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Results from Nepal's 2018 Report Card on Physical Activity for Children and Youth

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ABSTRACT

Background/objective: Nepal's Report Card on Physical Activity for Children and Youth summarises the available evidence on ten physical activity-related indicators among Nepalese children and youth.**Methods:** Published scientific papers on physical activity of Nepalese children and youth (5–17 years) were searched systematically in four databases (Medline, Embase, PsycINFO, and PubMed Central) while some survey reports were manually searched. Letter grades were assigned to ten indicators (Overall Physical Activity, Organized Sport Participation, Active Play, Active Transportation, Sedentary Behaviours, Physical Fitness, Family and Peers, School, Community and Environment, and Government) by the country's report card team based on available data.**Results:** Among the ten indicators, five indicators were successfully graded based on available data. Overall Physical Activity was graded as D+. Active Transportation and Family and Peers were assigned as A- and A, respectively. Community and Environment was graded as C-. The other five indicators could not be graded due to insufficient data.**Conclusions:** Though a majority of Nepalese children and youth use active modes of transport and have adequate support for physical activity from family and peers, overall participation in physical activity appears to be low. Lack of data identified with five incomplete indicators reflects the need for further research. Studies with larger sample, more rigorous study design and objective assessment of physical activity is recommended for future physical activity surveillance in Nepal.© 2020 The Society of Chinese Scholars on Exercise Physiology and Fitness. Published by Elsevier (Singapore) Pte Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Background

Physical inactivity is one of the established modifiable risk factors for the prevention and treatment of major non-communicable diseases (NCDs) such as coronary heart disease, stroke, and diabetes.¹ Engaging in regular physical activity (PA) has multiple

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benefits. It helps with the prevention of different health problems among children and youth, including overweight and obesity^{2,3} and is positively associated with physical, psychological/social and cognitive health.⁴ Despite known benefits of PA, 81% of adolescents (aged 11–17 years) globally are not meeting the World Health Organization (WHO)'s recommendation of 60 min/day of moderate-intensity PA or equivalent.⁵

Recognizing the global urgency of high physical inactivity among children and youth, Active Healthy Kids Global Alliance (AHKGA)⁶ initiated the development of the PA Report Card for Children and Youth in 2014. The purpose of the AHKGA was to synthesize the evidence available in different countries to

understand the country-specific PA context and to encourage evidence-based and evidence-informed health policies, as well as to enable international comparisons. AHKGA is an international network of researchers, health professionals and stakeholders involved to promote PA among children and youth (5–17 years).⁶ The alliance has completed the development of two sets of Global Matrix, in 2014 and 2016, respectively.⁷ Global Matrix 3.0 in 2018 was very successful with broader participation of countries (49 countries from 6 continents) and incorporating 490 grades.⁶

In alignment with the global movement to promote PA among children and youth, Nepal participated in the development of country's Report Card on PA in 2018 for the first time. Although national-level surveys in Nepal have shown a higher prevalence of PA among adults (97%),⁸ PA among schoolchildren has been reported to be lower. For example, a cross-sectional survey conducted in 2015 reported that only 15% of the school students of 13–17 years were physically active for at least 60 min/day on all days of the week.⁹ However, consolidated evidence on PA among children and youth on a range of PA indicators is lacking in Nepal. In the context of WHO's Global Action Plan on Physical Activity 2018–2030 with the vision of "More active people for a healthier world",⁵ and the absence of national PA guidelines in Nepal, this report card could present and highlight the current scenario of PA among Nepalese children and youth and identify research gaps specific to this population. Therefore, the purpose of the study was to consolidate the available evidence on the PA of children and youth, assign grading of the indicators and to identify the data and research gaps in Nepal.

Methods

The Report Card team of Nepal composed of six members from a diverse background including academia, government and non-government sectors. Upon registration with the AHKGA in 2017, the team carried out the task to develop the nation's first PA Report Card. The team searched and reviewed the relevant papers on PA of children and youth in Nepal through a systematic process. Specifically, papers published until February 2018 were identified using different databases: Medline, Embase, PsycINFO, and PubMed Central. Search was conducted combining subject headings and keywords related to "Nepal" and "physical activity" - "physical activity", "exercise", "fitness", "sedentary behaviour", "screen time", "leisure activities" and "walking"; however, search was not limited by age group and study design. Finally, we included the studies carried out in Nepal and that reported physical activity among Nepalese children and youth of the 5–17 year age group. We excluded qualitative studies, commentary and reviews, as they were not relevant for the grading of quantitative indicators. Though the AHKGA Report Card guidelines suggested to include grey literature, our search was mainly limited to published papers due to lack of resources; however, some of the publicly available survey reports and government documents were also reviewed. A manual search was done by checking reference lists and citations of included papers and published survey reports. Grading of the indicators was primarily based on the published scientific papers as very few survey reports/documents were identified and had few relevant indicators for Global Matrix 3.0. The Report Card development process was supported and guided by a designated mentor (E-Y Lee) who had experience in developing a Report Card previously.

The Nepal's Report Card used the 10 core PA indicators and benchmarks developed for the Global Matrix 3.0. Core indicators included: 1) Overall PA, 2) Organized Sport Participation, 3) Active Play, 4) Active Transportation, 5) Sedentary Behaviors, 6) Physical Fitness, 7) Family and Peers, 8) School, 9) Community and

Environment, and 10) Government.¹⁰ Altogether, 857 papers were identified from the database search, however, only six had relevant PA data pertaining to children and youth aged 5–17 years. The team, in consultation with the mentor, assigned final grades for the indicators. Internationally standardized grading benchmarks and rubric for the Global Matrix 3.0¹⁰ guided the evaluation process of the grading. The letter grades developed by the AHKGA¹⁰ ranging from A to F (A+ = 94%–100%; A = 87%–93%; A- = 80%–86%; B+ = 74%–79%; B = 67%–73%; B- = 60%–66%; C+ = 54%–59%; C = 47%–53%; C- = 40%–46%; D+ = 34%–39%; D = 27%–33%; D- = 20%–26%; F = <20%; INC = incomplete data) were assigned for the 10 indicators which are presented in Table 1.

Results

Nepal's 2018 Report Card on PA for Children and Youth (Fig. 1) is the first-ever PA report card for Nepal and was initiated by a team of Nepalese researchers. The final grades of 10 indicators based on a summary of the available data are presented in Table 2.¹² A short, non-peer-reviewed version of the Nepalese Report Card has already been published elsewhere.¹²

Overall PA of children and youth in Nepal has been graded as D+, which means less than 40% of children and youth were physically active, i.e., 40% of Nepalese children and youth met the WHO's PA recommendation.¹³ Of the 10 common indicators, Family and Peers (A ≈ 87–93%)¹⁰ and Active Transportation (A- ≈ 80–86%)¹⁰ had the highest grades. Data were not available or inadequate to grade five of 10 indicators Table 2.

Discussion

Overall Physical Activity: D+

Nepal does not have national, comprehensive guidelines on PA for children and youth. Therefore, the WHO's PA recommendation (i.e., at least 60 min of moderate-to vigorous-intensity PA per day)¹ for children and youth has been used as the reference. A study conducted in the Terai (plain) district of Nepal¹³ was the only study that reported PA prevalence to fit in the given benchmark of Global Matrix 3.0. Based on the data available from this single study,¹² overall PA for Nepalese children and youth was graded as D+. The study reported that only less than 40% of children and youth were physically active as per WHO recommendations.¹³ Due to the subjective measurement of PA, poorly designed methodology, and study limited to a small geographical area, findings of this study could not be generalized. That being said, results from the 2015 Global School-based student Health Survey (GSHS) (n = 6529) also reported a low prevalence of PA among Nepalese school-aged children and youth. Specifically, this survey reported only 15% of school students aged 13–17 years were physically active for at least 60 min per day.⁹ In addition, PA was found higher among males (17%) than females (13%)⁹ and in Terai (plain) region (18%) than other regions (mountains and hills).¹⁴ For instance, the prevalence of PA among students in the mountains and hills were 16%¹⁵ and 13%, respectively.¹⁶

The Report Card team identified three additional studies^{17–19} that reported higher levels of PA than the two studies mentioned above, using different indicators. Nepal's NCD risk factors STEPwise approach to Surveillance (STEPS) 2013 reported that 97.7% of 15–29 years children and youth had at least 600 Metabolic Equivalents (METs) of activity per week.¹⁷ However, we did not include this study to grade the Overall PA indicator because of the poor representation of our target age group (i.e., 5–17 years). Likewise, two other studies have reported that 95% and 67.7% of 15–20 years adolescents¹⁹ and 15–24 years youths,¹⁸ respectively, accumulated

Table 1
Benchmarks used to guide grading assignment of 10 indicators in the Global Matrix 3.0.¹⁰

Indicator	Benchmark
Overall Physical Activity	% of children and youth who meet the Global Recommendations on Physical Activity for Health, which recommends that children and youth accumulate at least 60 min of moderate- to vigorous-intensity physical activity per day on average.
Organized Sport Participation	% of children and youth who participate in organized sport and/or physical activity programs for at least once per week.
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-y-olds: no more than 2 h of recreational screen time per day).
Physical Fitness	% of children and youth who meet the international criterion-referenced standards for cardiorespiratory fitness (Tomkinson et al.) ¹¹
Family and Peers	% of parents who are physically active with their kids. % of family members who facilitate physical activity and sport opportunities for their children. % of parents who meet the physical activity guidelines for adults (at least 150 min of moderate-intensity 75 min of vigorous-intensity aerobic physical activity throughout the week).
School	% of schools with active school policies (e.g., daily physical education (PE), daily physical activity, recess, "everyone plays" etc.). % 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 physical activity opportunities to the majority ($>80\%$) of their students in addition to PE. % 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/municipalities that report they have policies promoting physical activity. % of communities/municipalities that report they have the infrastructure (e.g., sidewalks, trails, paths, bike lanes) specifically geared toward promoting physical activity. % of children or parents who report having facilities, programs, 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.
Government	% of children or parents who report having well-maintained facilities, parks, and playgrounds in their community that are safe to use. 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.



Fig. 1. Front cover of Nepal's 2018 Report.

600 or more METs per week. As these studies used different indicators and had inadequate disaggregated data, findings of these studies were also not considered for grading. Given the socio-economic context of Nepal and with more families engaged in agriculture, diverse topography (mountains, hills and plains) of the country and inadequate transportation system, one could argue

Table 2
Final grades of 10 common indicators in Nepal's 2018 Report Card.¹²

Indicator	Grade
Overall Physical Activity	D+
Organized Sport Participation	INC
Active Play	INC
Active Transportation	A-
Sedentary Behaviours	B+
Physical Fitness	INC
Family and Peers	A
School	INC
Community and Environment	C-
Government	INC

Grading scheme: A+ = 94%–100%, A = 87%–93%, A- = 80%–86%, B+ = 74%–79%, B = 67%–73%, B- = 60%–66%, C+ = 54%–59%, C = 47%–53%, C- = 40%–46%, D+ = 34%–39%, D = 27%–33%, D- = 20%–26%, F = <20%, INC = incomplete/inadequate.

that most of the Nepalese children and youth should be more active than the grade assigned for the Overall PA indicator. Nonetheless, the final grade assigned for Overall PA of Nepal was slightly higher than the global average, which was a D+ grade.¹⁰

Organized sport participation: INC

Participation of children and youth in any form of goal-oriented, structured, competitive or contest-based physical activities were defined as organized sports participation.¹⁰ It was measured as the percentage of children and youth who participated in such organized sport or PA programs. Data was not adequate to grade this indicator in Nepal and was assigned incomplete/insufficient (INC). However, countries with low and middle Human Development Index (HDI) that participated in the Global Matrix 3.0 were graded as C.²⁰ Though intra- and inter-school competitive sports are usually in an organized form, such events are not common at community level in Nepal.

However, there are some opportunities for Nepalese children and youth to engage in organized sports and competitive events organized by some local clubs to participate in occasional sports at the municipal or district level. Future research is needed to obtain a close estimate of organized sports participation at various levels.

Active play: INC

Active Play included any games or activities that are played in a group or individually with or without defined rules and could be unorganized or unstructured.¹⁰ Active Play is often difficult to measure because of its sporadic nature with frequent, unscheduled resting periods. However, as a proxy measure, it was defined as the percentage of children and youth who remained active outdoors for more than 2 h a day.¹⁰ In 2018 Nepal's Report Card, this indicator was graded as INC due to data unavailability¹² in Nepal. It is evident that in many developed countries, screen time among children and youth is increasing at the cost of active play.^{21,22} However, it can be speculated that Nepalese children and youth, particularly in rural areas, may be engaging in active play outdoors as fixed or mobile screen devices ownership is largely limited to high income and urban population. National data on electronic devices ownership supports this claim, which reports nearly 65% of households in Nepal had a mobile phone (may not be a smartphone), 37% had a television, and only 7% had a computer.²³

Nonetheless, access to and the use of mobile devices is increasing drastically in urban and rural areas along with increased internet access. Thus, precaution is needed to mitigate the use and potential negative consequences of screen time among children and youth.^{24–26} Low and medium income HDI countries were graded Active Play as C-, while countries with high and very high HDI were graded Active Play as D+.¹⁰

Active transportation: A-

Active transportation was defined as the percentage of children and youth who used transportation means such as walking, cycling to commute from places such as school, friend's house, or grocery markets. Based on the findings of a single study available that was conducted in urban Nepal, this indicator was graded as A-.¹² The study reported that the majority (86%) of children and youth of 15–20 years used active means of transport, such as walking to get to and from places.¹⁹ Though this study did not use a nationally representative sample, the study depicts a scenario of urban areas in Nepal. The report card team assumes that the overall grade of active transportation could be better than the current grade as children in rural areas have minimal access to motorised transport and are forced to walk to school or other places. Cycling is also a more common means of transport among students, particularly among those living in the plains. Children and youth's access to passive transportation is largely limited to major cities and district headquarters where less than 20% of the population live.²³

Most of the high and very high HDI countries had lower grades (C or less C-) on this indicator due to the access of automated transportation means (e.g., auto-vehicle), with the exception of Japan, South Korea and Hong Kong, which had better grades (A- and B+ respectively).¹⁰ Despite the high population density particularly in urban areas in Japan and South Korea, laws and campaigns encouraging active commuting to schools such as urban planning designed to minimize the distance between home and school²⁷ and traffic regulations restricting the use of private-owned vehicles and other automated transportation means were the main reasons^{28,29} for higher grades. Developing countries like Nepal could learn from such excellent examples as the urban population in Nepal (annual rate of 3.08%),³⁰ and vehicle ownership (11.2%)²³

are gradually increasing. Strategies are needed to maintain and promote active transportation such as walking and cycling among children and youth as a preferred choice of commuting for their health and well-being, not only as a necessity.¹⁰ Safe walking and cycling lanes, especially in urban areas, could encourage active commuting to schools.

Sedentary behaviours: B+

Canadian Sedentary Behaviour Guidelines recommend that children and youth of 5–17 years should not have more than 2 h of recreational screen time per day,³¹ was used in grading the Sedentary Behaviour indicator for the Global Matrix 3.0.¹⁰ This indicator was graded as B+ in Nepal based on a study that reported 78.1% of children and youth aged 16–19 years spent less than 2 h watching television.³² Sedentary behaviours among children and youth were higher in other low and medium HDI, high and very high HDI countries, which were graded as the average of C+, D and D+, respectively.¹⁰ The rapid increase in access to and use of mobile screen devices such as smartphones and internet in recent years (>50%)³³ could have increased sedentary behaviours among children and youth in Nepal, particularly in urban areas, which is a potential area for future research.

Physical fitness: INC

The health-related components of physical fitness are cardio-respiratory endurance, muscular endurance, muscular strength, body composition and flexibility.³⁴ In the Global Matrix 3.0, physical fitness was measured as the percentage of children and youth who meet the international criterion-referenced standards for cardiorespiratory fitness.¹¹ Data on physical fitness among Nepalese children was not available; hence, this indicator was graded as INC.¹² Results of other countries showed that physical fitness was better among children and youth in very high and high HDI countries (C- and D+ respectively) than in low and medium HDI countries like India (F).¹⁰

Family and peers: A

This indicator was defined as the influence of any family member who supports or promote PA of children and youth or those who engage in PA with their children. It was measured as a percentage of parents who facilitate PA and sport opportunities for their children or percentage of parents who meet the WHO's global recommendations on PA for adults (i.e., at least 150 min of moderate-intensity or 75 min of aerobic PA throughout the week). Role of family and peers was graded as A based on a single study conducted in western Nepal.¹⁹ About 91% of 15–20 year children and youth reported they received support from their family members and nearly 88% perceived support from their peers to engage in PA.¹⁹ This indicator of Nepal was found better in comparison to other low and medium (D+), high (D+) and very high HDI countries (C-),¹⁰ however, nationally representative data are warranted. The potential reasons of higher perceived support among children and youth could be due to PA friendly landscape (plain/terai) in the study area and activities such as cycling/walking considered as part of the daily living/habits. Likewise, most of the children supported their parents in household chores and outdoor activities in the field.

School: INC

This indicator was assigned as INC due to inadequate information. Although most schools in Nepal run organized sports activities

during annual events such as ‘parents day’ or any particular school events, sufficient data is not available on how many schools have active school policies. Likewise, it is unclear how many schools have a physical education (PE) specialist to teach students or have mandatory PE classes for sports activities or have adequate and quality sports materials and adequate play space for their students. Students are generally taught on the theory of PE mainly in secondary schools; however, it needs to be explored how many schools are providing an opportunity to translate this into practice. The 2015 GSHS, which included grades 7 to 11 students aged 13–17 years, reported that 44% of students attended three or more PE classes per week during the past school year. However, it is unclear whether a PE specialist or other teachers, and whether PE classes were mandatorily taught to students or not. Based on anecdotal evidence, one can argue that most of the public schools, in general, have relatively more play space in comparison to private schools, which are usually run in urban areas in limited rented spaces.

However, it should be noted that there is also a wide diversity among private schools in terms of resources and school space for sports and PA. More investigation is needed on school-specific indicators in the Global Matrix 3.0 to better understand the influence of schools on PA among children and youth. In addition, little is known about differences in PA participation across students in primary, secondary and higher secondary schools, and a potential difference in PA between public and private schools.

Community and Environment: C-

This indicator has been defined by several benchmarks of the Global Matrix 3.0 (see Table 1). Based on the available data on the percentage of children and youth who reported having parks, and playgrounds available in their community, this indicator was graded as C-. We found only one study reporting this indicator in which less than half of the children and youth (15–20 years) accepted that they had parks/playgrounds available in their community.³⁵ This data was taken as a proxy measure as three-fourth of the participants were in the 15–17 year age-group, and this was the only study available. More studies using a large, nationally representative sample reflecting the diversity of geographic context and the urban-rural setting of Nepal are required for future research.

In the context of the changing federal structure of the country, some local-level initiatives have been started, which could have a consequential effect on PA promotion among the population, including children and youth. Although the purpose of those initiatives is primarily promoting tourism, it could have positive consequences on the health and well-being of the people. There are some examples: under the patronage of Waling Municipality in Gandaki Province, Wonderful Waling Tourism Development Organization organized an International event on cycling – ‘Waling 100: Ultimate Mountain Bike Challenge’ in March 2019 to promote tourism and cycling.³⁶ Likewise, Kathmandu Kora Cycling Challenge organized by Socialtours and Cycle City Network Nepal since 2011 are the other ongoing initiatives.^{37,38} These events could have encouraged and motivated children and youth as well, for cycling, and to be active, however, more research is needed to better understand the other ongoing initiatives at the community level and their potential influence among children and youth in the country.

Government: INC

This indicator was measured based on two benchmarks outlined in Table 1. During the time of review, little information was available regarding government leadership and commitment. Thus, this indicator was graded as INC. However, in recent years, due to the increase in the prevalence of NCDs among adults, PA promotion has

been given importance in some of the policy and program documents of the Nepalese government. For example, one initiative ‘Mero Barsa Abhiyan’ with an information booklet, ‘Mero Barsa 2074, Ma Swastha, Mero Des Swastha (My Year 2074 – Me healthy, My Country Healthy)’ was published by Ministry of Health and Population in 2017/18, which focused mainly on adopting healthy lifestyle, with five commitments – not to consume alcohol, tobacco and tobacco-related products; engage in regular exercise; consume nutritious foods; participate in regular health check-ups, and raise awareness on health of family and community.³⁹ This booklet also included information about the advantages and disadvantages and some essential tips to adopt healthy habits and modify unhealthy ones to inform and support end-users. However, its implementation and effectiveness are yet to be assessed. Such government initiatives aimed to promote PA of children and youth are imperative at the local and national level.

In addition, there is a government organization to promote sports in Nepal, ‘National Sports Council’ with the motto: “*Sports for Health, Sports for Nation*”.⁴⁰ National Sports Council has been organizing various sport events at different levels including schools, communities, municipalities and national level; however, its effectiveness to promote PA among children and youth at different levels needs to be evaluated.⁴¹

Recently, the newly formed provincial and local governments have taken a few initiatives for PA promotion. For example, a policy and programme document of Karnali province have prioritized infrastructure development for promoting bicycle use in its capital city, Birendranagar, in the current fiscal year (2019/2020 AD or 2076/77 B.S.).⁴² Likewise, metropolitan cities such as Pokhara and Bhaktapur municipality have started installing open gym centres in public places to encourage people to adopt an active lifestyle. There could be other such initiatives that are particularly aimed at promoting the health of children and youth and needs further investigation.

Strengths and limitations

This is the first Report Card to summarize the available data on PA of children and youth in Nepal. The Report Card team composed of representatives from various sectors; however, it could be more representative, including media and other relevant sectors. PA data, and especially the quality data were not available/inadequate to assign five of the ten indicators, and whatever data available were inadequate to represent different age groups, ethnicity and geographical diversity in the country. Data from available studies that had small sample were used for grading of the indicators, and all the studies had only subjectively measured PA data. Lack of nationwide surveillance data on various PA indicators, including organized sport, active play, and physical fitness was observed. Due to lack of funding for the report card development, only the scientific papers published in journals and some of the government documents available publicly were reviewed in this study.

Conclusions/recommendations

The overall PA level of Nepalese children and youth were found low. Nepal lacks data on five out of 10 common indicators provided by the AHKGA, and the available data relied entirely on subjective measurement. This review identified the data and research gaps in the area of PA among Nepalese children and youth. Furthermore, data regarding the differences in PA participation across a range of age groups is lacking. In addition, urban-rural and ethnic differences in PA among children and youth have not yet been explored. Studies using a comprehensive set of indicators with objective measurement are recommended for future research. Increase in

mobile devices ownership and sedentary behaviour among Nepalese children and youth, both urban and rural areas should be explored concurrently and comparably as this could be a major public health concern in the near future. In the context of changing administrative system of the country, local and state governments and concerned stakeholders could play a major role in promoting PA among children and youth, and it should be monitored and investigated.

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Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesf.2020.02.001>.

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