

Physical Activity Indicators Amongst Children and Adolescents in Lebanon, Qatar, and the United Arab Emirates: Active Healthy Kids Report Card Data from 1998–2022

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Abstract

Background: High prevalence of physical inactivity amongst children and adolescents continues to represent a significant health challenge globally with approximately two-thirds of children worldwide not achieving the recommended daily Physical Activity (PA) levels. Countries in the Middle East exhibit some of the highest levels of physical inactivity and sedentary behaviour, paralleled with increasing obesity rates amongst children and adolescents in the region.

Objective: This study aims to summarize and compare findings on PA indicators amongst children and adolescents in Lebanon, Qatar, and the United Arab Emirates (UAE) based on the Active Healthy Kids Global Alliance (AHKGA) PA Report Cards and compare these results with regional and global trends.

Methods: Previous Report Cards from Lebanon, Qatar, the UAE were utilised to evaluate and compare PA indicators amongst children and adolescents, and to compare these findings with global data. Report Cards were published in 2016 (1998?2014 data), 2018 (2016?2017 data) and 2022 (2017?2022 data). Data addressing 10 key PA indicators were analysed to identify trends and gaps in PA levels and influencing factors amongst children and adolescents across these countries.

Results: Based on data collected between 1998 and 2022, less than one-third (15%?33%) of children and adolescents in Lebanon, Qatar, and the UAE achieved the recommended daily average of 60 minutes of moderate- to vigorous-intensity PA. Additionally, more than half (45%?74%) of children and adolescents exceeded the recommended limit of two hours of recreational screen time per day. Other behavioural indicators revealed insufficient PA levels, though the results were slightly better for sources of influence indicators. In comparison with global averages from the Global Matrix, our results were generally lower across indicators. Comparable low levels of PA were commonly observed across other Asian countries.

Conclusions: Data from a 25-year period show consistent low levels of PA and high levels of sedentary behaviour amongst children and adolescents from these three Arab Middle Eastern countries. Despite governmental investment in implementation of PA initiatives, there seems to be a lag in eliciting increases in PA at a population-level. The evidence points to a critical need for systematic PA surveillance programmes utilising nationally representative samples, with the aim to measure self-report and objective estimates of PA across different domains.

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Original Manuscript

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Results: Based on data collected between 1998 and 2022, less than one-third (15%–33%) of children and adolescents in Lebanon, Qatar, and the UAE achieved the recommended daily average of 60 minutes of moderate- to vigorous-intensity PA. Additionally, more than half (45%–74%) of children and adolescents exceeded the recommended limit of two hours of recreational screen time per day. Other behavioural indicators revealed insufficient PA levels, though the results were slightly better for sources of influence indicators. In comparison with global averages from the Global Matrix, our results were generally lower across indicators. Comparable low levels of PA were commonly observed across other Asian countries.

Conclusions: Data from a 25-year period show consistent low levels of PA and high levels of sedentary behaviour amongst children and adolescents from these three Arab Middle Eastern countries. Despite governmental investment in implementation of PA initiatives, there seems to be a lag in eliciting increases in PA at a population-level. The evidence points to a critical need for systematic PA surveillance programmes utilising nationally representative samples, with the aim to measure self-report and objective estimates of PA across different domains.

Keywords: Physical Activity Surveillance; Physical Education; Sedentary Lifestyle; Sports; Children and Adolescents; Middle East.

Introduction

Physical activity (PA) is an important factor in preventing and managing non-communicable diseases, as well as enhancing mental health, quality of life, and overall wellbeing.¹ The high prevalence of physical inactivity amongst children and adolescents continues to represent a significant health challenge globally with approximately two-thirds of children worldwide estimated to not achieving the minimum recommended level of daily PA (i.e., at least an average of 60 minutes of moderate- to vigorous-intensity physical activity; MVPA).² Moreover, countries in the Middle East report some of the highest levels of physical inactivity and sedentary behaviour.^{3,4} This trend is paralleled with increasing obesity rates amongst children, adolescents and adults in the region.⁵

Physical inactivity is a recognized independent risk factor for the onset of various chronic diseases in early and late adulthood.⁶ Therefore, promoting PA should be a public health priority.⁷ In 2005, a team of Canadian researchers developed a Report Card that provided a comprehensive assessment of PA amongst Canadian children and adolescents, with the aim to identify areas of concern, and advocate for action to improve their PA levels.^{8,9} The Report Card included indicators related to PA in different domains and each indicator was assigned a letter grade (A to F) based on the best available evidence, with “A” representing the highest level of achievement and “F” representing the lowest. For 20 years, Active Healthy Kids Canada and ParticipACTION have worked to inspire the country to engage all children and adolescents in PA and the Canadian Report Card has been released annually between 2005 and 2016 and biannually thereafter.

Building on the success of the Canadian model, the Active Healthy Kids Report Card initiative expanded globally to an international project encompassing 15 countries producing PA Report Cards as part of the Global Matrix 1.0 in 2014.¹⁰ Since then, the project continued to grow and include more countries (Global Matrix 2.0, 2016, 38 countries¹¹; Global Matrix 3.0, 2018, 49 countries¹²; Global Matrix 4.0, 2022, 57 countries¹³). The Active Healthy Kids Global Alliance (AHKGA)¹⁴ leads the Global Matrix initiative and has made significant efforts to gather evidence-based data on PA indicators amongst children and adolescents worldwide.¹⁵ As a result, the individual country Report Cards have formed a source of consolidated research knowledge on PA indicators during childhood and adolescence years, with contributions to academia, research, education, health, policy, and related fields.^{16,17} The primary goal of the AHKGA “Global Matrix” initiative is to raise awareness, develop capacity, exchange knowledge and strategies, as well as improve PA surveillance amongst children and adolescents aged 5–17 years across different jurisdictions, countries, and continents. This process involves reviewing key indicators and influencing factors using a harmonised methodology, conducted as a cohort of countries/jurisdictions periodically (every 2–4

year). The AHKGA Global Matrix is currently the only worldwide initiative that monitors PA amongst children and adolescents, covering a broad range of diverse indicators. Over the past decade, the data gathered from various countries participating in the Global Matrices 2.0–4.0 have consistently indicated low levels of PA across most domains.¹⁸ Without a significant shift toward more active lifestyles, current and future generations may face increased risks of non-communicable diseases as they transition into adulthood.³

In Asia, the number of countries taking part in the AHKGA initiative has increased over the years, demonstrating the region's enthusiasm for global promotion of PA. However, the overall PA levels have remained insufficient throughout the years in almost all Asian countries.^{19,20} Therefore, gaining additional insights would be important for shaping targeted interventions and informing policy decisions to enhance PA levels and outcomes on global and regional scales. At the regional level, cross-country analyses of the gathered data can help identify trends in PA and influencing factors amongst children and adolescents, as well as reveal gaps in existing surveillance systems.²¹

Within the Middle East region, participation in the AHKGA initiative has so far been limited to a few countries, with Lebanon, Qatar, and the United Arab Emirates (UAE) being the Arab nations that have independently developed Report Cards. This study aims to synthesize and compare evidence from the PA Report Cards developed by these Arab Middle Eastern countries. The analysis specifically focuses on Arab nations, with the objective of evaluating trends and identifying gaps in PA indicators amongst children and adolescents in countries with similar cultural backgrounds but differing socioeconomic and political climates. It also examines the relationships amongst socioeconomic and geographic factors and the levels of PA, thereby enabling a comparison of findings with those of other regions as well as global averages.

Methods

We adopted a harmonised comparative approach to evaluate PA indicators amongst children and adolescents across three participating Arab countries in the Middle East region (Lebanon, Qatar, UAE) utilising results from their previous PA Report Cards. We also compared their results to other regions and overall global trends. In this study, we have utilised the Report Cards published in 2016 (Global Matrix 2.0; including data from 1998–2014)^{22,23}, 2018 (Global Matrix 3.0; data from 2016)^{24–26} and 2022 (Global Matrix 4.0; data from 2017–2022)^{27,28} for Lebanon, Qatar, and the UAE. Participation amongst these countries varied; the UAE participated in all three Global Matrices, Qatar in Global Matrix 2.0 (2016) and 3.0 (2018), and Lebanon in Global Matrix 3.0 (2018) and 4.0 (2022). Members of their Report Card teams included researchers, clinicians, and policy makers

from universities, educational authorities, public health departments, and/or government health authorities from each country. These Report Card teams gathered available evidence on 10 common indicators of PA related to behaviour, fitness and sources of influence. The indicators included: 1) Overall Physical Activity, 2) Organized Sport and Physical Activity, 3) Active Play, 4) Active Transportation, 5) Physical Fitness (added in Global Matrix 3.0 onwards), 6) Sedentary Behaviour, 7) Family and Peers, 8) School, 9) Community and Environment, and 10) Government.

As per the AHKGA policy, countries were allowed to exclude or include supplementary indicators in their respective Report Cards, as deemed beneficial to enhance the value of their results. For example, Qatar's Report Card team decided not to evaluate Active Transportation and considered it "Not Applicable" due to insufficient data and the prevalence of high temperatures during much of the year. Instead, they included Obesity and Dietary Habits as additional indicators in their 2016 Report Card. Likewise, Lebanon included Weight Status in addition to the common indicators in their 2018 Report Card, and Sleep and Body Mass Index in their 2022 Report Card.

During the development of the Report Cards for each respective iteration (2016, 2018, 2022), teams from each country systematically gathered the most valid and reliable evidence and relevant data from the time period (i.e., Global Matrix 2.0 data from pre-2016; Global Matrix 3.0 data from 2016–2017; and Global Matrix 4.0 data from 2017–2022). Data sources included local, national, and international studies, national surveys, and official reports. Data were then synthesized by Report Card teams, and a consensus was established regarding the grading of each indicator. The grading was based on specific benchmarks, with the assigned grades corresponding to the proportion of children who achieved the benchmark (Table 1). Grading in the 2016 Report Cards was: A = 81% to 100%; B = 61% to 80%; C = 41% to 60%; D = 21% to 40%; F = 0% to 20%; INC = incomplete data. However, from 2018 onwards, each grade band was further sub-divided (Table 2). Report Card grades for each country, including rationale and references, were audited and reviewed by the AHKGA prior to final approval and release. In this study, we have incorporated references to the published results of the Report Card from each country over the years.^{22–28} We have also relied on the interpretations made by Report Cards teams to generate a comprehensive table with the assigned grades and percentages, based on the previous publications (Table 3). In certain instances, we have cited additional sources that did not play a direct role in determining the indicator's grade at the time that the Report Card was issued (e.g., governmental policies, future plans, and suggested strategies for improvement), however, they remain relevant to the context of the grading. This approach enabled us to provide thorough interpretations while ensuring that the grading process was based on information from the published Report Cards. Additionally, the most recent Report Cards (2022)

included the top three priorities for improving 10 key PA indicators, identified by Report Card teams in each country. Building on these priorities, recommendations were developed for each indicator to support improvements in PA levels across the region. Furthermore, sociodemographic characteristics of the countries were obtained from the latest (2023) Human Development Report from the United Nations²⁹ and the World Bank³⁰ (Table 4) and were used in analysing grade variations across regions. These included Human Development Index (HDI), Gross Domestic Product (GDP) per capita, gender inequality (GII), Gini index, expenditure on health, life expectancy at birth, mean years of schooling, total population, population density, urban population, and the average mean temperature.³¹

Table 1. Indicators and benchmarks used to guide the grade assignment process for 2016 (data from 1998-2014), 2018 (data from 2016-2017), and 2022 (data from 2017-2022) Report Cards.

Indicator	Benchmark
Overall PA	% of children and adolescents who meet the Global Recommendations on PA for Health, which recommend that children and adolescents accumulate at least 60 minutes of moderate- to vigorous-intensity PA per day on average. Or % of children and adolescents meeting the guidelines on at least 4 days a week (when an average cannot be estimated).
Organized Sport and PA	% of children and adolescents who participate in organized sport and/or PA programmes.
Active Play	% of children and adolescents who engage in unstructured/unorganized active play at any intensity for more than 2 hours a day.
	% of children and adolescents who report being outdoors for more than 2 hours a day.
Active Transportation	% of children and adolescents who use active transportation to get to and from places (e.g., school, park, mall, friend's house).
Sedentary Behaviour	% of children and adolescents who meet the Canadian Sedentary Behaviour Guidelines for 5- to 17-year-olds, which is no more than 2 hours of recreational screen time per day.
Physical Fitness	Average percentile achieved on certain physical fitness indicators based on the normative values published by Tomkinson et al. ³²
Family and Peers	% of family members (e.g., parents, guardians) who facilitate PA 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 PA for Health,

which recommend that adults accumulate at least 150 minutes of moderate-intensity aerobic PA throughout the week or do at least 75 minutes of vigorous-intensity aerobic PA throughout the week or an equivalent combination of moderate- and vigorous-intensity PA.

% of family members (e.g., parents, guardians) who are physically active with their kids.

% of children and adolescents with friends and peers who encourage and support them to be physically active.

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School	% of schools with active school policies (e.g., daily PE, daily PA, recess, “everyone plays” approach, bike racks at school, traffic calming on school property, outdoor time). % of schools where the majority ($\geq 80\%$) of students are taught by a PE specialist. % of schools where the majority ($\geq 80\%$) of students are offered the mandated amount of PE (for the given state/territory/region/country). % of schools that offer PA opportunities (excluding PE) to the majority ($> 80\%$) of their students. % of parents who report their children and adolescents have access to PA opportunities at school in addition to PE classes. % of schools with students who have regular access to facilities and equipment that support PA (e.g., gymnasium, outdoor playgrounds, sporting fields, multi-purpose space for PA, equipment in good condition).
Community and Environment	% of children or parents who perceive their community/municipality is doing a good job at promoting PA (e.g., variety, location, cost, quality). % of communities/municipalities that report they have policies promoting PA. % of communities/municipalities that report they have infrastructure (e.g., sidewalks, trails, paths, bike lanes) specifically geared toward promoting PA. % 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 neighbourhood 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 PA opportunities for all children and adolescents.

Allocated funds and resources for the implementation of PA promotion strategies and initiatives for all children and adolescents.
 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).

Abbreviations: PA, Physical Activity.

Table 2. Grading rubric for Global Matrix 2.0, 3.0, and 4.0.

Grade	Interpretation
A+	94%–100%
A	We are succeeding with a large majority of children and adolescents (87%–93%)
A–	80%–86%
B+	74%–79%
B	We are succeeding with well over half of children and adolescents (67%–73%)
B–	60%–66%
C+	54%–59%
C	We are succeeding with about half of children and adolescents (47%–53%)
C–	40%–46%
D+	34%–39%
D	We are succeeding with less than half but some children and adolescents (27%–33%)
D–	20%–26%
F	We are succeeding with very few children and adolescents (<20%)
INC	Incomplete—insufficient or inadequate information to assign a grade

Table 3. Grades assigned to the 10 common PA indicators in 2016 (data from 1998-2014), 2018 (data from 2016), and 2022 (data from 2017-2021) for Lebanon, Qatar, and the UAE.

Country Data from	GM 2.0 (2016)*		GM 3.0 (2018)			GM 4.0 (2022)	
	UAE	Qatar	UAE	Qatar	Lebanon	UAE	Lebanon
	1998– 2014	2004– 2014	2016	2016	2016	2017– 2021	2018– 2022
OPA	F–/D– (17%– 28%)	F (15%)	F (16%)	D (32%)	D (33%)	F (19%)	D– (21%)
OS & PA	INC	D (30%)	INC	D+ (48%)	F (5%)	INC	INC
AP	INC	INC	INC	INC	INC	INC	INC
AT	F–/D– (19%– 21%)	N/A	INC	N/A	[†] D (26%– 37%)	F (5%)	D+ (37%)
SB	[†] C– (49%– 62%)	D (<30%)	C– (40%)	[†] D+ (35%– 45%)	C– (46%)	D– (26%)	[†] C (55%)
PF	–	–	INC	INC	INC	INC	INC
SCH	D (28%)	INC	D– (26%)	[†] C (61%– 67%)	[†] D (22%– 58%)	[†] A– (100%)	D (32%)
F & P	C– (62%)	D	INC	INC	INC	D– (20%– 26%)	INC
C & E	INC	INC	INC	INC	INC	INC	INC

[†] GOV	B+	B	B+	B+	C+	B+	D
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Abbreviations: AP, Active Play; AT, Active Transportation; C & E, Community and Environment; F & P, Family and Peers; GM, Global Matrix; GOV, Government; INC, Incomplete; OPA, Overall Physical Activity; OS & PA, Organized Sport and Physical Activity; PF, Physical Fitness; SB, Sedentary Behaviour; SCH, School; UAE, United Arab Emirates. [†] Percentages may not correspond to final grades, as final grades were determined by expert consensus. *Minus sign in the UAE 2016 Report Card grades indicates variations in subgroups based on age, gender, nationality, socioeconomic status, and geographic location.

Table 4. Sociodemographic information of the three participating Arab Middle Eastern countries.

Country	Lebanon	Qatar	UAE
Human Development Index	0.752	0.886	0.940
GDP Per Capita (USD)	3,477.7	127,711.1	49,377.6
Gender Inequality Index	0.036	0.195	0.040
Gini Index	31.8	35.1	26.4
Expenditure on Health (% of GDP)	5.74	2.18	4.68
Life Expectancy at Birth (year)	77.8	82.4	82.9
Mean Years of Schooling	10.4	10.8	13.0
Population (millions)	5.8	2.9	10.9
Population Density (people/km ²)	562	231	142
Urban Population (%)	90	99	88
Average Mean Temperature (°C)	16.0	28.3	28.9

Abbreviations: GDP, Gross Domestic Product; UAE, United Arab Emirates.

Results

To contextualize the findings across these Arab Middle Eastern countries, sociodemographic and economic characteristics were first examined. Qatar (0.886) and the UAE (0.940) have very high (≥ 0.800) HDIs^{29,33}; Lebanon (0.752) has a high (0.700-0.799) HDI.^{29,34} As of the year 2024, the UAE exhibited the largest population amongst the three countries, with approximately 11 million residents, and the lowest population density (142 people/km² of land area) and urban population percentage (88%). Public health expenditure as a percentage of GDP was the highest in Lebanon (5.74%) and

the lowest in Qatar (2.18%). Life expectancy at birth ranged from 77.8 years in Lebanon to 82.9 years in the UAE. The lowest Gini index (least income inequality) was observed in the UAE (26.4) and the highest (greatest income inequality) in Qatar (53.1).³⁰

In total, 37 letter grades (56%) and 29 incomplete grades (44%) were assigned across all seven Report Cards. The indicator with the highest grade was *Government* (average of B+) and the lowest was *Overall PA* (average of D/F). *Active Play*, *Physical Fitness*, and *Community and Environment* were indicators that were marked incomplete (INC) throughout all Report Cards. The grades are explained under each indicator subheading below, except for indicators with INC grades which are not included in the rest of the results section.

Overall Physical Activity

Across all three countries, the proportion of children and adolescents meeting the recommended PA levels (i.e., minimum of 60 minutes of MVPA per day on average) varied from 15% to 33%, with the average grades ranging from F to D. In the UAE, data from 1998 to 2021 showed that most children and adolescents (72%–84%) were physically inactive. The first UAE Report Card (2016), which was based on the largest amount of data collected (1998–2014), revealed a proportion of 17%–28% children and adolescents achieving the recommended daily PA with a noticeable difference between boys (23%–24%) and girls (13%–16%). The World Health Organization Global School-based Student Health Survey (WHO GSHS)³³ and other studies in smaller samples were used to inform this indicator, resulting in a split grade of D–/F–, with the minus sign indicating variations in subgroups. *Overall PA* remained low in subsequent UAE Report Cards with only 16% of children and adolescents (21% of boys; 11% of girls) in 2018 and 19% (27% of boys; 8% of girls) in 2022 accumulating sufficient PA. Likewise, in Qatar, only 15% (30% of boys; 10% of girls) of children and adolescents met the recommended daily PA as reported in their first and most comprehensive Report Card issued in 2016. However, there was a notable increase in the following Report Card (2018), with PA levels ranging between 25% and 39% amongst children and adolescents. The final average grade assigned to the *Overall PA* in the 2018 Report Card by Qatar was D (32%). The Lebanese Report Cards for 2018 and 2022 reported comparable results, with average grades of D (33%) and D– (21%) assigned in those respective years. Like Qatar and the UAE, their evaluation primarily relied on the WHO GSHS data utilising self-report PA estimates. Boys exhibited higher levels of PA (29%) than girls (14%), and students attending private schools (23%) appeared to be more active than students in public schools (17%) in Lebanon. In all three countries, the *Overall PA* estimates were mostly derived from self-reported questionnaires, while device-based (accelerometer)

assessments were limited.

Organized Sport and Physical Activity

In Lebanon, the proportion of children and adolescents participating in events or competitions administered by the Ministry of Youth and Sports was extremely low, leading to an F grade (5%) in 2018. This may be due to a lack of public sport infrastructure and investment in community-level sport programmes. Their subsequent Report Card (2022) graded this indicator INC. In Qatar and the UAE, governmental support and investment in infrastructure are higher compared to Lebanon. In 2016, Qatar's GSHS national survey found that about 30% of children and adolescents regularly participated in at least one organized sport annually. Qatar also held a National Sports Day and had several initiatives aimed at promoting sport participation, which contributed to a grade D in this area. This grade improved to D+ in 2018, where nearly 48% of children and adolescents participated in organized sports. Additionally, 58% of boys and 42% of girls in Qatar were registered with sport clubs. The UAE marked this indicator as INC throughout their Report Cards.

Active Transportation

Of the three included countries, Lebanon reported the highest active transportation use (26%–37%; grade D). The proportion remained similar (37%), but the grade increased from D (2018) to D+ in 2022. Additionally, sex differences were observed (42% of boys and 32% of girls) in the 2017 GSHS national survey results. The UAE's evaluation of *Active Transportation* in 2016 was derived from 2005 and 2010 GSHS national reports, where data showed that 19%–21% of adolescents walked or cycled to school at least once during the week (grade D–/F–). The minus sign added to the grade was due to the notable sex differences (29% of boys and 16% of girls in 2005; 29% of boys and 15% of girls in 2010). No data were available for the following (2018) UAE Report Card. However, the 2022 UAE Report Card used data from an online survey run by the education authority in Dubai; 33,784 parents were asked about school transport mode and only 5% of children and adolescents in Dubai happened to use active transport to travel to and from school (4.8% walked, 0.2% cycled). Based on these findings, the indicator received an F in 2022.

Sedentary Behaviour

All three countries have faced ongoing challenges in reducing sedentary behaviour. The UAE Report Card showed 62% (2005) and 49% (2010) of children achieving the recommended Canadian Sedentary Behaviour Guidelines of screen time exposure (i.e., no more than two hours of

recreational screen time per day), with variations according to age and sex. The indicator was assigned a C– in the UAE in the first two Report Cards (2016 and 2018), with the minus sign indicating variations in subgroups. The numbers declined over time to 40% in 2018 (C–) and only 26% in 2022 (D–). In Qatar, the 2016 Report Card showed that less than one-third of children and adolescents met the recommended daily recreational screen time, which corresponded to grade D. These figures improved slightly to 35% for children and 45% for adolescents (D+) in 2018. Qatar did not participate in the 2022 Report Card; therefore, updated data were unavailable. The 2018 Lebanese Report Card showed that approximately 40% of children and 52% of adolescents met the screen time recommendations, resulting in an average grade of C– (46%). Similar findings were reported in 2022, with 55% of adolescents meeting the recommendations.

School

In the UAE, due to limited access to national data on school distribution, the benchmark used for this indicator varied between (i) the proportion of children and adolescents attending three or more PE classes per week (approximately 150 minutes) and (ii) the proportion of schools where the majority (80% or more) of students were taught by PE specialists. In 2016 and 2018, the UAE reported that slightly more than a quarter (26–28%) of adolescents adhered to the mandated PE requirements, and that participation decreased as age increased. The 2022 Report Card reflected updated figures with an A– grade based on data confirming that all children and adolescents in Dubai received PE classes taught by specialists. The minus sign was added to acknowledge the difference in the frequency of weekly PE classes across various schools. Whilst several components of the UAE schools (such as all PE teachers holding bachelor's degrees in PE and the adequate availability of PA facilities) would typically warrant a high grade for this indicator, only 79% of children reported receiving more than 100 minutes of PE classes per week. In Qatar, *School* was marked INC in 2016 due to insufficient data. In 2018, it was graded C, indicating that 67% of children participated in PE classes and 61% of schools offered support for PA programmes or initiatives such as 'Qatar Active Schools' and 'Health Promoting Schools'. It is worth noting here that at the time, many PE teachers in Qatar were not classified as specialists. Therefore, schools in these circumstances would not have been counted, even if their PE classes were delivered adequately. In Lebanon, *School* was graded D in 2018 (22%) and 2022 (32%). In both instances, the results were based on self-reported participation of school students in the number of weekly PE classes. Additionally, there was a notable sex discrepancy observed with 28% of boys participating in PE classes compared to only 18% of girls.

Family and Peers

This indicator relied on data showing the influence of family members and peers in encouraging or limiting PA opportunities and participation amongst children and adolescents. Based on parental PA levels in the UAE, the *Family and Peers* indicator was assigned C- (62%) in 2016 and D- (20–26%) in 2022. In the 2016 Qatar Report Card, it was graded D based on the overall prevalence of physical inactivity, suboptimal dietary habits, and a high rate of obesity amongst the population. Lebanon did not have any data to inform this indicator; hence, it was marked INC.

Government

All three countries relied mainly on unpublished data to evaluate this indicator. The data included any evidence of governmental support in promoting and providing PA opportunities for children and adolescents through policy, legislation, or regulation. Qatar assigned its highest grade to this indicator in both 2016 (B) and 2018 (B+). Similarly in the UAE, the indicator was graded B+ across all three Report Cards. However, in Lebanon, it was assigned C+ in 2018 and D in 2022.

Discussion

Human Development Index

Countries worldwide are classified by their level of development using the HDI, which measures a country's success in three key dimensions: life expectancy, education levels, and the standard of living as measured by income per capita.²⁹ Global analysis of PA levels by HDI showed that countries with high and very high HDI generally demonstrated lower grades in behavioural indicators (i.e., *Overall PA*, *Organized Sports*, *Active Play*, *Active Transportation*, and *Sedentary Behaviour*), but higher grades in sources of influence indicators (i.e., *School*, *Family and Peers*, *Community and Environment*, and *Government*).³⁶ This pattern of lower PA and higher HDI was evident in most indicators (except for the *Government* indicator) across the three Middle Eastern countries included in our study. On a global scale, the overall PA grades for countries with very high (≥ 0.800) HDI approximated to a C, with overall behavioural indicators near D and source of influence indicators around B.³³ The UAE and Qatar grades were not far from the global averages of PA amongst very high HDI countries. Similarly, Lebanon's grades were consistent with other countries classified as high HDI (e.g., Thailand, China, Bulgaria, and several nations in South America), with most results predominantly around D.³⁴

Behavioural Indicators

The latest global insights from the Global Matrix 4.0 (2022) revealed an *Overall PA* average of D (27%–33%) based on data gathered from 57 countries.¹³ A further temporal trend study of Asian countries from Global Matrices 2.0–4.0, which showed consistently lower grades, with an average grade of D– (20%–26%) across the years.²⁰ Countries in the Middle East have exhibited slightly lower results compared to regional (Asian) averages, however, the grades vary across the specific indicators. The assigned grades for *Sedentary Behaviour* across the three Arab Middle Eastern countries ranged between D– and C–, which is in line with the global findings observed over the past decade.³⁷ This expected given the advancement of technologies and widespread use of digital media. Moreover, the *Organized Sport and PA* indicator was marked INC in nearly all Asian countries (including Lebanon and the UAE) in Global Matrix 4.0. Considering its role in the overall health and PA of children and adolescents, it is important to incorporate organized activities into PA questionnaires with further specification of the type, intensity, frequency, and duration of each activity. *Active Play*, known for its numerous health benefits in children and adolescents, remains one of the least researched and documented areas of PA.³⁸ This indicator is a critical component of children and adolescent's physical, social, and cognitive wellbeing; however, it often goes unrecorded due to its unstructured nature.³⁹ In the most recent global reports (2022), *Active Play* was the indicator with the most INC grades (27/57, 47% incomplete; 30/57, 53% graded). The average grades differed across countries in relation to the HDI; low-medium HDI countries scored around C+, while high HDI countries scored around D–. This highlights the impact of the modern world on replacing PA with sedentary behaviour. Country-specific barriers and enablers to assessing this indicator are worth exploring to better understand children's total PA and design interventions that promote healthy, playful, and active lifestyles. Low levels of *Active Transportation* in the three Middle Eastern countries may be partially explained by the structure of pedestrian and cyclist areas and long distances between residential communities and schools. Most cycling and pedestrian tracks are primarily intended for recreational use, rather than serving as active transportation routes. The region's hot climate also adds to the barriers of outdoor PA in general, especially in Qatar and the UAE where temperatures can peak at 40.0–45.0 °C.³¹ In Lebanon, the weather throughout the academic year is generally moderate (mean temperature 16.0 °C)³¹, facilitating active transportation. The common gap amongst all Asian countries (including Middle Eastern countries) is the lack of a systematic evaluation of PA, as the evidence points to the need for PA surveillance programmes utilising nationally representative samples, and objectively measured estimates of PA across different domains.^{40–42}

Physical Fitness Indicator

The dearth of data on physical fitness levels presents a critical public health concern, as it is an indicator that offers important insights into the overall health of children and adolescents, and reveals early risk factors for chronic diseases that can develop later in life.^{43,44} Routine evaluation and monitoring of physical fitness can also serve as a baseline national indicator of the efficacy of PA policies, educational interventions, and environmental support for promoting active lifestyles amongst children and adolescents. Since its introduction in Global Matrix 3.0 (2018), *Physical Fitness* has been reported as INC in over half of the participating countries. Most grades for this indicator were assigned to countries classified as high or very high HDIs, with a global average of C-.^{12,13} Within the Middle East, Qatar has exhibited preliminary progress, where the Ministry of Education and Higher Education initiated a 'Physical Fitness Evaluation for Public School Students' and published their report for the 2019-2020 academic year online.⁴⁵ The results included 104,191 students (50% Qatari nationals) who were evaluated for cardiorespiratory fitness, strength endurance, flexibility, speed and consistency. Based on these findings, normative values were established for each fitness component. Qatar did not participate in the latest Global Matrix; therefore, this data was not included previous Report Cards and will likely be in future ones.

Sources of Influence Indicators

The average *School* grades for the three countries included in our study was D-/D, which was lower than the Asian (C/C+) and global (C/C+) averages. The indicator also exhibited variations according to HDI classifications, with countries classified as very high HDI typically scoring higher. That said, many countries in Asia are still not performing well with school-related PA. Although PE is mandated in most school curricula, the duration or frequency of classes does not always provide adequate amounts of PA. Given the benefits of PA in the overall wellbeing and academic performance of children and adolescents, it is essential for schools to give greater importance to PE classes and other sports within the curriculum. Additionally, due to the various benchmarks used in grading this indicator, it is difficult to directly compare across countries regionally and globally. Moreover, the influence of *Families and Peers* is multidimensional and demands extensive research for better understanding and assessment across regions and cultures.⁴⁶ Globally, this indicator exhibited great variations (from INC to F to A+), with Asian countries scoring an average of C-. Despite the recognized importance of social influences, the available data on this indicator remains limited or INC in the Middle East, mainly due to a lack of valid assessment tools. *Community and Environment* is another indicator that strongly influences children and adolescents' engagement in PA

and is assessed based on various factors such as local policies, infrastructure, the perception of safety, and access to green/blue spaces. The grades for this indicator varied between very high HDI countries (B-) versus low, medium, and high HDI countries (D+). In Asia, the average grade approximated C (47%–53%); this was closely aligned with global findings (C+) but lower than those of European countries, Australia, Canada, New Zealand, the United Kingdom, and the United States (B-). In Lebanon, Qatar, and the UAE, it was marked INC across all Report Cards. The lack of consistent monitoring in these countries highlights a critical gap in understanding how the built and social environment supports or hinders active lifestyles. To standardise the evaluation of these indicators, it would be necessary to conduct periodic public household surveys aimed at assessing social and environmental factors related to PA. Addressing this gap is essential for informing urban planning and public health interventions and policies. The *Government* also plays an important role in facilitating PA opportunities. In the UAE, the data suggested governmental support and leadership in promoting PA through national strategies, policies, and local initiatives. The ‘National Sports Strategy 2031’⁴⁷ is aimed at increasing sports participation to 71% of the UAE population by enhancing access to both community-level and competitive sports. Further evidence included the ‘National Policy for Promoting Healthy Lifestyles’⁴⁸, ‘National Strategy for Wellbeing 2031’⁴⁹ and ‘Masar Project’⁵⁰. Likewise, Qatar’s highest grades were assigned to the *Government* indicator in both Report Cards, reflecting the country’s commitment to PA. Some of Qatar’s strategies that prioritized PA in children and adolescents included the ‘Qatar National Sports Day’⁵¹, ‘Qatar National Physical Activity Guidelines’⁵², and ‘National Health Strategy 2018–2022’⁵³. Additionally, the WHO-Qatar partnership (2021–2024) on the FIFA World Cup and health legacy played a significant role in advancing PA through global awareness campaigns.⁵⁴ Lebanon’s results for the *Government* indicator reflected moderate efforts from both governmental and non-governmental stakeholders, based on data from the 2018 Report Card.²⁶ Although existing policies focused on enhancing PA in schools, the implementation and coverage remained limited, and there was no indication of sustainable funding, evaluation, or national legislation mandating these efforts. As a result, *Government* grades declined the latest Report Card (2022) for Lebanon. To maximise the benefits of these governmental initiatives and programmes, it is essential for all three countries to prioritise the public’s education on the importance of PA across different domains.

Report Card Team Recommendations for Improvement of Physical Activity Levels in the Region

In Global Matrix 3.0 (2018), Report Card members provided their top three priorities to improve the

ten common PA indicators in their respective countries. Based on these, we developed recommendations that are relevant to all three countries and the broader Middle East region in improving PA levels amongst children and adolescents.

(1) *Overall Physical Activity*: Development and implementation of PA surveillance programmes utilising nationally representative samples, with the aim to measure subjective and objective estimates of PA across different domains.

(2) *Organized Sport and Physical Activity*: Improving access to affordable, well-structured organized sports within schools and communities. Establishing talent identification programmes and athlete development pathways that increase mass participation at the grass-roots level. Promoting PA participation amongst girls and children and adolescents with disabilities or chronic conditions.

(3) *Active Play*: Integration of active play into urban planning by creating safe, accessible, and culturally appropriate play environments, and development of relevant surveillance tools for this PA domain.

(4) *Active Transportation*: Accelerating the development of safe and accessible infrastructures (e.g., walking, running, and cycling path networks) within communities and cities to promote active transportation.

(5) *Physical Fitness*: Developing and implementing nationwide standardized physical fitness tests and monitoring programmes in school curriculums, paired with targeted interventions to improve fitness and physical performance levels.

(6) *Sedentary Behaviour*: Integration of regular active breaks in school lessons to interrupt long periods of sedentary behaviour, and implementation of awareness campaigns that promote screen-time reduction.

(7) *School*: Development of physical literacy amongst students and maximizing the time spent in MVPA (minimum of 150 minutes per week across all schools and grades) whilst offering fun, enjoyable, and skill developing activities for both boys and girls.

(8) *Family and Peers*: Establishment of family-centred community PA initiatives and peer-led activity clubs in collaboration with municipalities and/or sports clubs.

(9) *Community and Environment*: Continued development and maintenance of accessible green and blue active spaces (i.e. parks and beaches) for all children and adults to interact socially, as well as the development and implementation of related surveillance systems.

(10) *Government*: Establishment of national multi-sectoral PA monitoring and accountability frameworks to support the implementation of health policies, PA guidelines, and school-based PA programmes.

Strengths and Limitations

This is the first paper to identify and compare trends in PA indicators amongst children and adolescents in Middle Eastern countries using a standardised approach. Despite PA being an emerging area of research within the region, teams of PA researchers retrieved, synthesised, and analysed multiple sources of data to compare findings within and between countries over a 25-year period. The results were further compared to regional and global trends, offering valuable insights for both the public and policymakers. The study also highlighted major research and surveillance gaps and provided recommendations for the various PA indicators. The main limitation of this study was the lack of high-quality data for majority of the PA indicators (seven out of ten) and the complete absence of data sources for the remaining three. When evaluating grades, we identified differences in data sources between countries. This was carefully considered during analysis and comparison of data. Additionally, the available data was not adequately representative and data collection tools were neither comprehensive nor standardized.

Conclusions

Children and adolescents in Qatar, UAE and Lebanon exhibited overall low PA levels coupled with high levels of sedentary behaviour. These results were consistent with global trends as well as regional findings (specifically Asia). In addition to the overall dearth of data in all three countries, there were significant gaps in PA indicators such as *Active Play*, *Physical Fitness*, as well as *Community and Environment*. Addressing the current challenges requires a thoughtful approach that considers the unique contexts of each country and promotes equitable access to opportunities for active living.⁵⁵ There is a clear need for a standardised and comprehensive data collection tool that assesses both self-report and objective estimates of PA amongst children and their parents.⁵⁶ School remains an important opportunistic arena for increasing PA levels; prioritising the enhancement of the quantity and quality of PE programmes and extracurricular sports would maximise the proportion of children and adolescents receiving the health benefits of regular PA. Regional stakeholder collaboration is essential for developing evidence-informed, locally-relevant policies that address the current implementation gap between policy and practice. Bridging this gap requires sustained commitment from governments, educational institutions, and communities to translate research findings into effective, accessible interventions for all children and adolescents.

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Conflicts of Interest

The authors have no conflicts of interest relevant to this article.

Data Availability

All data reported and analyzed in this study were obtained from published sources and publicly available datasets as cited in the reference list.

Author Contributions

Conceptualization: AB, LM, MJL, AMA, PAN, SS, ASA, JN, SA, MST, TL; **Data curation:** AB, LM, MJL, AMA, PAN, SS, ASA, JN, SA, MST, TL; **Formal analysis:** AB, LM, MJL, AMA, PAN, SS, ASA, JN, SA, MST, TL; **Methodology:** AB, LM, MJL, AMA, PAN, SS, ASA, JN, SA, MST, TL; **Validation:** AB, LM, MJL, TL; **Visualization:** AB, TL; **Writing – original draft:** AB, TL; **Writing – review & editing:** AB, LM, MJL, AMA, PAN, SS, ASA, JN, SA, MST, TL; **Supervision:** TL.

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