PAN AMERICAN JOURNAL OF PUBLIC HEALTH

Original research

The Global Matrix of Physical Activity in Children and Adolescents in Latin America: trends, successes and challenges in practice and surveillance

Bruno Bizzozero-Peroni[1], Mark S. Tremblay[2], Salomé Aubert[3], Silvia A. González[4], Diego Augusto Santos Silva[5], Juan López-Taylor[6], Pablo Lobo[7], Gabriela De Roia[7], Olga L. Sarmiento[4], Nicolas Aguilar-Farias[8], Susana Andrade Tenesaca[9], Karla I. Galaviz[10], Javier Brazo-Sayavera[11]

Suggested citation Bizzozero-Peroni B, Tremblay MS, Aubert S, González SA, Silva DAS, López-Taylor J, et al. The Global Matrix of Physical Activity in Children and Adolescents in Latin America: trends, successes and challenges in practice and surveillance. Rev Panam Salud Publica. 2025;49:e87. https://doi.org/10.26633/RPSP.2025.87

ABSTRACT

Objective. To synthesize the grades of physical activity (PA) indicators for children and adolescents (5–17 years) in Latin American countries; explore the social determinants of health (SDoH) for PA indicators; and identify strengths, weaknesses, opportunities, and threats to improve PA levels.

Method. Participating Latin American countries graded a set of common PA indicators following the harmonized methodology established by the Global Matrix initiative. Cross-sectional (2014, 2016, 2018, 2022) and time trend (2018–2022) data were synthesized within and between countries for each PA indicator. PA data were also synthesized according to their SDoH. Report card team leaders completed a questionnaire to identify strengths, weaknesses, opportunities, and threats (SWOT) to improve PA grades.

Results. Eight Latin American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Uruguay, and Venezuela) participated in at least one of the four editions of the Global Matrix initiative. Across all PA indicator grades in the region (*n* = 193), 35.2% received a "D" (20%–39% success rate), the most frequent grade. Incomplete information was reported in 27.5% of the indicators. A 9.3% improvement was observed in the regional average score of all PA indicators analyzed over time. While source-of-influence indicators improved by 28.1%, behavioral indicators declined by 6.2%. The need for further analyses disaggregated by SDoH, such as sex, was identified.

Conclusion. Latin American countries reported poor grades on PA indicators for children and adolescents. Contrasted progress was observed between the behavioral and source of influence indicator groups. Improved surveillance systems and greater country-level investment in PA data collection are urgently needed to enhance comparability and guide regional action.

Keywords Child health; adolescent health; sedentary behavior; epidemiology.

[1] Instituto Superior de Educación Física, Universidad de la República, Rivera, Uruguay. ✉ Bruno Bizzozero-Peroni, brunobpru@gmail.com
[2] Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada.
[3] Active Healthy Kids Global Alliance, Ottawa, Ontario, Canada.
[4] School of Medicine, Universidad de los Andes, Bogotá, Colombia.
[5] Departamento de Educação Física, Centro de Desportos, Universidade Federal de Santa Catarina, Florianópolis, Brazil.
[6] Instituto de Ciencias Aplicadas a la Actividad Física y al Deporte, Universidad de Guadalajara, Guadalajara, Mexico.
[7] Laboratorio de Estudios en Actividad Física (LEAF), Universidad de Flores (UFLO), Buenos Aires, Argentina.
[8] Department of Physical Education, Sports and Recreation, Universidad de La Frontera, Temuco, Chile.
[9] Departamento de Biociencias y Facultad de Filosofía, Letras y Ciencias de la Educación, Universidad de Cuenca, Cuenca, Ecuador.
[10] Indiana University School of Public Health, Bloomington, USA.
[11] Department of Sports and Computer Science, Universidad Pablo de Olavide, Seville, Spain.

Insufficient physical activity (PA) represents one of the main modifiable risk factors for mortality and noncommunicable diseases worldwide (1, 2). In 2016, the prevalence of insufficient PA among school-aged children and adolescents (11–17 years) was estimated at 81% globally, with an even higher estimate of 84.3% in Latin America (3). The World Health Organization has recommended the improvement of national data systems that support routine surveillance of PA as one of the strategic activities needed to address the insufficient PA challenge (4). In this regard, the Active Healthy Kids Global Alliance (AHKGA) has been leading the Global Matrix (GM) initiative to monitor the PA levels in children and adolescents since 2014 (5). To this end, each participating country developed a national report card summarizing the status of key PA indicators (5). This knowledge translation process facilitates the grading and synthesizing of the available evidence at global, regional, and national levels (6).

In specific regions such as Asia (7) and Europe (8), report card grades and their interaction with local characteristics of the jurisdictions participating in the GM have been analyzed and compared. A study by Lee et al. (9) explored the within-country and Asia-wide patterns and trends of report card grades on the PA of children and adolescents from Asian countries that participated in at least one GM edition. These regional syntheses have helped identify context-specific priorities and challenges related to the social determinants of health (SDoH) and efforts to improve PA levels (7, 9). To date, trends in PA grades in Latin America have not been assessed through a regional lens that integrates key contextual factors such as the SDoH, which play a critical role in shaping PA behaviors in the region (10). Regional comparisons can have a positive impact on capacity building, networking, and identification of regional research gaps (11, 12). This is particularly relevant in the Latin American region, where PA research is still an emerging field (13, 14). In turn, the identification of internal and external factors that limit or facilitate the improvement of PA indicators among Latin American children and adolescents may be relevant to improve the effectiveness of the GM as a monitoring tool for future PA promotion policy strategies.

Therefore, the aims of this study were to (i) compare the PA indicator grades between and within Latin American countries over time; (ii) evaluate the SDoH in PA indicators; and (iii) identify strengths, weaknesses, opportunities, and threats (SWOTs) to improve PA grades of children and adolescents in the Latin American region.

METHODS

Context

Four editions of the GM have been held to date: in 2014 (GM 1.0) (5), 2016 (GM 2.0) (15), 2018 (GM 3.0) (16), and 2022 (GM 4.0) (17). Each participating Latin American country developed a report card on PA indicators for children and adolescents based on the best available evidence and following a harmonized process outlined by the AHKGA (11). In all four GM editions, each country established a research work group to synthesize the best available evidence and assign preliminary grades. While consultation with stakeholders was encouraged, it was not mandatory. The development of a knowledge translation document summarizing the findings and grades was a required component of the process. For GM 3.0 and GM 4.0, initial preliminary grades and their rationale for each country were audited by at least two AHKGA experts before finalization.

Indicators and Grading

For the GM 1.0 and GM 2.0 editions, nine required common PA indicators were assessed, including five behavioral indicators (i.e., Overall PA, Organized Sport and Physical Activity Participation, Active Play, Active Transportation, and Sedentary Behavior) and four sources of influence indicators (i.e., Family and Peers, School, Community and Environment, and Government). Physical Fitness was added to the GM 3.0 and GM 4.0 report cards as the tenth indicator. Each country assigned indicator grades, ranging from "A" to "F" (GM 1.0 and GM 2.0) and "A+" to "F" (GM 3.0 and GM 4.0) or incomplete ("INC") when sufficient data were lacking, following the common grading framework and benchmarks (18).

Data Extraction

Data from all Latin American countries that participated in at least one GM edition were included in the analysis of PA indicator grades. Two researchers (BB-P and JB-S) developed standardized templates to extract data on PA indicator grades and related contextual information from the report cards of Latin American countries (18).

Data Collection

Report card leaders of Latin American countries that participated in at least one GM edition were invited to participate in this study and complete a questionnaire to identify SWOTs to improve PA grades of children and adolescents in the region. An online survey was created using Google Forms and distributed on 30 May 2023 to report card leaders. The SWOT matrix allowed for the analysis of internal (strengths and weaknesses) and external (opportunities and threats) aspects that affect the situation of PA in the region. Specifically, the survey aimed to identify report card leaders' top 5 SWOTs to improve the grade of each PA indicator in their countries. For this purpose, specific questions were formulated by team members (BB-P, MST, SA, SAG, and JB-S) and then sent to report card leaders of Latin American countries (18). More details on the application of the SWOT strategy and specifically related to GM have been provided previously (19).

Evidence Synthesis

For the four GM editions, the total numbers of graded and ungraded (i.e., INC) PA indicators were computed. For analysis purposes (both cross-sectional and time trends), grades were converted to a 15-point numerical scale (18), following the scoring guidelines proposed by Aubert et al. (8): A+ (94%–100% success) = 15; A (87%–93% success) = 14; A– (80%–86% success) = 13; B+ (74%–79% success) = 12; B (67%–73% success) = 11; B– (60%–66% success) = 10; C+ (54%–59% success) = 9; C (47%–53% success) = 8; C– (40%–46% success) = 7; D+ (34%–39% success) = 6; D (27%–33% success) = 5; D– (20%–26% success) = 4; F (<20% success) = 2; and INC = 0 (treated as a missing value). Mean grades (average scores) were estimated by country, region, and PA indicator (18). The average score for each country's PA indicator groups

(behavioral, source of influence, and overall) was calculated as follows: sum of numeric scores for each indicator divided by the number of indicators graded (9). The regional mean grades for each PA indicator were calculated as follows: (sum of the number of countries that graded each indicator × overall grade of each indicator)/(sum of grades for all indicators) (9).

Cross-Sectional Analyses

To compare PA grades between countries across GM editions, the previously calculated average scores were considered separately for each indicator, as well as for the behavioral group, the source-of-influence group, and all indicators combined. Differences between individual indicators and group averages served to identify cross-country contrasts and to contextualize the overall distribution of grades across the region. A series of network geometry graphs were generated from the synthesized data to show the cross-sectional associations between grades assigned and PA indicators of children and adolescents in participating countries over the four GM editions. These analyses showed the available comparisons between (i) the grades assigned for each participating country and the PA indicators and (ii) the regional grades calculated for Latin America and the PA indicators. To facilitate comparison across the four GM editions, signed letter grades (e.g., A+, A–) were grouped into their base grade categories (e.g., A). Therefore, the PA indicator grades from all GM editions were collapsed into six groups (i.e., A, B, C, D, F, and INC) for network analyses. Network geometry plots were performed using STATA software (v.17, StataCorp, College Station, TX, USA).

Time Trend Analyses

To compare the grades between and within Latin American countries over time, the follow-up period (4 years) was established between GM 3.0 (2018, baseline) and GM 4.0 (2022, follow-up). For time trends per country and region, changes in grades for each PA indicator were interpreted by the magnitude of change. Specifically, changes were identified by converting all letter grades to numerical values. Absolute and relative changes were calculated based on Lee et al. (9). Specific methodological considerations of time trend analysis are detailed elsewhere (18). All quantitative syntheses (cross-sectional and time trends in grades for PA indicators) were conducted in Excel (v.2308, Microsoft 365, Microsoft Corporation, Seattle, WA, USA).

Analysis of Strengths, Weaknesses, Opportunities, and Threats

The main SWOT priorities for the Latin American region, comprising all PA indicators, were synthesized. After grouping all responses identified in the online survey (20) by two independent researchers (BB-P and JB-S), the most repeated SWOTs to improve the grade/situation of PA indicators for children and adolescents in Latin America were detected. Subsequently, the report card leaders who participated in the process had to identify the top 5 SWOTs. The SWOT options were selected and ranked according to the highest collective agreement. As the SWOTs for each PA indicator are interrelated, they were systematically analyzed together. SWOT synthesis was conducted in Excel (v.2308, Microsoft 365, Microsoft Corporation, Seattle, WA, USA).

Supplementary Information

Relevant supplementary materials are available in the open-access Zenodo repository and provide additional details regarding both the methods and results of this study (18, 20). These include (i) the PA indicators used in the GM initiative; (ii) the grading framework and corresponding numerical equivalents applied across the four GM editions; (iii) data extraction procedures; (iv) methodological considerations for time trend analyses; and (v) the survey questions administered to report

TABLE 1. Main characteristics of the Physical Activity Report Cards for children and adolescents from Latin American countries that participated in at least one edition of the Global Matrix

	GM 1.0[a]			GM 2.0[a]			GM 3.0[b]			GM 4.0[b]			
Countries	Grades, *n*[c]	Data source[d]	Sources, *n*[e]	Grades, *n*[c]	Data source[d]	Sources, *n*[e]	Grades, *n*[c]	Data source[d]	Sources, *n*[e]	Grades, *n*[c]	Data source[d]	Sources, *n*[e]	SDoH[f]
Argentina	NP	—	—	NP	—	—	NP	—	—	5	A, B	32	—
Brazil	NP	—	—	5	A, B, C	22	10	A, B, C	7	10	A, B, C	15	Age, sex, residence area[g]
Chile	NP	—	—	8	A, B, C	34	9	A, B, C	14	8	A, C	48	—
Colombia	5	A, B, C	19	7	A, C	24	8	A, C	7	7	A, B, C	13	Age, sex, residence area[g]
Ecuador	NP	—	—	NP	—	—	5	A, B	6	NP	—	—	—
Mexico	7	A, B, C	34	8	A, B, C	41	7	A, C	8	9	A, C	17	Age, sex, residence area[g]
Uruguay	NP	—	—	NP	—	—	7	A, B	3	7	A, B, C	15	Sex
Venezuela	NP	—	—	3	A, B, C	40	5	A, B, C	7	NP	—	—	—

[a]The GM editions comprised 9 physical activity indicators. [b]The GM editions comprised 10 physical activity indicators. [c]Number of indicators with assigned grade, i.e., without incomplete data. [d]Data sources: A = nationally representative data; B = peer-reviewed scientific studies; C = gray literature (government/provincial/regional/school reports). [e]Number of sources used for reporting indicator grades. [f]SDoH according to physical activity indicators were analyzed only in the Global Matrix 4.0. [g]Data provided by Silva et al. 2022 (36).
Abbreviations: GM = Global Matrix; NP = countries that have not participated in the respective GM edition; SDoH = social determinants of health.

card leaders from Latin American countries, addressing perceived SWOTs to improving PA indicator grades in the region. Supplementary results include (i) grades for each PA indicator by GM edition and country, (ii) time trends of individual indicators and grouped indicators within and between Latin American countries, and (iii) grades of PA indicators disaggregated by social determinants of health and additional outcomes.

RESULTS

Table 1 presents the Latin American countries that participated in each GM edition, number of PA indicators with assigned grade, main data sources (number and type), and the availability of data stratified according to indicators of the SoDH. Eight Latin American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Uruguay, and Venezuela) participated in at least one edition of the GM (Figure 1). The largest number of countries participated in GM 3.0 (n = 7), representing 14.9% of the total number of territories (countries and dependent territories, n = 47) in Latin America and the Caribbean as classified by the World Bank in previous studies (21). The completeness of PA indicator grades for all participating countries from GM 1.0 to GM 4.0 was 66.7%, 68.9%, 72.9%, and 76.7%, respectively (Table 2).

FIGURE 1. Latin American countries that participated in at least one edition of the Global Matrix

Source: Original map for this article.

Cross-Sectional Results

Across all PA indicator grades assigned by Latin American countries over the four GM editions (n = 193), 35.2% were graded D, 27.5% were marked as INC, 23.3% received a C, 7.3% received a B, 6.2% received an F, and only 0.5% received an A (Figure 2a). When considering country average grades of the 9 or 10 (depending on the GM version) common PA indicators (n = 38) for the Latin American region over the four GM editions, 52.6% were graded D, 23.7% C, 18.4% INC, and 5.3% F (Figure 2b). In the most recent GM edition (2022), Colombia, Mexico, and Uruguay graded C–, reporting the highest average grades across all PA indicators. Argentina and Brazil both received a grade of D+, while Chile reported the lowest average performance, with a grade of D.

Time Trends

The average scores of all indicators reported an overall positive progress over 4 years among countries participating in GM 3.0 and GM 4.0 (Table 2). All countries showed a positive trend in the average score of all PA indicators, except for Brazil, which remained stable (Δ = 0, ΔR = 0, D+). Chile (Δ = +0.7, ΔR = +13.4%, D), Colombia (Δ = +0.5, ΔR = +6.4%, C–), Mexico (Δ = +0.7, ΔR = +10.4%, D+ to C–), and Uruguay (Δ = +0.8, ΔR = +12.9%, D+ to C–) showed a positive trend. Specifically, the time trends from GM 3.0 to GM 4.0 of the Latin American region showed an increase in the average score of all PA indicators, although the corresponding letter grade remained unchanged (Δ = +0.6, ΔR = +9.3%, D+). Regarding the group of PA indicators, positive changes were observed for the source-of-influence indicators (Δ = +1.7, ΔR = +28.1%, D+ to C–), mainly due to improvements in the Family and Peers and School indicators. In contrast, behavioral indicators showed a negative change (Δ = –0.4, ΔR = –6.2%, D+), largely driven by a decline in Sedentary Behavior grades.

Social Determinants of Health and Additional Indicators

SoDH (i.e., age, sex, geographical location) were analyzed in four countries (Brazil, Colombia, Mexico, Uruguay) for GM 4.0. Overall, PA indicators registered higher grades for boys compared to girls, and for children compared to adolescents. For example, in Brazil, Colombia, and Mexico, Overall PA and Organized Sports Participation were consistently graded lower in girls than in boys. Overall PA and Active Transportation received higher grades among children compared to adolescents across the countries assessed. Geographical differences (rural vs. urban) were inconsistently reported but suggest possible rural advantages in certain contexts. Seven additional indicators were examined between GM 1.0 and GM 4.0, with a total of 23 grades assigned, including physical health (i.e., body composition, cardiometabolic risk, obesity), disability, mental health, sleep duration, and social environmental outcomes. However, due to the variation in country-level data availability, these were not consistently reported across editions.

Strengths, Weaknesses, Opportunities, and Threats

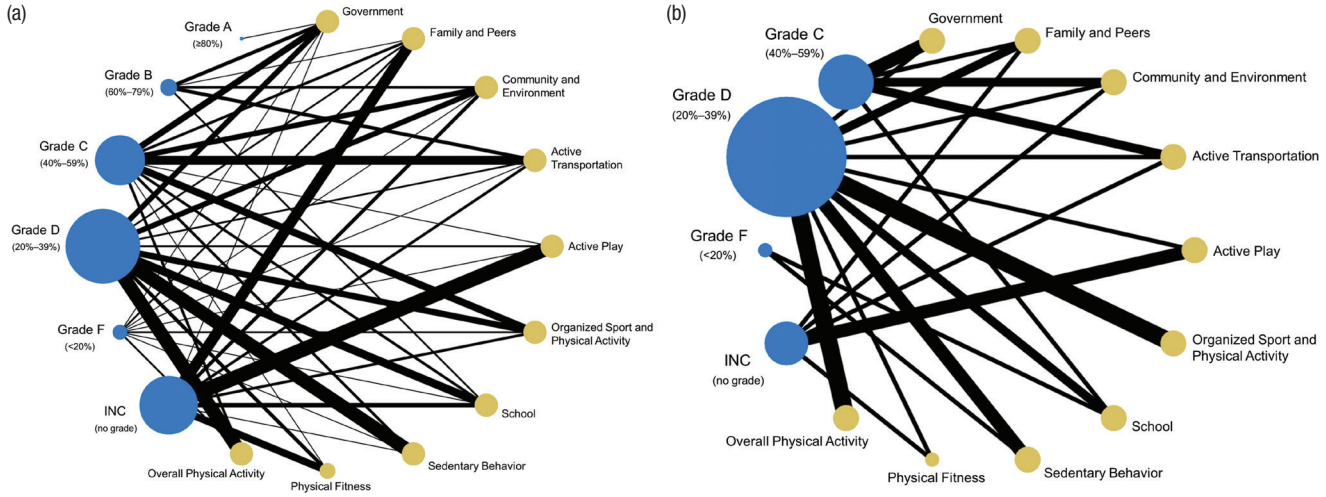
The Latin American report card leaders (n = 11), except those of Venezuela (i.e., lack of response to the survey), completed the SWOT questionnaire. A total of 6 strengths, 13 weaknesses, 10 opportunities, and 8 threats were recorded from the SWOT analysis. The most frequently reported strengths included the existence of supportive school environments (e.g., mandatory physical education and trained professionals), active government engagement, and policies facilitating access to PA opportunities. Weaknesses highlighted by report card leaders included limited implementation and evaluation of policies, lack of coordinated actions between stakeholders, and insufficient human and financial resources. Notably, several countries reported

TABLE 2. Time trends in average scores of all physical activity indicators and the number of incomplete grades, by Latin American country among children and adolescents

Countries	Mean grades (average scores) of all indicators[a]							Number of incomplete grades			
	GM 1.0[b]	GM 2.0[b]	GM 3.0[c]	GM 4.0[c]	Absolute changes (average)[d]	Relative changes (%)[e]	Time trends[f]	GM 1.0[b]	GM 2.0[b]	GM 3.0[c]	GM 4.0[c]
Argentina	—	—	—	D+ (6.7)	—	—	N/A	—	—	—	5
Brazil	—	D (2.6)	D+ (6.7)	D+ (6.7)	0	0	◄►	—	4	0	0
Chile	—	D (2.2)	D (5.1)	D (5.8)	+0.7	+13.4	▲►	—	1	1	2
Colombia	D (2.2)	D (2.6)	C– (7.3)	C– (7.8)	+0.5	+6.4	▲►	4	2	2	3
Ecuador	—	—	D (5.7)	—	—	—	N/A	—	—	5	—
Mexico	D (2.3)	D (2.4)	D+ (6.6)	C– (7.3)	+0.7	+10.4	▲	2	1	3	1
Uruguay	—	—	D+ (6.2)	C– (7.0)	+0.8	+12.9	▲	—	—	3	3
Venezuela	—	D (2.0)	D+ (6.3)	—	—	—	N/A	—	6	5	—
Latin America region	D (2.2)	D (2.3)	D+ (6.3)	D+ (6.9)	+0.6	+9.3	▲►	6	14	19	14

[a]The grade for each indicator and the numerical equivalent for the analysis is based on the percentage of achievement of a defined benchmark; see Bizzozero-Peroni and Brazo-Sayavera 2025 (18). [b]The GM editions 1.0 and 2.0 comprised 9 physical activity indicators. [c]The GM editions 3.0 and 4.0 comprised 10 physical activity indicators. [d]For the absolute changes (Δ), GM 3.0 served as the baseline data, and baseline average scores were subtracted from the corresponding average scores at follow-up (GM 4.0). [e]Relative changes (ΔR) were calculated using the following equation: ΔR (% increase or decrease) = (Δ / baseline average score) × 100. [f] Time trends of the mean grades (average scores) of all indicators (except overall physical activity and government, as there was a change in benchmarks between editions) for Latin American countries that participated in GM 3.0 and GM 4.0. Time trends were defined in three categories: upward arrows ▲ = positive progress in average score and positive change in letter grade; upward and sideway arrows ▲► = positive progress in average score and no change in letter grade; and sideways arrows ◄► = no progress in average score and no change in letter grade. GM = Global Matrix; N/A = not applicable.

FIGURE 2. Network geometry plots of available comparisons between (a) the grades assigned (*n* = 193) in Latin American countries and the physical activity indicators over the four Global Matrix editions, and (b) the calculated mean grades (*n* = 38) for the Latin American region and the physical activity indicators over the four Global Matrix editions



Source: Original figure for this article.
Note: For panel (a), the size of the yellow circular nodes (physical activity indicators) is relative to the number of grades assigned in Latin American countries from GM 1.0 to GM 4.0. The size of the blue circular nodes (assigned grades) is relative to the number of available data on physical activity indicators reporting these grades. The width of the solid line connecting the nodes is relative to the number of countries reporting physical activity indicators (yellow circular nodes) according to the assigned grades (blue circular nodes). Grade A (*n* = 1), success with a large majority of children and youth (≥80%); Grade B (*n* = 14), success with well over half of children and youth (60%–79%); Grade C (*n* = 45), success with about half of children and youth (40%–59%); Grade D (*n* = 68), success with less than half but some children and youth (20%–39%); Grade F (*n* = 12), success with very few children and youth (<20%); and INC (*n* = 53), incomplete information to assign a grade.
For panel (b), the size of the yellow circular nodes (physical activity indicators) is relative to the number of the estimated mean grades for the Latin American region from GM 1.0 to GM 4.0. The size of the blue circular nodes (mean grades) is relative to the number of available data on physical activity indicators reporting these mean grades. The width of the solid line connecting the nodes is relative to the number of the GM editions reporting physical activity indicators (yellow circular nodes) according to the mean grades (blue circular nodes). Grade C (*n* = 9), success with about half of children and youth (40%–59%); Grade D (*n* = 20), success with less than half but some children and youth (20%–39%); Grade F (*n* = 2), success with very few children and youth (<20%); and INC (*n* = 7), incomplete information to assign a grade.

limited incorporation of equity considerations (e.g., sex, socioeconomic status) in PA surveillance and programming. Among the opportunities, increasing awareness and education at the community, academic, and government levels and the potential for intersectoral collaboration stood out. Conversely, threats included political instability, social violence, and rising screen time and sedentary behaviors among youth. The report card leaders' top 5 SWOTs to improve PA grades of children and adolescents in the Latin American region are detailed in Table 3.

DISCUSSION

This is the first study to examine cross-sectional patterns and time trends in report card grades of PA indicators among children and adolescents in Latin America using data from the GM initiative between 2014 and 2022. The findings confirm persistent challenges in PA promotion across the region, with most indicator grades remaining low—commonly D (35.2%) or incomplete (27.5%)—and only a few countries showing modest improvements in recent years. Notably, in 2022, Colombia, Mexico, and Uruguay with grades of C– obtained the highest average grades across PA indicators, whereas Argentina and Brazil received D+ grades, and Chile reported the lowest performance with a D grade. In the regional time trends (2018–2022), the overall average scores for all PA indicators showed an increase of 9.3% with no change in the letter grade (i.e., D+). Specifically, the source-of-influence indicators reported positive progress of 28.1%, while the behavioral indicators reported negative progress of 6.2%. All countries (i.e., Chile, Colombia, Mexico, and Uruguay) showed a positive trend in the average score of all PA indicators, except for Brazil, which remained stable. The syntheses of the top 5 SWOTs for improving PA indicators and the need for further analysis according to the SDoH could improve the effectiveness of the GM framework as a monitoring tool for PA promotion policy strategies in the region.

Considering the time trends between 2018 and 2022, the regional improvement of the average score of the sources of influence PA indicators contrasted with the negative progress of the behavioral indicators, which could signify that relevant policies, socio-educational environments, research, and infrastructures conducive to PA promotion in Latin American nations may not have translated into favorable behaviors. The gap between policy strategies and PA program implementation observed in this study corroborates previous findings (13, 22, 23). In fact, while the SWOT analysis showed that the governmental and public policy environment was favorable to the promotion of PA (e.g., legislation, public educational institutions, sports organizations) as a strength, in contrast, the limited implementation, coordination, evaluation, and resources of PA initiatives in different contexts were the main weakness. Although most governments had PA policies established, their implementation levels remained notably inadequate, and, specifically, transfer times between government policies and national or local programs can be considerably long in the Latin American region (24). Factors such as potential population impact (e.g., reach, uptake in practice, contextual factors), feasibility, and costs are often overlooked but exert significant influence on real-world generalizability and provide crucial insights into public health planning (22). Furthermore, instability in government environments (i.e., in political priorities and discontinuity of actions after government changes) was one of the main threats identified by the PA panel that could impact the policy-action transfer challenge.

TABLE 3. Top 5 strengths, weaknesses, opportunities, and threats (SWOTs) to improve physical activity indicator grades among children and adolescents in the Latin American region

Strengths	Weaknesses
1. Supportive school environment for the development of physical activity (e.g., physical education as a mandatory course, qualified professionals).	1. Limited implementation and evaluation of public policies.
2. Supportive government environment to promote physical activity (e.g., legislation, public educational institutions, sports organizations).	2. Difficulty of a coordinated approach between government policies, social and private organizations, schools, children's families, and community centers at the local and national levels.
3. Supportive public policy environment to promote national and local programs/initiatives in different contexts (e.g., school, sports organizations, recreational facilities, community centers).	3. Limited human and financial resources for municipalities, educational and social institutions, sport organizations, and national programs related to physical activity.
4. Democratization of access by reduced cost to participate in organized or nonorganized physical activities.	4. Lack of analysis of inequality indicators related to physical activity (e.g., sex, socioeconomic status).
5. Supportive community environment (e.g., local initiatives, strong sense of community, organized neighborhood) for social support and engagement in physical activity.	5. Limited promotion of physical fitness in educational programs as a health marker.
Opportunities	**Threats**
1. Increasing interest, awareness, and education at the community, academic, and government levels about the importance of physical activity and its impact on health.	1. Instability in the government environment, i.e., instability in political priorities and discontinuity of actions after government changes.
2. High rate of school attendance.	2. Current social violence and insecurity perception negatively affect the potential use of public spaces.
3. Community organizations are great places to develop strong partnerships and articulate actions between government, schools, sports organizations, health centers, and families.	3. Increase in sedentary behaviors and screen time.
4. Increasing education training capacity and providing professional development opportunities.	4. Increase in social inequalities.
5. Identifying and addressing barriers to physical activity, such as social inequalities.	5. Limited family leisure time and increased work time.

According to the SWOT analysis, other possible explanations for the low grades on PA indicators, and specifically for the negative progress in sedentary behavior between GM 3.0 and GM 4.0, could refer to specific threats (i.e., current social violence and insecurity perception negatively affects the potential use of public spaces; limited family leisure time and increased work time; and increase in screen time) and weaknesses (i.e., limited promotion of physical fitness in educational programs as a health marker) observed by the panel of PA experts. These global and regional challenges can restrict opportunities for PA in public spaces. Across developing countries, and specifically in Latin America, economic instability is commonplace, social inequalities are pronounced, and criminal violence persists as a paramount social issue (25). In turn, high amounts of screen-based sedentary behaviors have been reported worldwide (26) and could be associated with lower levels of PA (27).

Public health surveillance serves as the bedrock of public health efforts, and monitoring PA indicators is vital for gauging progress, setting priorities, and shaping policy initiatives (28, 29). In this context, specific SDoH (e.g., age, sex) and additional indicators (e.g., inclusion, obesity, sleep duration) were evaluated by some participating countries and may play a role in the formulation of public policies designed to encourage PA among youth (30, 31). However, because of the limited data and heterogeneity definitions, the authors were unable to compare cross-sectional and time trend analyses regarding these SDoH and additional outcomes. Given the integration of indicators such as inclusion (i.e., compliance with PA recommendations for specific groups, such as children with disabilities, immigrant children, or children from indigenous communities) among countries engaged in the GM editions, harmonized methods and standardized benchmarks should be established to facilitate cross-country comparisons in the future (7). Future report cards from Latin American countries should consider disaggregating PA grades by specific SDoH (10), such as sex, gender identity (32, 33), and disability status (34). This could assist in the creation of more detailed and targeted public policies for children and adolescents to achieve the recommended levels for each PA indicator (10). The SDoH should be prominent in the PA research for this region, where social inequalities are increasingly widespread and have been negatively affecting PA levels for several years (35). Indeed, the absence of analysis according to inequality indicators (e.g., sex, socioeconomic status) represents the fourth weakness from the SWOT analysis for improving PA levels in Latin America.

Some limitations of this study must be acknowledged. First, although the regional contribution to the GM has been increasing, only 8 of the 47 Latin American and Caribbean countries were included over the four editions. This limited coverage affects the representativeness and generalizability of the findings to the broader region. Specifically, participation from Caribbean nations must be encouraged in the future Global Matrices. Second, inconsistent data sources, benchmarks, and measurement tools across countries—particularly for indicators like Active Play, Physical Fitness, and Government—limit the comparability of grades and contribute to between-country heterogeneity. Third, the large number of INC grades on PA indicators limited comparisons and interpretations within and between Latin American countries. Finally, the impact of the COVID-19 pandemic on PA indicators was outside the scope of the latest Latin American country reports and is addressed in another study of the GM initiative (17).

Conclusion

This study represents the inaugural regional effort to compare PA indicators among Latin American countries, providing a valuable framework for synthesizing the latest evidence on children's PA and facilitating cross-country comparisons and trend analyses. Latin American countries reported low levels of PA among children and adolescents, with most indicator grades falling below international recommendations. While the sources of influence indicators showed positive progress, the behavioral indicators declined, suggesting that PA promotion policies may not yet translate into favorable PA behaviors. To improve comparability and regional trend analyses, broader participation of Latin American countries in future GM initiatives is needed. The top 5 SWOTs identified in this study, along with greater attention to SDoH, can help enhance the usefulness and effectiveness of the GM framework as a monitoring tool and guide the development of more targeted PA promotion policy strategies in Latin America.

Author contributions Conceptualization: BB-P, MST, SA, SAG and JB-S; Methodology: BB-P, MST, SA, SAG, DAS-S and JB-S; Software: BB-P; Validation, Formal Analysis and Writing - Original Draft: BB-P and JB-S; Investigation: BB-P, SAG, DAS-S and JB-S; Resources: MST, SA, and DAS-S; Data curation: SAG, DAS-S, JL-T, PL, GDR, OLS, NA-F, DSAT and KG; Visualization and Writing - Review & Editing: all authors; Supervision: MST and JB-S. All the authors have read and approved the final manuscript.

Conflicts of interest The authors declare no conflicts of interest.

Disclaimer Authors hold sole responsibility for the views expressed in the manuscript, which may not necessarily reflect the opinion or policy of the RPSP/PAJPH and/or PAHO.

REFERENCES

1. Lee I-M, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet. 2012;380(9838):219–29. https://doi.org/10.1016/S0140-6736(12)61031-9
2. GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396(10258):1223–49. https://doi.org/10.1016/S0140-6736(20)30752-2
3. Guthold R, Stevens GA, Riley LM, Bull FC. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1·6 million participants. Lancet Child Adolesc Health. 2020;4(1):23–35. https://doi.org/10.1016/S2352-4642(19)30323-2
4. World Health Organization (WHO). Global Action Plan on Physical Activity 2018–2030: more active people for a healthier world. Geneva: WHO; 2018 [cited 2025 April 20]. Available from: https://iris.who.int/handle/10665/272722
5. Tremblay MS, Gray CE, Akinroye K, Harrington DM, Katzmarzyk PT, Lambert EV, et al. Physical activity of children: a global matrix of grades comparing 15 countries. J Phys Act Health. 2014;11(Suppl 1):S113–S125. https://doi.org/10.1123/JPAH.2014-0177
6. Aubert S, Barnes JD, Forse ML, Turner E, González SA, Kalinowski J, et al. The international impact of the Active Healthy Kids Global Alliance Physical Activity Report Cards for Children and Youth. J Phys Act Health. 2019;16(9):679–97. https://doi.org/10.1123/JPAH.2019-0244
7. Huang WY, Aubert S, Tremblay MS, Wong SH. Global Matrix 4.0 Physical Activity Report Cards grades for children and adolescents: a comparison among 15 Asian countries and regions. J Exerc Sci Fit. 2022;20(4):372–81. https://doi.org/10.1016/J.JESF.2022.10.002
8. Coppinger T, Milton K, Murtagh E, Harrington D, Johansen D, Seghers J, et al. Global Matrix 3.0 physical activity report card for children and youth: a comparison across Europe. Public Health. 2020;187:150–6. https://doi.org/10.1016/J.PUHE.2020.07.025
9. Lee EY, Shih AC, Collins M, Kim Y-B, Nader PA, Bhawra J, et al. Report card grades on physical activity for children and adolescents from 18 Asian countries: patterns, trends, gaps, and future recommendations. J Exerc Sci Fit. 2023;21(1):34–44. https://doi.org/10.1016/J.JESF.2022.10.008
10. Werneck AO, Barboza LL, Silva ECM, Araujo RHO. Sociodemographic inequalities in physical activity in Latin America: time for policies targeted at groups that need it the most. Int J Public Health. 2022;67(1):1605125. https://doi.org/10.3389/IJPH.2022.1605125
11. Tremblay MS, Barnes JD, Demchenko I, Gonzalez SA, Brazo-Sayavera J, Kalinowski J, et al. Active Healthy Kids Global Alliance Global Matrix 4.0—a resource for physical activity researchers. J Phys Act Health. 2022;19(11):693–9. https://doi.org/10.1123/JPAH.2022-0257
12. Godoy-Cumillaf A, Bizzozero-Peroni B, Tomkinson GR, Brazo-Sayavera J. Physical fitness of Latin America children and adolescents: a protocol for a systematic review and meta-analysis. BMJ Open. 2021;11(5):e047122. https://doi.org/10.1136/bmjopen-2020-047122
13. Salvo D, Parra DC, Jáuregui A, Reséndiz E, Garcia-Olvera A, Velazquez D, et al. Capacity for childhood obesity research in Latin American and US Latino populations: state of the field, challenges, opportunities, and future directions. Obes Rev. 2021;22(Suppl 3):e13244. https://doi.org/10.1111/OBR.13244
14. Bizzozero-Peroni B, Fernández-Giménez S, Pintos-Toledo E, Corvos CA, Díaz-Goñi V, Brazo-Sayavera J. Physical activity-related indicators in children and adolescents in Uruguay: a scoping review based on the Global Matrix initiative. Front Public Health. 2022;10:954621. https://doi.org/10.3389/fpubh.2022.954621
15. Tremblay MS, Gonzalez SA, Katzmarzyk PT, Onywera VO, Reilly JJ, Tomkinson G. Introduction to the Global Matrix 2.0: Report Card grades on the physical activity of children and youth comparing 38 countries. J Phys Act Health. 2016;13(11 Suppl 2):S85–S86. https://doi.org/10.1123/JPAH.2016-0641
16. Aubert S, Barnes JD, Abdeta C, Nader PA, Adeniyi AF, Aguilar-Farias N, et al. Global Matrix 3.0 Physical Activity Report Card grades for children and youth: results and analysis from 49 countries. J Phys Act Health. 2018;15(S2):S251–S273. https://doi.org/10.1123/JPAH.2018-0472
17. Aubert S, Barnes JD, Demchenko I, Hawthorne M, Abdeta C, Nader PA, et al. Global Matrix 4.0 Physical Activity Report Card grades for children and adolescents: results and analyses from 57 countries. J Phys Act Health. 2022;19(11):700–28. https://doi.org/10.1123/JPAH.2022-0456
18. Bizzozero-Peroni B, Brazo-Sayavera J. Physical activity indicators in children and adolescents from Latin America: a complementary analysis of the Global Matrix 2014–2022. Zenodo; 2025. https://doi.org/10.5281/zenodo.15652933
19. Hutzler Y, Barak S, Aubert S, et al. "WOT" do we know and do about physical activity of children and adolescents with disabilities? A SWOT-oriented synthesis of Para report cards. Adapt Phys Activ Q. 2023;40(3):431–55. https://doi.org/10.1123/APAQ.2022-0123
20. Bizzozero-Peroni B, Brazo-Sayavera J. SWOT priorities for improving physical activity levels of children and adolescents in the Latin American region [data set]. Zenodo; 2024. https://doi.org/10.5281/zenodo.12819762

21. Brazo-Sayavera J, Aubert S, Barnes JD, González SA, Tremblay MS. Gender differences in physical activity and sedentary behavior: results from over 200,000 Latin-American children and adolescents. PLoS One. 2021;16(8):e0255353. https://doi.org/10.1371/JOURNAL.PONE.0255353
22. Hoehner CM, Ribeiro IC, Parra DC, Reis RS, Azevedo MR, Hino AA, et al. Physical activity interventions in Latin America: expanding and classifying the evidence. Am J Prev Med. 2013;44(3):e31–e40. https://doi.org/10.1016/J.AMEPRE.2012.10.026
23. Salvo D, Sarmiento OL, Reis RS, Hino AAF, Bolivar MA, Lemoine PD, et al. Where Latin Americans are physically active, and why does it matter? Findings from the IPEN-adult study in Bogota, Colombia; Cuernavaca, Mexico; and Curitiba, Brazil. Prev Med. 2017;103:S27–S33. https://doi.org/10.1016/J.YPMED.2016.09.007
24. Klepac Pogrmilovic B, Ramirez Varela A, Pratt M, Milton K, Bauman A, Biddle SJH, et al. National physical activity and sedentary behaviour policies in 76 countries: availability, comprehensiveness, implementation, and effectiveness. Int J Behav Nutr Phys Act. 2020;17(1):116. https://doi.org/10.1186/S12966-020-01022-6
25. Altamirano M, Berens S, Ley S. Security or social spending? Perceptions of insecurity, victimization, and policy priorities in Mexico and Brazil. Polit Stud. 2022;72(1):134–57. https://doi.org/10.1177/00323217221096559
26. McArthur BA, Volkova V, Tomopoulos S, Madigan S. Global prevalence of meeting screen time guidelines among children 5 years and younger: a systematic review and meta-analysis. JAMA Pediatr. 2022;176(4):373–83. https://doi.org/10.1001/JAMAPEDIATRICS.2021.6386
27. De Araújo LGM, Turi BC, Locci B, Mesquita CAA, Fonsati NB, Monteiro HL. Patterns of physical activity and screen time among Brazilian children. J Phys Act Health. 2018;15(6):457–61. https://doi.org/10.1123/JPAH.2016-0676
28. Aubert S, Brazo-Sayavera J, González SA, Janssen I, Manyanga T, Oyeyemi AL, et al. Global prevalence of physical activity for children and adolescents; inconsistencies, research gaps, and recommendations: a narrative review. Int J Behav Nutr Phys Act. 2021;18(1):81. https://doi.org/10.1186/S12966-021-01155-2
29. Reilly JJ, Andrew R, Abdeta C, Azevedo LB, Aguilar Farias N, Barak S, et al. Improving national and international surveillance of movement behaviours in childhood and adolescence: an international modified Delphi study. Sports Med. 2025;55(1):203–19. https://doi.org/10.1007/s40279-024-02104-2
30. Silva DAS, Christofaro DGD, De Moraes Ferrari GL, et al. Results from Brazil's 2018 Report Card on Physical Activity for Children and Youth. J Phys Act Health. 2018;15(s2):S323–S325. https://doi.org/10.1123/JPAH.2018-0421
31. Brazo-Sayavera J, Fernandez-Gimenez S, Pintos-Toledo E, Corvos C, Souza-Marabotto F, Bizzozero-Peroni B. Results from the Uruguay's 2022 report card on physical activity for children and adolescents. J Exerc Sci Fit. 2023;21(1):104–10. https://doi.org/10.1016/J.JESF.2022.11.005
32. The Lancet Public Health. Time to tackle the physical activity gender gap. Lancet Public Health. 2019;4(8):e360. https://doi.org/10.1016/S2468-2667(19)30135-5
33. National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Committee on National Statistics; Committee on Measuring Sex, Gender Identity, and Sexual Orientation. Measuring sex, gender identity, and sexual orientation. Becker T, Chin M, Bates N, editors. Washington, DC: National Academies Press; 2022. https://doi.org/10.17226/26424
34. Tremblay MS, Demchenko I, Reilly JJ, Aubert S, Sit C. The future of Para Report Cards on physical activity of children and adolescents with disabilities—a global call for engagement, data, and advocacy. Adapt Phys Activ Q. 2023;41(1):1–8. https://doi.org/10.1123/apaq.2023-0131
35. Werneck AO, Araujo RH, Aguilar-Farias N, Ferrari G, Brazo-Sayavera J, García-Witulski C, et al. Time trends and inequalities of physical activity domains and sitting time in South America. J Glob Health. 2022;12:04027. https://doi.org/10.7189/JOGH.12.04027
36. Silva DAS, Aubert S, Ng K, Morrison SA, Cagas JY, Tesler R, et al. Association between physical activity indicators and human development index at a national level: information from Global Matrix 4.0 Physical Activity Report Cards for children and adolescents. J Phys Act Health. 2022;19(11):737–44. https://doi.org/10.1123/JPAH.2022-0321

Manuscript submitted 14 April 2025. Revised version accepted for publication on 24 June 2025.

La matriz mundial sobre la actividad física en la población infantil y adolescente en América Latina: tendencias, logros y desafíos en la práctica y la vigilancia

RESUMEN

Objetivo. Resumir las calificaciones obtenidas en relación con los indicadores sobre la actividad física en la población infantil y adolescente (de 5 a 17 años) en los países de América Latina, analizar los determinantes sociales de la salud relacionados con estos indicadores, y determinar las fortalezas, oportunidades, debilidades y amenazas para mejorar los niveles de actividad física.

Método. Los países latinoamericanos participantes calificaron un conjunto de indicadores comunes sobre la actividad física aplicando la metodología armonizada establecida por la iniciativa para elaborar la matriz mundial (conocida como Global Matrix por su nombre en inglés). Se resumieron los datos transversales correspondientes a los años 2014, 2016, 2018 y 2022 y a la tendencia temporal (período 2018-2022) dentro de cada país y entre los países para cada indicador. Los datos sobre la actividad física también se resumieron según los determinantes sociales de la salud relacionados. Los jefes de los equipos a cargo de elaborar los boletines de calificaciones completaron un cuestionario para determinar las fortalezas, oportunidades, debilidades y amenazas a fin de mejorar las calificaciones obtenidas.

Resultados. Ocho países latinoamericanos (Argentina, Brasil, Chile, Colombia, Ecuador, México, Uruguay y Venezuela [Republica Bolivariana de]) participaron en al menos una de las cuatro ediciones de esta iniciativa. En todas las calificaciones de los indicadores sobre la actividad física en América Latina (n = 193), el 35,2% recibió una "D" (20-39% de éxito), la calificación más frecuente. En el 27,5% de los indicadores, se informó que no se contaba con datos completos. Se observó una mejora del 9,3% en la puntuación media regional de todos los indicadores de AF analizados a lo largo del tiempo. Si bien los indicadores sobre la fuente de influencia mejoraron un 28,1%, los indicadores sobre el comportamiento disminuyeron un 6,2%. Se determinó que era necesario realizar más análisis desglosados según los determinantes sociales de la salud, como el sexo.

Conclusiones. Los países latinoamericanos no obtuvieron buenas calificaciones en los indicadores sobre la actividad física en la población infantil y adolescente. Se observaron algunos progresos dispares entre los grupos de indicadores de comportamiento y los de la fuente de influencia. Es urgente contar con sistemas de vigilancia mejorados y una inversión más alta a nivel nacional en la recopilación de datos sobre la actividad física para mejorar la comparabilidad y orientar la acción regional.

Palabras clave Salud infantil; salud del adolescente; conducta sedentaria; epidemiología.

Iniciativa Global Matrix sobre atividade física entre crianças e adolescentes na América Latina: tendências, sucessos e desafios na prática e na vigilância

RESUMO

Objetivo. Sintetizar as notas dos indicadores de atividade física (AF) entre crianças e adolescentes (5 a 17 anos) nos países da América Latina; explorar os determinantes sociais da saúde (DSS) relacionados aos indicadores de AF; e identificar pontos fortes, pontos fracos, oportunidades e ameaças para melhorar os níveis de AF.

Método. Os países latino-americanos participantes classificaram um conjunto de indicadores comuns de AF, seguindo a metodologia harmonizada estabelecida pela iniciativa Global Matrix. Foram sintetizados dados transversais (2014, 2016, 2018, 2022) e de tendência temporal (2018–2022) dentro dos países e entre eles para cada indicador de AF. Também foram sintetizados os dados de AF segundo os DSS. Os líderes das equipes de desenvolvimento dos boletins dos países preencheram um questionário para identificar pontos fortes, pontos fracos, oportunidades e ameaças (análise SWOT), visando melhorar as notas de AF.

Resultados. Oito países latino-americanos (Argentina, Brasil, Chile, Colômbia, Equador, México, Uruguai e Venezuela) participaram de pelo menos uma das quatro edições da iniciativa Global Matrix. Entre todas as notas atribuídas aos indicadores de AF na região (n = 193), 35,2% receberam a nota "D" (correspondente a uma taxa de sucesso de 20% a 39%), sendo a nota mais frequente. Informações incompletas foram registradas em 27,5% dos indicadores. Observou-se uma melhora de 9,3% na média regional das notas de todos os indicadores de AF ao longo do tempo. Embora os indicadores de fontes de influência tenham melhorado 28,1%, os indicadores comportamentais caíram 6,2%. Identificou-se a necessidade de análises adicionais desagregadas por DSS, como sexo.

Conclusão. Os países da América Latina apresentaram notas insatisfatórias nos indicadores de AF entre crianças e adolescentes. Observou-se um progresso contrastante entre os grupos de indicadores comportamentais e de fontes de influência. São urgentemente necessários sistemas de vigilância aprimorados e maiores investimentos na coleta de dados sobre AF em nível nacional, a fim de melhorar a comparabilidade entre países e orientar ações regionais.

Palavras-chave Saúde da criança; saúde do adolescente; comportamento sedentário; epidemiologia.