de dados. Ao todo, 5 artigos foram incluídos nessa revisão sistemática, sendo 4 com amostra com base populacional e 1 com base escolar. Entre os artigos selecionados, 4 foram realizados na região sul brasileira (2 em Santa Catarina; 1 no Rio Grande do Sul; 1 no Paraná) e o outro artigo foi realizado com amostra nacional. O período da pesquisa variou entre o ano de 2012 e 2017, com tamanho da amostra variando de 38 voluntários até 102.072 participantes. Os indicadores ambientais encontrados foram a segurança viária, a existência e utilização de espaços para a prática de atividade física, as características da escola e a possibilidade de prática no ambiente escolar. Concluiu-se que os indicadores ambientais podem potencializar a prática de atividade física entre os jovens brasileiros, exigindo políticas públicas que desenvolvam projetos ambientais de promoção da atividade física.

Palavras-chave: Adolescente; Brasil; Ambiente construído; Atividade motora.

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INTRODUCTION

Research into the potential factors associated with physical activity has continued to expand by the day, especially with the distressing decrease in physical activity and the increasing sedentary behavior among children and adolescents, significantly contributing to two serious public health problems: childhood obesity and sedentary lifestyle¹⁻⁴.

Complying with the physical activity recommendations proposed by the World Health Organization and building a more active society is a major challenge for Brazilian families and public authorities. In addition to the individual factors that can impact the level of physical activity, serving as a barrier or facilitator of physical activity, active life is associated with different variables of environmental characteristics in which the child or adolescent is inserted⁴. An example of this was the study carried out with Brazilian adolescents in the city of Pelotas (Rio Grande do Sul), where significant associations were found between facing the beach, street lighting, paved streets, and bicycle paths and patterns of physical activity⁵.

These environmental characteristics can be classified into three categories: natural, built, or social. Therefore, Sallis et al.⁶ proposed a model to identify potential environmental and political influences based on four pillars: recreation, transport, occupation, and home.

Since Brazil is a country of continental dimension, with a heterogeneous population, great cultural diversity, and enormous social inequality, the importance of constant studies that can detail and update the varied characteristics of its regions is increasing⁷. In addition, identifying potential facilitators or barriers to physical activity in Brazilian regions constitutes an important asset for public policies that wish to design effective strategies to increase physical activity and reduce sedentary behavior in children and young people. The involvement of urban planning, transport, and other departments can positively impact the level of physical activity⁸.

This study aims to update what is already known about the built environment and physical activity, with data from 2018 and 2019.

METHOD

This study followed the recommendations and guidelines for conducting systematic reviews for observational studies⁹. According to the previous review⁷, the relationship between the environment and physical activity in Brazilian children and adolescents was investigated. As in the previous review, environmental characteristics related to spaces, physical activity facilities, climatic factors, pollution, and perception of the neighborhood and neighborhood were considered⁷. These variables could be obtained objectively or subjectively. The inclusion criteria for this review considered articles published in indexed scientific journals, articles that analyzed children and/or adolescents, studies carried out in the Brazilian population, and samples without any disease or specific clinical condition. Variables of social indicators (e.g., socioeconomic level or education) and social support (e.g., support from friends and family for the practice of physical activity) were not considered⁷. Only original articles were selected. Theses, dissertations, and monographs were not considered for

this study. The entire article selection process was carried out by two researchers (ERV and GF).

Search strategy

A systematic search was performed for articles published between 2018 and 2019 in three of the main electronic databases: Online Medical Literature Analysis and Retrieval System (Medline), Latin American and Caribbean Health Sciences Literature and Regional Library of Medicine (LILACS and BIREME), and Scientific Electronic Library Online (SciELO).

The search strategy used the advanced search tool in each of the databases. The Boolean operator “AND” was used for the search with the three blocks of descriptors elaborated by the authors. In addition, the Boolean operator “OR” was used for the different possibilities of terms for the same block. The elaborated blocks were divided among environment, physical activity, and population⁷. The descriptors chosen to compose each block were:

Block 1: “environment” OR “community” OR “built environment”

Block 2: “physical activity” OR “motor activity”

Block 3: “child*” OR “adolescent*” OR “preschool*”

Database-specific truncation symbols (\$, * or “”) were also used to increase the range of search possibilities. The searches were carried out with the descriptors in English and Portuguese. Filters related to the publication date (2018 and 2019), age group (0 to 19 years), and nationality of the sample (Brazilian) were adopted during the searches.

Each survey was performed separately and then downloaded as a separate file using Endnote[®] X9¹⁰. Subsequently, this tool allowed for the identification and exclusion of duplicate studies, in addition to the division and organization of the results of each database. With the selected references in the database, the title and abstract were read. Based on the selected abstracts, the full articles were read to analyze whether they met the inclusion and exclusion criteria. An independent assessment of risk of bias and methodological quality was performed by the authors (ERV, GF) using a specific tool from the National Heart, Lung, and Blood Institute that has 14 criteria to detect the risk of bias and methodological quality of the study¹¹. The scores obtained according to the criteria generated a final score. Questionnaire questions that could not be answered due to the available information and/or that were not applicable to the evaluated study and/or unreported aspects were excluded from the calculation to determine the final score of methodological quality or risk of bias¹².

After meeting the inclusion and exclusion criteria and obtaining the final score, the selected studies were classified as of good methodological quality/low risk of bias (final score ≥ 0.70), moderate methodological quality/moderate risk of bias (final score < 0.70 and ≥ 0.50), low methodological quality/high risk of bias (final score < 0.50)¹³. Any divergence between the authors regarding the assessment of methodological quality was resolved by discussion.

RESULTS

According to the use of blocks and descriptors, in addition to the search filters, 116 articles were found. Of this total, after reading the title and abstract, in addition to excluding duplicate articles, 19 articles were

considered. Afterwards, after reading the articles completely, only 5 articles met the inclusion criteria and were considered for this systematic review update (Figure 1).

Of the five articles selected, four were carried out in the southern region of Brazil, one in Porto Alegre-RS¹⁴, one in Florianópolis-SC¹⁵ and another two in Curitiba-PR^{16,17}. The other article was carried out with a national sample¹⁸ (Table 1).

In terms of sample type, 4 of the articles had population-based samples and 1 has a school-based sample. The survey period ranged between 2012 and 2017. The sample size showed a wide discrepancy, with studies ranging from 102,072 participants to 38 volunteers (Table 1).

The assessment instruments used in the studies on environmental characteristics were different in the 5 studies. Among the types of environmental indicators, the following were analyzed: road safety, the use and existence of spaces for the practice of physical activity, the characteristics of the school, and the possibility of practicing in the school environment (Table 1).

Among the studies analyzed, 2 of the studies aimed to investigate the association between environmental characteristics and the practice of physical activity, 2 aimed to identify environmental characteristics that favored the practice of physical activity, and 1 article presented data on the use of places for the practice of physical activity according to the distance from the house (Table 1).

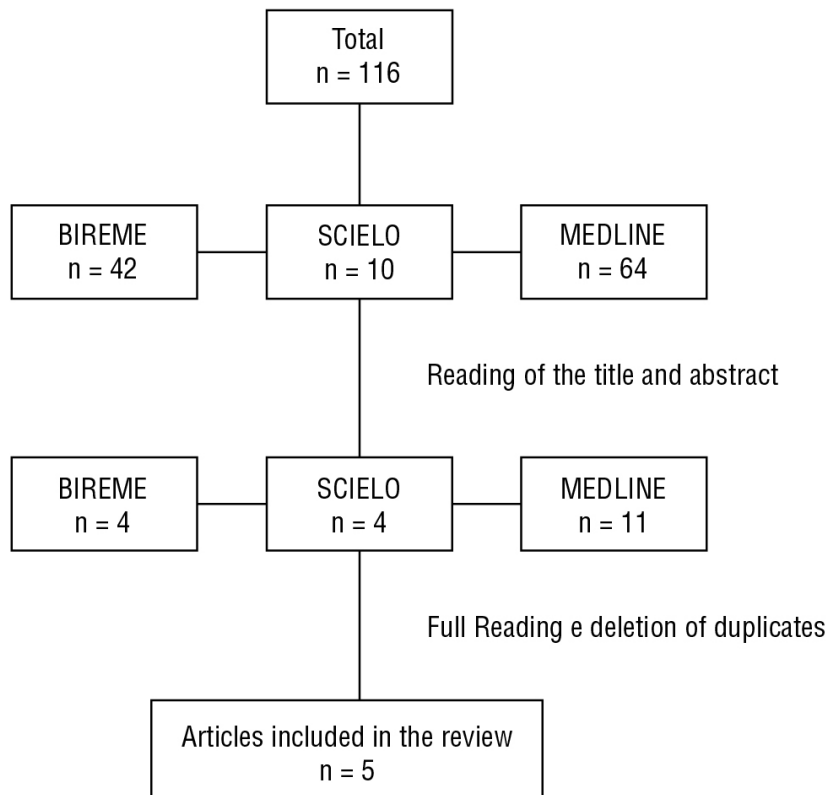


Figure 1. Search results for the data and criteria used in the selection of studies aimed at investigating community environment for physical activity in children and adolescents in Brazil.

Table 1. Cross-sectional studies with data from community environment for physical activity in Brazilian children and adolescents between 2018 and 2019.

Author (year of publication)	Location (survey study)	Sample (n)/ % of girls	Age range	Aim	Instrument description	Type of indicators	Results
Dias et al. (2019) ¹⁴	Porto Alegre - RS (2017)	(1130) 52.7%	14 to 20	To examine whether adolescents road safety perception acts as a mediator on the association between the distance from home to the nearest park and the use of the parks for physical activity	Neighborhood Environment Walkability Scale for Youth	Perception of road safety	The perception of road safety was associated with the use of parks for physical activity
Rossi et al. (2018) ¹⁵	Florianópolis - SC (2012-2013)	(2152) 56.5%	7 to 14	To investigate associations between use of public places for physical activity and active leisure, and their distance from subjects' homes	Undefined Questionnaire - self-report questionnaires created for this study	Use beaches, parks/ playgrounds, sport courts, football pitches, o perceived distances from the places to home	The frequencies of use of all places for the public places for physical activity and active leisure were progressively higher when the places were closer to home
Oliveira et al. (2018) ¹⁸	Brazil (2015)	(102.072) -	-	To verify the association between school environment and accumulated physical activity in Brazilian adolescents	Questionnaire National School Health Survey	The existence of sports court ; The existence of courtyard ; The opening of School on weekends for the community ; Are there activities agreed with the community on weekends ; The offer of Physical Activities (except physical education classes ; Participates in Interschool Games ; Performance of internal games for the practice of physical activities	Association of the practice of accumulated physical activity with the existence of a multi-sport court; presence of a patio for the use of physical education classes; offer of varied physical activities
Camargo et al. (2018) ¹⁶	Curitiba – PR (2013)	(38) 50%	12 to 17	To identify the characteristics of the routes used for cycling according to gender	Accelerometer and Global Positioning System	Land use - vacant lots, food, retail, recreational and residential; Leisure - parks, plazas, bike lanes/paths, and fitness zones; 3) Transport - Bus Rapid Transit stops, express bus stops, regular/ open bus stops and public transportation	Girls travel on routes with greater bicycle infrastructure and services and less empty land compared to boys.
Prado et al. (2018) ¹⁷	Curitiba – PR (2013-2014)	(107)* 72.6% [#]	-	To identify physical activity opportunities in public and private schools	Evaluation of the Promotion of Physical Activity in School	Characteristics of opportunities for the practice of PA during Physical Education classes ; Characteristics of opportunities for the practice of PA during recess ; . Characteristics of opportunities for the practice of PA during Extracurricular Activities	Most schools offered two weekly classes of Physical Education . Private schools had materials available on the playground more often than public ones. Private schools had a greater offer of physical activity in other contexts. Public schools had greater participation in the "Saúde na Escola" program.

Note. * School-based sample. [#]public school.

DISCUSSION

This study is an update of a systematic review on the prevalence of indicators in the community environment that can impact and provide opportunities for the practice of physical activity in Brazilian children and adolescents. This update made with articles published between the 2018 and 2019 adds to the past review that analyzed articles published until 2018⁷.

As in the last review, this update mostly presented data from the southern region of Brazil, and the only one that presented data from other regions was a national sample, in this case, the National Survey of School Health¹⁸. Neither the selected articles from the last review nor those of this update included articles selected with data on the North and Midwest of Brazil⁷. In addition, of the 27 federative units in Brazil, articles were only found in 7 states (Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Pernambuco, Sergipe, and Paraíba). Data obtained from other states were studies carried out with national samples. This geography of scientific production and collaboration in the country should be considered for the creation of strategies and public policies aimed at improving the built environment for the practice of physical activity. Studies in the North and Midwest regions should be further explored, promoting regional deconcentration of scientific activity and, consequently, the development of these less favored regions¹⁹. Given the great heterogeneity of Brazilian regions, an in-depth analysis of the environmental characteristics of each region is a challenge for increased physical activity to occur.

The environmental indicators investigated in the articles selected for this review were varied¹⁴⁻¹⁸. The perception of road safety proved to be an important factor for the use of parks for physical activity¹⁴. At the same time, the use of places for physical activity and active leisure becomes more frequent the closer they are to home¹⁵. Another study on the environmental characteristics of the routes used for bicycles by gender found that girls tended to use routes with more bicycle infrastructure and services and fewer empty lots compared to boys¹⁶. These studies and data obtained from Brazilian samples corroborate another review carried out on the subject, worldwide, where it was found that improvements in infrastructure and proximity to places that promote the practice of physical activity have great chances of increasing the level of physical activity in children and adolescents²⁰.

Another important feature found in this review was the conditions provided by schools for the practice of physical activity. The existence of a multi-sport court in usable conditions or the presence of a courtyard for physical education classes is associated with the practice of cumulative physical activity¹⁸. These data reinforce the importance of the school in the health of children and adolescents, opening the need for the school to constitute an environment that promotes the practice of physical activity during and after school hours²¹.

Still in the school environment, the study by Prado et al.¹⁷ described the environmental characteristics and opportunities for physical activity in schools in the city of Curitiba (Paraná), showing that the vast majority offered two physical education classes per week. In private schools, the availability of material was more frequent than in public schools, in addition to a greater offer of activities during periods outside the classroom. Despite this, the participation of a specific federal program for health promotion in schools was greater in public schools¹⁷.

As these are different environmental characteristics among the articles selected in this review, the instruments used to collect data and environmental

indicators were different in all of them. This review did not need to compare results of studies for the same indicator, since none of the indicators was repeated among studies. Despite this, as highlighted in the past review, it is interesting to standardize instruments for each environmental indicator, thus providing a better discussion of future data on the subject⁷.

This review update has limitations that should be considered, such as the low number of articles selected and the high possibility of biases generated by the different tools used for the assessment and perception of the environment, in addition to the geographic concentration of the selected studies, leaving a gap in information about other Brazilian regions. The strength of the study was the advanced search in three of the main scientific databases and the careful assessment of the methodological quality of the selected studies.

CONCLUSION

The results of this systematic review show that there are several environmental indicators that can enhance the practice of physical activity among children and adolescents. Residential location, local security, regional infrastructure, and the conditions offered at the school for the practice of physical activity can impact the level of physical activity of young people. Future studies are needed to detail the impact of each environmental characteristic on child behavior with a standardized assessment instrument, in addition to the need for more data from different Brazilian regions. The departments related to health, infrastructure, public safety, traffic, and many others must be aware of the possibilities of improvements in the built environment to promote physical activity among young people and a more active population.

COMPLIANCE WITH ETHICAL STANDARDS

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Ethical approval

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

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

Conceived and designed the experiments: ERV and GF. Performed the experiments: ERV, and GF. Analyzed the data: ERV, DS and GF. Contributed reagents/ materials/analysis tools: ERV and GF. Writing-review and editing:

ERV, DS and GF. All authors have read and agreed to the published version of the manuscript.

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