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Indicators of physical activity and nutritional status among children and adolescents in Zimbabwe: Findings from three global matrix initiatives

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ABSTRACT

Background: Regular physical activity is associated with several benefits among children and adolescents. Globally, only limited surveillance data, collected using harmonized approaches to accurately compare levels of physical activity among children and adolescents are available. Through its Global Matrix initiatives, Active Health Kids Global Alliance provides an opportunity for participating countries/jurisdictions to compare physical activity levels of children and adolescents based on ten common indicators. The 2022 Zimbabwe Report Card summarizes the best available evidence and assigns grades on these ten indicators of physical activity for children and adolescents.

Methods: Through an iterative process, a team of national experts working in various sectors of physical activity used Active Healthy Kids Global Alliance's Global Matrix benchmarks and grading rubric, to assign Report Card grades on 10 indicators of physical activity (Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviours, Physical Fitness, School, Family and Peers, Community Environment, and Government) among 5–17-year-old children and adolescents in Zimbabwe. Published and unpublished data as well as policy documents informing grades for each indicator were summarized. An unweighted average of all studies with data for an indicator was used to inform the grade assignment. Where data were unavailable or insufficient to provide accurate estimates, an incomplete grade was assigned. The primary purpose of the present study was to synthesize and summarize the best available data and assign grades on 10 common indicators of physical activity for children and adolescents. The secondary objective was to compare Report Grades across three Global Matrix initiatives.

Results: Grades for the ten common indicators for Global Matrix 4.0 plus Nutritional Status (**B+**) were assigned as follows: Overall Physical Activity (**C+**), Organized Sport and Physical Activity (**B-**), Active Play (**C+**), Active Transportation (**B**), Sedentary Behaviours (**C**), Physical Fitness (**Incomplete**), Family and Peers (**Incomplete**), School (**C**), Community and Environment (**C-**), Government (**D**). Generally, grades for individual behaviours (Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviours) were higher than for sources of influence (Family and Peers, School, Community and Environment, Government). Across 3 Global Matrices, the grade for Overall Physical activity (**C+**) did not change, Community and Environment (**F, D, C-**) steadily improved over time; while those for Active Transportation, Sedentary Behaviours and Sports were unchanged for Global Matrix 2.0 and 3.0, but declined for Global Matrix 4.0.

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Conclusion: Although grades for individual behaviours were higher than those for sources of influence, overall, our findings show that the levels of physical activity among children and adolescents in Zimbabwe were lower than recommended. Robust surveillance data with large and representative samples are required to provide accurate estimates of physical activity participation among children and adolescents in Zimbabwe. Furthermore, policies and initiatives that promote equitable physical activity participation among children and adolescents are urgently needed in Zimbabwe.

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1. Background

Participation in regular physical activity is associated with several benefits including but not limited to better adiposity profiles, academic performance and cognition, improved physical and mental health, and improved cardiometabolic health among children and adolescents.^{1,2} Despite these benefits, evidence presented in the World Health Organization (WHO)'s recent Global status report on physical activity,² other international surveillance data,^{3,4} systematic review evidence,⁵ and our own previous data syntheses^{6,7} show concerning levels of insufficient physical activity among children and adolescents. Globally, as of 2016, 81% of children and adolescents aged 11–17 years engaged in insufficient physical activity.^{2,3} Insufficient physical activity is a known significant contributor to a number of non-communicable diseases including but not limited to type 2 diabetes mellitus, cardiovascular disease, stroke, certain types of cancers etc.⁸ Already widely understood to be a 'global pandemic',^{9,10} and compounded by the COVID-19 pandemic^{2,11} insufficient physical activity, especially among children and adolescents has become a significant global public health priority.¹⁰ As such, it is now included in global action plans and initiatives. The initiatives include the International Society for Physical Activity and Health (ISPAH)'s Global Observatory for Physical Activity (GoPA),⁹ the World Health Organization (WHO)'s Global Action Plan on Physical Activity,¹² Global Advocacy for Physical Activity (GAPA),⁸ and the Active Healthy Kids Global Alliance (AHKGA)'s Global Matrix initiative.¹³

These international initiatives are aimed at addressing the challenge of insufficient physical activity through research, interventions, advocacy and policies. For example, using 2010 as baseline, the Global Action Plan on Physical Activity targets a 15% reduction in insufficient physical activity among adolescents by 2030.¹² GoPA collaborates "with other institutions and governments worldwide to track progress in PA, and to achieve the WHO target of reducing the prevalence of inactivity by 10% by 2025".⁹ AHKGA works "to advance physical activity in children and adolescents from around the world".¹⁴ Since 2016, and as part of AHKGA's international effort, Active Healthy Kids Zimbabwe (AHKZ), a not-for-profit organization established in 2015, has developed and summarized two Zimbabwe Report Cards^{6,7} following AHKGA's Global Matrix methodology.¹⁵

AHKZ participates in the global matrix initiatives as part of a global effort to curb the ongoing global insufficient physical activity. To this end, the first two iterations of the Zimbabwe Report Cards^{6,7} showed that there was generally a dearth of surveillance data on physical activity among children and adolescents in Zimbabwe. However, the limited available data pointed to an impending and concerning public health challenge, since grades from those Report Cards demonstrated that children and adolescents in Zimbabwe were insufficiently active. As part of learning and knowledge translation, during, and after participating in each of the two previous global matrix initiatives, AHKZ implemented

several dissemination strategies, including engaging policymakers, and developing health promotion materials to improve physical activity among children and adolescents in Zimbabwe. Furthermore, there have also been concerted and robust data collection efforts designed to improve data quality. Despite these efforts, data from recent and unpublished standalone studies^{16,17} still showed concerning levels of physical inactivity among children and adolescents in Zimbabwe. In order to better assess whether there has been changes over time (e.g., improvement in grades), this article summarizes the results of the 2022 Zimbabwe Report Card and presents the findings in the context of the two previous iterations (2016, 2018).

2. Methods

Led by the AHKGA, the Global Matrix initiative is an international harmonized endeavour dating back to 2014, involving teams of physical activity experts from participating countries, synchronously developing national Report Cards.¹³ In January 2020, the AHKGA invited interested countries and/or jurisdictions to register for and participate in the Global Matrix 4.0 through an open call that was distributed via established networks. After successful registration, Zimbabwe participated in the harmonized Report Card development process. Through an extensive and iterative process, the 2022 Zimbabwe Report Card was developed by a representative team of national experts (n = 8) working in various sectors of physical activity and nutrition. In-depth descriptions of the general Report Card development process¹⁵ and previous Zimbabwe Report Cards^{6,7} for Global Matrices 2.0 and 3.0 are reported elsewhere.

In brief, for the 2022 Report Card, the Global Matrix 4.0 benchmarks (Table 1) and grading rubric (Table 2) were used to assign grades on 10 common indicators of physical activity (Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviours, Physical Fitness, School, Family and Peers, Community and Environment, and Government) among 5–17-year-old Zimbabwean children and adolescents. In addition to the 10 common indicators for Global Matrix 4.0, the 2022 Zimbabwe Report Card included Nutritional Status as a supplementary indicator, given its importance in the Zimbabwean context. Nutritional Status was defined using combinations of two anthropometric indices (height-for-age and BMI-for-age) as applied by the WHO.¹⁸ Report Card team members were involved in data searches, and acquisition. Available published and unpublished studies, graduate theses as well as policy documents from 2015 onwards that informed grades for each indicator were summarized into a bibliography and subsequently organized as a spreadsheet. The bibliography and spreadsheet prepared by the first author (TM), were later shared with all team members for verification of completeness and accuracy. Of note is the fact that grade assignment for the 2022 Zimbabwe Report Card was informed by data collected before as well as during the COVID-19 pandemic.

Table 1
Global Matrix 4.0 indicators and benchmarks.

Indicator	Benchmark
Overall Physical Activity	% of children and youth who meet the Global Recommendations on Physical Activity for Health, which recommend that children and youth accumulate at least 60 min of moderate- to vigorous-intensity physical activity per day on average; Or % of children and youth meeting the guidelines on at least 4 days a week (when an average cannot be estimated).
Organized Sport and Physical activity	% of children and youth who participate in organized sport and/or physical activity programs.
Active Play	% of children and youth who engage in unstructured/unorganized active play at any intensity for more than 2 h a day; % of children and youth who report being outdoors for more than 2 h a day.
Active Transportation	% of children and youth who use active transportation to get to and from places (e.g., school, park, mall, friend's house).
Sedentary Behaviours	% of children and youth who meet the Canadian Sedentary Behaviour Guidelines (5- to 17-year-olds: no more than 2 h of recreational screen time per day). Note: The Guidelines currently provide a time limit recommendation for screen-related pursuits, but not for non-screen-related pursuits.
Physical Fitness	Average percentile achieved on certain physical fitness indicators based on the normative values published by Tomkinson et al. ³⁸
Family and Peers	% of family members (e.g., parents, guardians) who facilitate physical activity and sport opportunities for their children (e.g., volunteering, coaching, driving, paying for membership fees and equipment); % of parents who meet the Global Recommendations on Physical Activity for Health, which recommend that adults accumulate at least 150 min of moderate intensity aerobic physical activity throughout the week or do at least 75 min of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity physical activity; % of family members (e.g., parents, guardians) who are physically active with their kids.
School	% of schools with active school policies (e.g., daily physical education (PE), daily physical activity, recess, "everyone plays" approach, bike racks at school, traffic calming on school property, outdoor time); % of schools where the majority (≥80%) of students are taught by a PE specialist; % of schools where the majority (≥80%) of students are offered the mandated amount of PE (for the given state/territory/region/country); % of schools that offer physical activity opportunities (excluding PE) to the majority (>80%) of their students; % of parents who report their children and youth have access to physical activity opportunities at school in addition to PE classes; % of schools with students who have regular access to facilities and equipment that support physical activity (e.g., gymnasium, outdoor playgrounds, sporting fields, multipurpose space for physical activity, equipment in good condition).
Community and Environment	% of children or parents who perceive their community/municipality is doing a good job at promoting physical activity (e.g., variety, location, cost, quality); % of communities or municipalities that report they have policies promoting physical activity; % of communities or municipalities that report they have infrastructure (e.g., sidewalks, trails, paths, bike lanes) specifically geared toward promoting physical activity; % of children or parents who report having facilities, programmes, parks, and playgrounds available to them in their community; % of children or parents who report living in a safe neighborhood where they can be physically active; % of children or parents who report having well-maintained facilities, parks, and playgrounds in their community that are safe to use.
Government	Evidence of leadership and commitment in providing physical activity opportunities for all children and youth; Allocated funds and resources for the implementation of physical activity promotion strategies and initiatives for all children and youth. Demonstrated progress through the key stages of public policy making (i.e., policy agenda, policy formation, policy implementation, policy evaluation and decisions about the future); HEPA PAT vol 2 and the scoring rubric published by Ward et al. ³⁹

¹Tomkinson GR, Carver KD, Atkinson F et al. European normative values for physical fitness in children and adolescents aged 9–17 years: results from 2 779 165 Eurofit performances representing 30 countries. *Br J Sports Med* 2018; 52:1445–1456.

²Ward MR, Tyler R, Edwards LC et al. The AHK-Wales Report Card 2018: Policy Measures - is it possible to 'score' qualitative data? *Heal Prom Int* 2021; 36:1151–1159.

Table 2
Global Matrix 4.0 benchmarks.

Grade	Interpretation	Corresponding number for analysis
A+	94%–100%	15
A	We are succeeding with a large majority of children and youth (87%–93%)	14
A-	80%–86%	13
B+	74%–79%	12
B	We are succeeding with well over half of children and youth (67%–73%)	11
B-	60%–66%	10
C+	54%–59%	9
C	We are succeeding with about half of children and youth (47%–53%)	8
C-	40%–46%	7
D+	34%–39%	6
D	We are succeeding with less than half but some children and youth (27%–33%)	5
D-	20%–26%	4
F	We are succeeding with very few children and youth (<20%)	2
INC	Incomplete—insufficient or inadequate information to assign a grade	No grade

After a meeting to discuss the data appraisal and the grade assignment process, each member of the Zimbabwe Report Card Team was given a copy of the bibliography of included studies/reports, the spreadsheet of synthesized data as well as the grading rubric and benchmarks. Members individually assigned grades on each of the indicators. Letter grades were converted to integer values that ranged from 0 to 15 (Table 2). An unweighted average of all studies, policy documents or reports, with relevant data for each

indicator was used to inform the final grade assignment. Following guidance from AHKGA, for the 2022 Report Card, if grade assignment for an indicator was informed by both self-report and device-measured data, a '*' was added beside the grade for that indicator. Grades assigned by each team member were then collated by indicator. Discrepancies in assigned grades per indicator were noted and further explored/discussed during a virtual grade assignment meeting. The final grade was assigned after consensus from all

members of the Report Card Team. Where there was no consensus or data were unavailable/insufficient to provide accurate estimates, an incomplete grade was assigned to that indicator. Once the team finalized the 2022 Zimbabwe Report Card grades, they were submitted to AHKGA headquarters for auditing. The submitted grades included a spreadsheet with rationale for grade assignment, references used and the characteristics of studies/reports that informed grades for each indicator. The grades were audited by two independent reviewers and the Zimbabwe Report Card team responded (as needed and/or requested) to queries, clarifications or additional information on the rationale for assigning grades. After satisfactorily addressing the reviewers' comments and/or questions, the grades were accepted by AHKGA for inclusion in the Global Matrix 4.0 database.

3. Results

Table 3 presents the characteristics of studies, main findings and the 2022 Zimbabwe Report Card Grades for the 10 common indicators included in the Global Matrix 4.0 as well as a grade for Nutritional Status. The assigned grades for the ten common indicators ranged from as low as **D** (Government) to as high as **B** (Active Transportation). Two indicators (Physical Fitness, Family and Peers) were assigned incomplete grades. Grades for individual behaviours (Overall Physical Activity, **C+**; Active Transportation, **B**; Organized Sport and Physical Activity, **B-**; Active Play, **C+**; Sedentary Behaviours, **C**) were generally higher than those for the sources of influence (School, **C**; Community and Environment, **C-**; Government, **D**). The average grade for individual behaviours combined was a **B-** compared to a **C-** for the sources of influence. Nutritional Status, which was graded separately from the ten common indicators for Global Matrix 4.0, received a **B+**.

Report card grades spanning the three Global Matrix initiatives (Global Matrix 2.0 to 4.0) in which Zimbabwe has participated are presented in Table 4. While Overall Physical Activity is the only indicator whose grade (**C+**) did not change across the three Global Matrices, grades for Community and Environment (**F**, **D**, **C-**) have steadily improved from Global Matrix 2.0 to 4.0. Grades for Active Transportation (**A-**, **A-**, **B**), Sedentary Behaviours (**B**, **B**, **C**) and Organized Sports and Physical Activity (**B**, **B**, **B-**) were unchanged for the first two Global Matrices but declined in 2022. Data to inform the Family and Peers (incomplete) or Physical Fitness (not graded, incomplete) indicators have been insufficient or unavailable to assign grades accurately. Active Transportation has consistently had a high grade across the three Global Matrices. Grades for each behavioural indicator were unchanged for the first two global matrix initiatives but changed for the 2022 Report Card except for Overall Physical Activity. The grade for Nutritional Status which was not graded in 2016 for Global Matrix 2.0, improved from a **B** (Global Matrix 3.0 in 2018) to a **B+** (Global Matrix 4.0 in 2022).

4. Discussion

The present article summarizes the results of the 2022 Zimbabwe Report Card and compares the grades to the 2016 and 2018 Report Cards. Findings from the 2022 Zimbabwe Report Card shows that grades for individual behaviours: Overall Physical Activity (**C+**), Active Transportation (**B**), Organized Sport and Physical Activity (**B-**), Active Play (**C+**), Sedentary Behaviours (**C**), were generally higher than those for their sources of influence (School, **C**; Community and Environment, **C-**; Government, **D**). Two indicators (Physical Fitness; Family and Peers) were graded incomplete due to lack of data. Although grades for Overall Physical Activity remained unchanged across the 3 Global Matrix initiatives, those for other four behavioural indicators (Organized Sport and Physical Activity,

Active Play, Active Transportation, Sedentary Behaviours) did not change for the first 2 Global Matrix initiatives but did change between 2018 and 2022. Family and Peers is the only indicator to have been assigned an incomplete grade for all three Report Cards.

Our finding showing that Overall Physical Activity did not change over time is consistent with the results reported from Canada,¹⁹ and a recent international paper²⁰ summarizing secular trends in Report Card Grades from Global Matrix 1.0–4.0. Similarly, findings from other previous studies also suggest that generally, physical activity has remained relatively stable,²¹ although below the recommended levels³ or has declined²² among children and adolescents over time. Changes in grades for the other four behavioural indicators (Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviours) observed between Global Matrix 3.0 and 4.0 may be related to the impact of the public health restrictions imposed to curb the COVID-19 pandemic.² Given that the four behavioural indicators contribute to Overall Physical Activity, the improvement in the grade for Active Play against the decline in the other three indicators, may also help to explain why the grade for Overall Physical Activity did not change. Despite the previously proposed strategies to increase physical activity,^{6,7} minimize recreational screen time among children and adolescents in Zimbabwe, as well as the potential impacts of the COVID-19 restrictions,^{23,24} the present findings indicate that there haven't been significant improvements between 2016 and 2022. This suggests that there may be a need to rethink and reprioritize strategies to promote physical activity among children and adolescents in Zimbabwe. These strategies could include the prioritization of targeted public health messages, delivered in the school setting, promoting various forms of physical activity, encouraging 'breaking sitting time'. Additionally, the public health messages could also reinforce the utility of active transportation as an important and healthy way of life to be cherished, valued, and not necessarily to be associated with being less affluent, as may currently be the case in the Zimbabwean context.

The finding showing that generally, grades for behaviours have been consistently higher than those for sources of influence across the three Zimbabwe Report Cards is consistent with findings from other low-middle-income countries that have participated in previous Global Matrix initiatives.^{25–27} A plausible explanation may be related to the fact that in most low-middle-income countries such as Zimbabwe, utilitarian physical activity and necessity (e.g. active transportation to and from school), may supersede choice. Additionally, children and adolescents, especially those in rural communities may still have limited opportunities to access recreational screens, thus, reducing their sedentary behaviours. Furthermore, this finding may also suggest that despite the known and lauded influence of having better infrastructure and conducive environments to support physical activity,²⁸ other factors may also be important. Therefore, in resource-limited contexts such as the case in Zimbabwe, it may be prudent to adopt strength-based approaches,²⁹ and focus on promoting and preserving healthy behaviours among children and adolescents in all settings despite the lack of well-developed infrastructure.

The strategy of prioritizing behaviours over infrastructure development in low-resource contexts is supported by recent evidence showing lower levels of physical activity among children and adolescents from countries with well-established physical activity infrastructure.^{30–32} As has been highlighted previously, it is not clear that 'building infrastructure will guarantee that they will come and use it'.³³ This is also important given that the reasons for the consistently lower grades for sources of influence may be more challenging to address in low-resource countries or contexts. For example, lack of resources and political will,³⁴ as well as other competing priorities such as the need to address communicable,

Table 3
 Characteristics of studies/reports and grades for the 2022 Zimbabwe Report Card.

Indicator	Author(s), year of study, study characteristics, and main finding(s)	Grade
Overall Physical Activity	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-reporting on child and adolescent behaviours (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; e-survey questions were piloted and modified before being administered. A majority (61%) of adults proxy-reported that children and adolescents in Zimbabwe spend an average of 60 min/day in MVPA. Rukuni et al. ⁴⁰ ; Published cross-sectional, self-report survey of 8-16-year-olds (n = 306); Random school and random school selection-sequencing; IPAQ for adolescents was researcher-administered. 63% of 8-16-year-olds reported engaging in moderate or vigorous PA (≥600 MET minutes) per week. Makaza et al. ⁴¹ ; Unpublished, cross-sectional self-reported data from 8 to 16-year-olds (n = 4402); convenience sample of primary school children from 6 rural, 7 urban, 1 boarding and 1 Mining town schools. 59% of 8-16-year-olds reported attaining 60 min of MVPA on at least 4 days per week. Dlamini ⁴² ; Graduate thesis, cross-sectional, pedometer-measured step count of 12-19-year-olds (n = 126); Convenience sample of students from 2 urban and 1 high school; device-measured PA data were obtained using Omron Walking Style Pro 2.0 pedometer worn at the waist for seven days; Global Physical Activity Questionnaire was used to collect self-reported PA, sedentary time data as well. 46% of 12-19-year-olds accumulated ≥9000 steps/day.	C+*
Organized Sport and Physical Activity	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; e-survey questions were piloted and modified before being administered. In an e-survey of adults, 73% reported that children and adolescents engage in organized sport. Makaza et al. ⁴¹ ; Unpublished, cross-sectional self-reported data from 8 to 16-year-olds (n = 4402); Convenience sample of primary school children from 6 rural, 7 urban, 1 boarding and 1 Mining town schools. 67% of 8-16-year-olds self-reported participating in organized sport. Dlamini ⁴² ; Graduate thesis, cross-sectional, pedometer-measured step count of 12-19-year-olds (n = 126); Convenience sample of students from 2 urban and 1 high school; device-measured PA data were obtained using Omron Walking Style Pro 2.0 pedometer worn at the waist for seven days; Global Physical Activity Questionnaire was used to collect self-reported PA, sedentary time data as well. 58% of 12-19-year-olds self-reported participating in organized sport of moderate intensity.	B-
Active Play	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; E-survey questions were piloted and modified before being administered. 75% of adults (proxy-report) believe children and adolescents engage in sufficient active play (at least 2 h of outdoor time each day). Rukuni et al. ⁴⁰ ; Published, cross-sectional, self-report survey of 8-16-year-olds (n = 306); Random school and random school selection-sequencing; The International Physical Activity Questionnaire (IPAQ) for adolescents was researcher-administered. 56% of 8-16-year-olds self-reported ≥2hrs of daily outdoor time. Makaza et al. ⁴¹ ; Unpublished, cross-sectional self-reported data from 8 to 16-year-olds (n = 4402); convenience sample of primary school children from 6 rural, 7 urban, 1 boarding and 1 Mining town schools. 35% of 8-16-year-olds reported engaging in outdoor after-school time for ≥2 h/day.	C+
Active Transportation	Matsungo et al. ¹⁷ ; Published, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; E-survey questions were piloted and modified before being administered. 52% of adult Zimbabweans proxy-reported that children and adolescents in Zimbabwe use active transport. Makaza et al. ⁴¹ ; Unpublished, cross-sectional self-reported data from 8 to 16-year-olds (n = 4402); convenience sample of primary school children from 6 rural, 7 urban, 1 boarding and 1 Mining town schools. 84% of 8-16-year-olds reported using active transport to and from school on most days. Dlamini ⁴² ; Graduate thesis, cross-sectional, pedometer-measured step count of 12-19-year-olds (n = 126); Convenience sample of students from 2 urban and 1 high school; device measured PA data were obtained using Omron Walking Style Pro 2.0 pedometer worn at the waist for seven days; Global Physical Activity Questionnaire was used to collect self-reported PA, sedentary time data as well. 69% of 12-19-year-olds reported using active transport on most days to and from school.	B
Sedentary Behaviours	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; e-survey questions were piloted and modified before being administered. Data from a national e-survey indicate that only 31% believe that children and adolescents in Zimbabwe spend the recommended ≤2 h each day on recreational screen time. Makaza et al. ⁴¹ ; Unpublished, cross-sectional self-reported data from 8 to 16-year-olds (n = 4402); convenience sample of primary school children from 6 rural, 7 urban, 1 boarding and 1 Mining town schools. Data from an unpublished study indicated that approximately 75% of children and adolescents aged 8-16-years old do spend the recommended ≤2 h per day engaged in recreational screen time	C
Physical Fitness	No data available to accurately assign a grade for this indicator	INC
Family and Peers	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; e-survey questions were piloted and modified before being administered. 45% agree/strongly agree that families or peers support children and adolescents to participate in PA. Due to inconclusive evidence (only 1 study) with preliminary findings and lack of consensus by the team, an (INC) was assigned for this indicator	INC
School	Government of Zimbabwe (2015); Syllabi, Early childhood to grade 2 are allocated 5 × 20-min sessions of PE per week ⁴³ ; Grades 3 to 7: have 10 × 30-min sessions of PE per week ⁴⁴ ; Forms 1 to 4 have 8 × 35-min sessions of PE per week. ⁴⁵ Forms 5 and 6 are allocated at least 10 × 40-min sessions of PE per week. ⁴⁶ The Ministry of Primary and Secondary Education curricula in Zimbabwe mandates the instruction and examination of PE from elementary to high school. There are dedicated time slots (as is the case with other subjects) throughout the week at all levels of primary and secondary education. In addition, PE is taught and examined as a separate subject at all Institutions of higher education where schoolteachers are trained. However, although the syllabus mandates PE it is difficult to evaluate the proportion of schools where the time slots are adhered to and the activities being implemented during those sessions.	C
Community and Environment	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; e-survey questions were piloted and modified before being administered. 46% of adults believe that their community and environment support and is safe for children and adolescents to participate in PA. Government of Zimbabwe; Policy document, ⁴⁷ there is some evidence of infrastructure resuscitation, in the form of a draft policy document, adopted by the government of Zimbabwe in 2016 that prioritizes community recreational activities and spaces in some neighborhoods.	C-

Table 3 (continued)

Indicator	Author(s), year of study, study characteristics, and main finding(s)	Grade
Government	Matsungo et al. ¹⁷ ; Unpublished, cross-sectional, national e-survey of adults (18 years or older), proxy-report (n = 354); Snowball convenience sampling, e-survey sent to participants on social media platforms e.g. WhatsApp groups; e-survey questions were piloted and modified before being administered. 41% of respondents to an e-survey believed there is strong government support for PA among children and adolescents.	D
Nutritional Status	Government of Zimbabwe; Policy document, ⁴⁸ through the Ministry of Health & Child Care; Ministry of Adolescents, Sport, Arts and Recreation; and Ministry of Primary and Secondary Education, the Government of Zimbabwe has developed and now begun implementing policies that are meant to increase physical activity among children and adolescents. All three ministries have promulgated 5-year strategic plans, with some evidence of allocation of funding to implement the policies. Combinations of expert opinion and the data available led us to award a D on this grade. Although not one of the common indicators included for the Global Matrix 4.0, nutritional status remains an important indicator in B+ the context of Zimbabwe. This indicator was informed by data from a cross-sectional survey ¹⁶ involving children and adolescents from across Zimbabwe (n = 1858). In this survey, 9% of 9-17-year-old learners were categorized to be of short stature. Meanwhile, in the same study, 7% of the participants were classified as thin, 80% normal weight, 9% overweight and 4% were obese. Based on combinations of these data and expert opinion, this indicator was assigned a B+.	

MVPA = Moderate-to-Vigorous Intensity Physical Activity; MET = Metabolic Equivalents; IPAQ = International Physical Activity Questionnaire; PA = Physical Activity; INC = Incomplete; PE = Physical Education; * = informed by a combination of self-report and device-measured data.

Table 4
Zimbabwe Report Cards Grades on physical activity for children and adolescents for Global Matrices 2.0–4.0

Category	Indicator	Grades		
		GM 2.0	GM 3.0	GM 4.0
		2016	2018	2022
Physical Activity	Overall Physical Activity	C+	C+	C+*
	Organized Sport and Physical Activity participation	B	B	B-
	Active Play	D+	D+	C+
Sedentary Behaviours	Active Transportation	A-	A-	B
	Screen-based and non-screen-based sedentary behaviours	B	B	C
School	Infrastructure, policy, and programs	D	C	C
Family and Peers	Support and behaviour	INC	INC	INC
Community and Environment	Infrastructure, policy, programs, safety	F	D	C-
Government	Strategies and investments	D	C-	D
Physical Fitness	Physical Fitness	Not graded	INC	INC
Nutrition	Nutritional Status	Not graded	B	B+

Note: The grade for each indicator is based on the percentage of children and adolescents meeting a defined benchmark (see Table 2); INC = Insufficient or no available data to inform the grading of that indicator; GM = Global Matrix; * = subjective and device-based data informed the grade for the indicator.

water-borne, and other parasitic diseases which cannot be easily addressed, may be largely responsible for the consistently lower grades for sources of influence. To this end, it is still important to engage policymakers and other stakeholders with convincing evidence-informed arguments highlighting the risks of the impending healthcare costs and other potentially significant consequences of ignoring insufficient physical activity and related behaviours among children and adolescents in Zimbabwe. This is particularly important given the documented and ongoing physical activity transitions in comparable low-middle-income countries³⁵ as well as the observed, and relatively high prevalence of overweight and obesity in a large national sample of children and adolescents in Zimbabwe.¹⁶

4.1. Impacts of the COVID-19-induced lockdowns on behavioural physical activity grades

As has been consistently documented in systematic reviews,^{11,23,24} and the Global Status Report,² public health measures that were implemented to curb the spread of COVID-19, including lengthy school shutdowns or closures of public parks etc., may have impacted physical activity behaviours and consequently the corresponding Report Card grades. Matsungo & Chopera,³⁶ showed that the COVID-19 lockdowns contributed to reductions in physical activity among adults in Zimbabwe. The 2022 Report Card grades

for Active Transportation, Organized Sport and Physical Activity, Sedentary Behaviours declined, while Active Play improved compared to 2018. The majority of children and adolescents in Zimbabwe use active transportation to and from school^{6,7} and most organized sporting activities in low-middle-income countries occurs in the school setting,^{2,37} therefore lengthy school shutdowns, especially early in the COVID-19 pandemic may have negatively impacted these behaviours. Interestingly, preliminary findings from a recent national e-survey¹⁷ seems to show that the COVID-19 lockdowns, which restricted children and adolescents to being mostly at home on school days, may have given the children and adolescents in Zimbabwe plenty of opportunities to engage in active outdoor play, thus, the improvement in the related grade in the 2022 Zimbabwe Report Card.

4.2. Strengths and limitations

The main strength of the present article is that it summarizes data from all three Zimbabwe Report Cards (developed following rigorous and internationally harmonized procedures), therefore, is the most comprehensive assessment of the levels of physical activity among children and adolescents in Zimbabwe. However, a few but important limitations need to be highlighted. First, data informing the Report Card grades are mostly unpublished and relies on non-representative samples with largely self-reported

measures. Therefore, findings from the present synthesis need to be interpreted with caution. Second, most of the data and/or reports used to inform the Zimbabwe Report Cards rely on school-based samples, thus, exclude a significant proportion of children and adolescents who are not attending school. Relatedly, the measures of behaviours such as active transportation and organized sports and physical activity are limited to school-based and not to and from other places or any community-based sporting activities. Finally, due to unavailability or insufficient data, levels of family and peer support as well as physical fitness for children and adolescents in Zimbabwe have not been captured in all three iterations (2016, 2018, 2022) of the Zimbabwe Report Cards.

5. Conclusions

Findings from the three Report Cards show that although grades for individual behaviours are higher than their sources of influence, the levels of physical activity among children and adolescents in Zimbabwe are lower than recommended. The findings also show that there is still a lack of reliable information and research evidence on key indicators of physical activity and the nutritional status of children and adolescents in Zimbabwe. Therefore, robust surveillance data with large and representative samples are required to provide accurate estimates of physical activity participation among children and adolescents in Zimbabwe. Additionally, policies and initiatives that promote physical activity among children and adolescents in Zimbabwe are needed. Furthermore, the prevalence of short stature, thinness, overweight and obesity are concerning and reflect the presence of the double burden of malnutrition in children and adolescents, thus, require appropriate multisectoral responses. Due to lack of opportunities, safe areas, programmes, and investments, as well poor diets, children and adolescents in Zimbabwe may be becoming increasingly physically inactive, more sedentary, with unhealthy nutritional status, thereby putting them at a higher risk for non-communicable diseases early in their adulthood.

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