Results from the China 2022 report card on physical activity for children and adolescents

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ABSTRACT

Background/Objective: Regular physical activity (PA) is beneficial to young people's health and development. In order to provide nationally representative and internationally comparable evidence on youth PA, China has participated in Global Matrix 2.0 and 3.0. The purpose of this study is to report the updated results of China’s Report Card on PA for Children and Adolescents.

Methods: The grades were assigned by results derived from the PA and Fitness in China Study (PACFTYS), conducted from October to December in 2020. The data from PACFTYS 2020 included a nationally representative sample of Chinese school-aged children (n = 133,006, boys: 49.6%, aged 9–17 years). Self-report questionnaires were completed by the sampled students, their parents/guardians (n = 133,006), and physical education teachers (n = 1036) from each sampled school respectively.

Results: The grades of China 2022 Report Card are Overall PA (C), Organized Sport Participation (F), Active Play (C), Active Transportation (C), Sedentary behaviors (C), Physical Fitness (INC), Family and Peers (C), School (D), Community and Environment (D-) and Government (D).

Conclusion: Levels of PA among Chinese youth were low and most young people were below the recommended guidelines, although the grade of Overall PA has been improved since the modified benchmark. Prevalence of sedentary behaviors remained high. Interventions and policies at the community and environment level should be encouraged to promote PA and reduce sedentary behaviors. In addition, national policies on young people's PA should be advocated widely to ensure the policies can be transferred into action.

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1. Introduction

Scientific research evidence consistently shows that physical activity (PA) is both important and beneficial for children and adolescents to maintain and improve their health. For example, a large number of studies have shown that PA can improve emotional and cognitive abilities, reduce depression and anxiety symptoms. Although regular PA is very important, and more and more scientific literature proves that PA is beneficial to the health of children and adolescents, many young people do not reach the recommended level of PA. There was a study found that 81% of 11–17-year-old students globally did not accrue sufficient PA.2 In China, two national surveys estimated that the prevalence of having at least 60 min per day of Moderate - to - Vigorous PA (MVPA) ranged from 29.9% to 34.1%.3,4 In addition, the time trend study also shows that from 2004 to 2015, the total PA of children and adolescents aged 6–17 in China showed a downward trend.5

Public health surveillance of PA is the first and most essential step in promoting PA among children and adolescents, which can measure and inform us about the hidden deficits of youth in terms of PA. In order to improve the previous incomplete, local,
intermittent, or even absent surveillance in China, in 2014, a research team from the Shanghai University of Sport (SUS) joined the Active Healthy Kids Global Alliance (AHKGA) and initiated the inaugural Report Card programme in China. Later in 2016 and 2018, SUS research team released the 2016 Shanghai (China) Report Card on PA for Children and Youth in Bangkok, Thailand as one part of Global Matrix 2.0,7 and the 2018 China Report Card on PA for Children and Youth in Adelaide, Australia as one part of Global Matrix 3.0.8

The purpose of this article is to provide the most updated information on PA and related social context of Chinese schoolchildren and therefore present the China 2022 Report Card on PA for Children and Adolescents. In addition to that, the grade for each covered indicator is briefly described. The data herein were derived from a national surveillance conducted from October to December 2020, in which over 133,000 schoolchildren aged 9–17 years, as well as their parents, school teachers were investigated in accordance with the protocol of Global Matrix 4.0.

2. Methods

The China Report Card research team from Shanghai University of Sport (abbreviating as “research team” afterwards) is still, as the representative of Active Healthy Kids China, fully responsible for work related to this third China Report Card as previous two.7,8 The research team is consisted of 10 researchers (7 professors and 1 associate professor with doctorate, plus 2 graduate students), co-led by Prof. Yang Liu and Prof. Yan Tang. Additionally, several international and national experts have been also involved in formulating China Report Card as the consultant or the reviewer.

Over ten years ago, the Ministry of Education of China started to organise the annual examination of national surveillance of students physical fitness test, which are carried out by Shanghai University of Sport, as well as other around thirty universities/institutions. In order to be able to present the China Report Card with national representative data, research team has developed and conducted the PA and Fitness in China—The Youth Study (PAFCTYS) based on the annual examination of students physical fitness test with the permission from the Ministry of Education of China. The PAFCTYS was conducted from October to December annually since 2016, in which a three-stage stratified cluster sampling design was used to sample a nationally representative group of schoolchildren among schools from 22 provinces, 4 municipalities, 5 autonomous regions, and Xinjiang Production and Construction Corps (an independent division within Xinjiang Uygur Autonomous Region), in Mainland China.9,10 Detailed information regarding the sampling can be found elsewhere.10 The study was approved by the Ethics Committee of Shanghai University of Sport and parental/guardian consent and participant assent for participating in the survey were acquired respectively.

The grades of China 2022 Report Card on PA for Children and Adolescents were assigned by results derived from the PAFCTYS, conducted from October to December in 2020. The data from the PAFCTYS 2020 included a nationally representative sample of Chinese school-aged children (n = 133,006, boys: 49.6%, aged 9–17 years). Self-report questionnaires were completed by the sampled students, their parents/guardians (n = 133,006), and physical education teachers (n = 1036) from each sampled school respectively. Although physical fitness was also assessed for all sampled students who have participated in the survey in the PAFCTYS 2020, both the indicators and the result format of physical fitness test are not consistent with Benchmark required by Global Matrix 4.0.11 Thus, grade of Physical Fitness was assigned as INC after AHKGA auditing and the other 9 core indicators that are common to the Global Matrix 4.0, including Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviors, Family and Peers, School, Community and Environment, and Government, are covered. Indicators and rationale of assessing instrument are presented in Table 1. The grade for each indicator is based on the percentage of children and adolescents meeting a defined benchmark derived from the results of PAFCTYS 2020: A+ is 94%–100%; A is 87%–93%; A– is 80%–86%; B+ is 74%–79%; B is 67%–73%; B– is 60%–66%; C+ is 54%–59%; C is 47%–53%; C– is 40%–46%; D+ is 34%–39%; D is 27%–33%; D– is 20%–26%; F is <20%; INC is Incomplete data.

3. Results

The China 2022 Report Card is the third assessment of PA, sedentary behaviors, etc. and related social context among Chinese children and adolescents on the basis of AHKGA Global Matrix. The grades of 10 indicators are summarized in Table 2. The grades of indicators by sex are summarized in Table 3.

4. Discussion

4.1. Overall Physical Activity: C

In the present study, the grade of Overall Physical Activity is determined as the percentage of children and adolescents who meet the guidelines at least 60 min of MVPA per day on average in recent 7 days. 50.0% of students confirmed and therefore C is assigned to Overall Physical Activity. Boys (54.5%) were more active than girls (44.9%). The rates of meeting the PA guideline decreased gradually with age from primary school (58.5%), to secondary school (53.7%), and finally to upper secondary school (35.5%). Compared with the 2016 and 2018 report cards, the grade has been greatly improved.7,8 The main reason is due to the fact that the benchmark and rationale of assessing instrument for this indicator have been changed in order to follow the new benchmark of Global Matrix 4.0. Nevertheless, if using the same benchmark and rationale of assessing instrument, the percentage of meeting PA guidelines in the 2022 Report Card (14%) has slightly increased compared with the 2018 Report Card (13%), which indicate the intervention strategies based on school, family or community have had a positive effect.7 In addition, the current results show that the proportion of high school students who meet the PA guidelines is low, and therefore more attention should be paid to them in the future.

4.2. Organized Sport and Physical Activity: F

Organized Sport and Physical Activity is one of the most common leisure-time activities among children and adolescents. 17% of students reported that they had taken part in organized sport and/or PA programs over the past 12 months. Thus, the grade of F was assigned to Organized Sport and Physical Activity. The percentage of boys (18.3%) participated in Organized Sport Participation is higher than girls (16.5%), which is reversed compared with the 2018 Report Card.9 The rates of Organized Sport and Physical Activity participation dropped from primary school (24.6%), to secondary school (16.8%), and to upper secondary school (10.6%). Increasing intensity levels during Organized Sport and Physical Activity could be an effective PA intervention strategy. It can be found that the grade of Organized Sport and Physical Activity has decreased compared with the 2018 Report Card,9 which indicates that Organized Sport and Physical Activity should be promoted.
Table 1: Indicators and rationale of Assessing Instrument of the China 2022 Report Card on Physical Activity for Children and Adolescents.

| Indicator | Rationale of assessing instrument |
|-----------|----------------------------------|
| Overall Physical Activity | At least 60 min of MVPA per day on average in recent 7 days |
| Organized Sport and Physical Activity | Participation of organized sport and/or physical activity (PA) programs over the past 12 months |
| Active Play | Participation in unstructured/unorganized PA at least four times during the past week |
| Active Transportation | Going school or go back home from school by walk or bicycle |
| Sedentary behaviors | No more than (≤) 2 h sedentary time (SDT) per day, SDT including 1) TV watching 2) using smartphone/ipad 3) using computer, internet surfing |
| Family and Peers | Response ‘very often’ at least two items for parents’ support, and response ‘very right’ at least two items for friends support for physical activity |
| School | Meet the benchmark regarding 1) students’ satisfaction with physical education (PE) and exercise-related opportunities in school; 2) amount of accredited PE teachers with state teacher qualification; 3) PA after school; 4) PE classes; 5) facilities and equipment for sport and exercise in school; 6) the school administrator’s concern about PA, exercise and PE of students |
| Community and Environment | Meet the benchmark regarding 1) whether it is easy to find facilities and equipment for sport/exercise in young people’s community; 2) whether there is organizations of sport/exercise (e.g. sport club) for youth in community; 3) whether there are sport/exercise activities organized in community |
| Government | Parents’ awareness around the national physical activity policies relating children and adolescents of China |

Table 2: Grades assigned to indicators in the China 2022 report card on physical activity for children and adolescents.

| Indicator | Grades |
|-----------|--------|
| Overall Physical Activity | C |
| Organized Sport and Physical Activity | F |
| Active Play | C- |
| Active Transportation | C |
| Sedentary behaviors | C |
| Physical Fitness | INC |
| Family and Peers | C- |
| School | D |
| Community and Environment | D- |
| Government | D |

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark: A+ is 94%–100%; A is 87%–93%; A- is 80%–86%; B+ is 74%–79%; B is 67%–73%; B- is 60%–66%; C+ is 54%–59%; C is 47%–53%; C- is 40%–46%; D+ is 34%–39%; D is 27%–33%; D- is 20%–26%; F is <20%; INC is Incomplete data.

Table 3: Grades assigned to indicators by sex in the China 2022 report card on physical activity for children and adolescents.

| Indicator | Boy | % Grades | | Girl | % Grades |
|-----------|-----|---------|-----|-----|---------|
| Overall Physical Activity | 54.5 | C+ | 44.9 | C- |
| Organized Sport and Physical Activity | 18.3 | F | 16.5 | F |
| Active Play | 52.0 | C | 41.0 | C- |
| Active Transportation | 53.4 | C | 48.3 | C |
| Sedentary Behaviors | 48.8 | C | 53.9 | C+ |
| Physical Fitness | INC | INC | INC | INC |
| Family and Peers | 45.7 | C- | 42.2 | C |
| School | 26.6 | D | 30.1 | D |
| Community and Environment | 19.3 | F | 19.9 | D- |
| Government | 27.2 | D | 27.5 | D |

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark: A+ is 94%–100%; A is 87%–93%; A- is 80%–86%; B+ is 74%–79%; B is 67%–73%; B- is 60%–66%; C+ is 54%–59%; C is 47%–53%; C- is 40%–46%; D+ is 34%–39%; D is 27%–33%; D- is 20%–26%; F is <20%; INC is Incomplete data.

Thus, the grade of C- was assigned to Active Play. Boys (52.0%) were more active than girls (41.0%). Possible reasons for this include those boys had a higher level of MVPA during physical education class at school and they participated more in organized sport activities. The rates of Active Play decreased gradually with age from primary school (61.2%), to secondary school (43.8%), and finally to upper secondary school (33.6%). The relatively low rate of Active Play among upper secondary school students, indicates that academic pressure in upper secondary school is high and that there should be targeted opportunities to increase Active Play for upper secondary school students.

4.4. Active transportation: C

Active Transportation was considered the percentage of those who reported that they go to school by walk or by bicycle. C was assigned in according to 51.0% of Chinese students walk or cycle to school. The percentage of Active Transportation has decreased compared with the 2018 Report Card. This shows that with the development of social economy, students are less likely to walk or ride bicycles. The promotion of walking and cycling for transportation complemented by active transportation, presents a promising strategy to not only address problems of urban traffic strain, environmental pollution and climate change, but also to provide a well-recognized opportunity for increasing PA. Thus, active transport for children and young people should be enhanced in the future.

4.5. Sedentary behaviors: C

In the 2022 Report Card, Sedentary Behaviors were examined by asking students how many hours per day they spent on 1) watching TV; 2) using smartphones/iPad; 3) using computers, and surfing the Internet on weekdays and weekends, respectively. Grade C was assigned because 51% of Chinese students had no more than 2 h of sedentary time per day. Boys (51.2%) are more likely to be sedentary than girls (46.1%). Additionally, older students are more likely to be sedentary than younger ones (Primary school 37.0%; Secondary school 54.0%; Upper secondary school 55.5%). These grades are better than the grades in the 2018 Report Card. The main reason for this change is that the benchmark and rationale of assessing instrument for Sedentary Behaviors in the 2022 Report Card differ from previous years, including: 1) It does not include homework time anymore; 2) The time cut-off is changed from less than 2 h to no more than 2 h. However, we also examined sedentary behaviors...
using the same measure as used in the 2018 Report Card and the grade remains F. And the percentage of Sedentary Behaviors in the 2022 Report Card (93.0%) has slightly increased compared with the 2018 Report Card (92.9%).

4.6. Family and Peers: C-

Family and peer support are critical factors that motivate children and adolescents to participate in PA. 

Family and peer support are critical factors that motivate children and adolescents to participate in PA. 12 In the current study, students and parents answered 13 items about parental and friends' support for PA. The grade C- was assigned according to 44% of Chinese children and adolescents responded 'very often' at least two items for parents support and responded 'very right' at least two items for friends support for PA. And older students have less support for PA than younger students (Primary school 55.1%; Secondary school 43.4%; Upper secondary school 32.9%). These grades have increased compared with the 2018 Report Card. 8 It shows that more Chinese students have gotten PA support from their parents and peers since 2018.

4.7. School: D

School is one of the most critical settings for promoting PA in children and adolescents. 12 In the current study, students and school administrators/teachers were asked to answer 6 items about the school environment. Grade D was given on account of the percentage (28%) of Chinese children and adolescent who responded to meeting the benchmark regarding school based on 1) the principal’s concern about PA, exercise, and physical education of students; 2) the frequency and duration of physical education course; 3) the amount of accredited physical education teachers; 4) Facilities; 5) Equipment; 6) Students' satisfaction with PA and exercise-related opportunities in school. The grade of D remained the same as in the 2018 Report Card. 8 Moreover, the school grade decreased markedly with age (Primary school 38.0%; Secondary school 28.9%; Upper secondary school 18.0%). Children and adolescents almost spend half of their day at school. It is therefore important for educators and policymakers to prioritize school factors related to PA.

4.8. Community and environment: D-

Community is another important setting that influences children and adolescents' PA. In the Report Card, community and environment were assessed by asking students and teachers 3 items: 1) whether it is effortless to find facilities and equipment for PA in the youth community; 2) whether there are youth sport organizations (e.g., sports clubs) in community; 3) whether there are sports activities organized in the community. The grade of D-was assigned depending on the 20% of Chinese children and adolescents who responded to meeting the benchmark. The grade has increased in comparison with the 2018 Report Card (F). 8 In addition, older students have a poorer community environment experience than younger students (Primary school 25.9; Secondary school 19.1%; Upper secondary school 13.4%). In this regard, facilities, sports organizations, and community sports activities should be designed to meet the needs of all grade levels.

4.9. Government: D

As physical inactivity causes various health problems for children and adolescents, the government has introduced a series of strategies and investments to promote their PA. 15 Because the impact of these policies/actions could not be evaluated clearly, the strategy was to assess their public awareness instead of grading this indicator. Thus, parents’ awareness of the national PA policies was examined in the study. The grade of D was granted in light of the percentage (27%) of parents who were aware of the national policies regarding Chinese children and youth PA. The grade has been promoted compared with the 2018 Report Card (F). 8 The survey indicates that there has been an increase in public awareness of government policies/actions regarding PA. However, more work needs to be done.

5. Strengths and limitations

The prominent strength of this third China 2022 Report Card is that the most updated results are based on nationally representative surveillance data with large size samples from all over mainland China. Therefore, the high-quality evidence-based grades of Global Matrix 4.0 indicators are able to demonstrate the general situation of PA and sedentary behaviors and their social context of Chinese children and adolescents. In addition, PA and its related factors were assessed comprehensively through students, parents, school teachers respectively by questionnaire developed, with improvement after 2018 China Report Card, by the working group. Apart from these strengths, it should be pointed out that self-report measures may overestimate PA and underestimate sedentary behaviors. Furthermore, the subjective cut-off of some indicators for grade assigning may not avoid the possibility of causing the artificial significant results.

6. Conclusion

PA levels of most Chinese adolescents were below the recommended guidelines, although the grade of Overall PA has improved which is mainly because the modified benchmark. Prevalence of sedentary behaviour remained high even excluding accounting doing homework. Thus, interventions and policies at the community and environment level should be encouraged to promote PA and reduce sedentary behaviors. In addition, national policies on young people's PA should be advocated widely to ensure the policies can be transferred into action.

Author statement

The authors agree with the content of the manuscript and approve of its submission to the Journal of Exercise Science & Fitness (JESF). We confirm that the manuscript has not been previously published (except in abstract form) and is not being concurrently submitted elsewhere, and will not be submitted to another journal before a final editorial decision from JESF is rendered.

Declaration of competing interest

All authors have declared that there are no any relevant financial interests related to the research, as well as all potential conflicts of interest.

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