Results From South Korea's 2016 Report Card on Physical Activity for Children and Youth

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Background: South Korea's 2016 Report Card on Physical Activity for Children and Youth is the first assessment of physical activity according to the indicators set by Active Healthy Kids Global Alliance. **Methods:** National surveys were used as preferred sources of data. This was then supported by peer-reviewed papers and government reports identified by a systematic search of the literature written in English or Korean. A Research Working Group then graded indicators based on the collected evidence. **Results:** Each indicator was graded as follows: Overall Physical Activity, *D-*; Organized Sport and Physical Activity Participation, *C-*; Active Transport, *C+*; Sedentary Behavior, *F*; School, *D*; Government and Investment, *C*; Active Play, Physical Literacy, Family and Peers, and Community and Built Environment were graded *INC* (incomplete) due to lack of available evidence. **Conclusions:** Though the final grades of key indicators for South Korean children and youth are not satisfactory, increasing interests and investments have been demonstrated at a national level. More evidence is required for comprehensive assessment on all indicators to better inform policy and practice. This should be accompanied by the use of consistent criteria to contribute to global efforts for active healthy kids.

Keywords: advocacy, policy, knowledge translation, KYRBS, KNHANES

Accumulating evidence suggests that daily participation in physical activity (PA) has physical, mental, and social benefits, and extended time spent in sedentary behavior (SB) has adverse health consequences for children and youth.¹⁻³ Therefore, the World Health Organization (WHO)⁴ recommends children and youth to engage in at least 60 minutes of moderate-to-vigorous PA (MVPA) daily. Consequently, developed Western countries including Australia, Canada, the United Kingdom, and the United States have developed national PA and/or SB guidelines for children and youth.⁵⁻⁸ Examining adherence to such guidelines enables researchers and policy makers to understand the current situation of PA and SB in young people and to better inform health promotion policy. In South Korea, some efforts have been made to promote PA among children and youth. However, the determinants, levels, and patterns of PA and SB are not well understood which then makes it difficult to compare with other countries.

South Korea's 2016 Report Card on Physical Activity in Children and Youth (Report Card hereafter) acquired the best available data, synthesized evidence according to international predefined criteria, and conducted a comprehensive assessment of PA and SB among South Korean children and youth. It provides baseline grades on PA and SB that can be used to understand and compare at national and international levels. The purpose of this manuscript is to present how the Report Card was developed, and to summarize the results in a culturally appropriate context.

Methods

When South Korea joined the Active Health Kids Global Alliance (AHKGA) at the end of 2015, the principal investigator (corresponding author) initiated the South Korean 2016 Report Card project and invited experts in the fields of PA and health to be part of the Research Working Group (RWG). The RWG consisted of 9 members (see South Korea's 2016 Report Card on Physical Activity of Children and Youth—full report card) and was responsible for acquiring and processing evidence, grading the predefined indicators, and producing the final content of the Report Card. The RWG also recruited policy makers, school principals, and members from the media to become part of a Report Card Committee (RCC) that contributed to acquiring evidence for and promoting the Report Card. The members of the RCC were also invited to sessions that involved the presentation of synthesized data and discussions on the grading of indicators. Ultimately, the final deliberation on grades was done by the RWG.

The Report Card assessed 10 key indicators and Physical Literacy: 1) Overall Physical Activity, 2) Organized Sport Participation, 3) Active Play, 4) Active Transport, 5) Physical Literacy, 6)

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Sedentary Behavior, 7) Family and Peers, 8) School, 9) Community and the Built Environment, and 10) Government Strategies and Investments.

Nationally representative data were the preferred resources used to grade the indicators. When necessary, descriptive analyses were conducted on these open data sets to calculate the prevalence of certain indicators (overall PA, active transport, SB) according to different groups (middle/high school, and boy/girl). The primary data source was the 2015 Korea Youth Risk Behavior web-based Survey (KYRBS; $n = 68,043$),⁹ and the secondary set of data were the 2014 Korea National Health and Nutrition Examination Survey (KNHANES; $n = 901$).¹⁰ The KYRBS and KNHANES are nationally representative data collected annually to assess the risk behaviors, health, and nutritional status of the population, monitor trends in health risk factors and the prevalence of major chronic diseases, and provide evidence to develop and evaluate health policies and programs in South Korea.

A systematic literature search was conducted both in Korean and English to identify any related evidence regarding PA or SB in South Korean children and youth within the previous 5 years (2011–2015). These papers were then scored to determine how much weight each study will carry on the final grades. The criteria that were used for scoring are as follows: type and quality of measure used (objective measures or validated questionnaires were preferred); the currency of the data (more recent data preferred); age range of children surveyed (age groups according to pre, elementary, middle, and high school preferred); and sample size (larger samples and generalizable samples preferred). Additional sources of data (ie, national reports on PA, SB and policy) were used to verify findings and to put them into context.

The RCC were involved in the initial discussions regarding the weight placed on evidence and the grading of indicators. The final grades were agreed upon by the RWG in line with the predefined criteria of the AHKGA: $A = >80\%$, $B = 61\%$ to 80% , $C = 41\%$ to 60% , $D = 21\%$ to 40% , $F = 0\%$ to 20% and $INC =$ incomplete data. Where significant differences between groups (such as age and sex) existed, the RWG assigned a grade that best reflected the grade of the majority and then lowered the grade according to the degree of the disparity.

Results

South Korea's Report Card is the first assessment of PA and SB among children and youth based on standardized criteria from the AHKGA. Table 1 shows the final grades of the 10 key indicators. Figure 1 shows the cover of the Report Card.

Discussion

Overall Physical Activity: *D-*

The 2015 KYRBS data was used as the primary data source. Results show that 6.9% of middle school students (10.6% in boys, and 2.9% in girls) and 4.9% of high school students (7.4% in boys, and 2.1% in girls) participated in ≥ 60 minutes of MVPA daily. Although nationally representative data did not exist for elementary school students, reports from the Ministry of Education,¹¹ the Ministry of Culture, Sport and Tourism,¹² and several independent studies^{13–16} show that elementary school students are much more physically

Table 1 Grades for the Indicators in the South Korean 2016 Report Card on Physical Activity for Children and Youth

Indicator	Grades
Overall Physical Activity	<i>D-</i>
Organized Sport and Physical Activity Participation	<i>C-</i>
Active Play	<i>INC</i>
Active Transport	<i>C+</i>
Physical Literacy	<i>INC</i>
Sedentary Behavior	<i>F</i>
Family and Peers	<i>INC</i>
School	<i>D</i>
Community and Built Environment	<i>INC</i>
Government and Investment	<i>C</i>

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark: *A* is 81% to 100%; *B* is 61% to 80%; *C* is 41% to 60%; *D* is 21% to 40%; *F* is 0% to 20%; *INC* is Incomplete data.

Figure 1 — Front cover of the 2016 South Korean Report Card on Physical Activity for Children and Youth.

active than middle/high school students. Due to a lack of consensus on PA guidelines, many reports and studies presented their data according to the criteria of ≥ 60 mins/day of MVPA for more than 5 days per week (21% for elementary and 14.1% for middle and high school), and muscle strengthening exercises for more than 3 days per week (duration not indicated; 22.1%).

Organized Sport Participation: C-

The Ministry of Education¹⁷ reported that, out of 3,878,938 students surveyed in 2015, 68.8% of elementary, middle, and high school students take part in school sports clubs or after school sports. This was supported by our analysis using the 2015 KYRBS data that showed 72.1% of middle school students and 31.5% of high school students participated in school sports clubs and after school sports. Limited evidence was available for younger age groups.

Active Play: INC

Active play could not be graded due to incomplete data as limited resources were identified on this indicator. The nature of active play makes it difficult to quantify; regardless, more efforts should be made in the future to understand active play among South Korean children and youth.

Active Transport: C+

The 2014 KNHANES data was used as the primary data source for active transport. Results show that 76.2% of middle school students and 77.4% of high school students take active transportation, mainly walking or cycling, to school for an average of 25 min/day. Independent studies showed that 80% to 100% of elementary students take an active form of transportation to school in South Korea.^{16,18} Though the majority of children and youth used an active mode of transport to commute to school, it is important to note that in South Korea most children go to a school located within their neighborhoods. The commute is therefore often very short and done at a leisurely pace.

Physical Literacy: INC

Due to incomplete data, physical literacy could not be graded. Though almost no data or studies were found, physical literacy was included in the Report Card to bring attention to this very relevant and important indicator. We hope that by including it in the Report Card, the South Korean research community will initiate studies that will help with acquiring relevant data.

Sedentary Behavior: F

The 2015 KYRBS data was used as the primary data source. Results showed that 35.4% of middle school students (38.9% in boys, and 31.7% in girls) and 41.5% of high school students (43.9% in boys, and 38.8% in girls) participate in less than 2 hours of recreational screen time per day. But, adolescents (12–18 years) spend an average of 8.9 hours sitting per day (8.7 hr/day for boys, 9.2 hr/day for girls).¹⁹ Recreational screen time among elementary school students showed a consistent increase over the previous 5 years, with an average screen time of 3.7 hr/day in 2014.^{15,20–23} Evidence is largely lacking among young children; however, 1 study showed that South Korean toddlers (24–30 months old) watch over 1.2 hr/day of TV.²⁴

Due to the lack of consensus on the definition and criterion of SB, the majority of studies only investigated recreational screen time behavior. Consequently, the representation of SB in many national-level reports and independent research has been inconsistent. A unanimous guideline for screen time and other activities, such as extended sitting in classroom without breaks, needs to be developed and promoted.

Although the prevalence of SB in children and youth is deserving of a *D* grade, an *F* grade was given for the following 2 reasons: 1) recreational screen time was the only available SB measure in the KYRBS data. Including screen time for academic purposes in and outside school for typical South Korean students would dramatically lower the adherence to SB guidelines; 2) a decline in the amount of free time available to children and youth with increasing age should also be put into context. South Korea is well known for its “education fever,” where most high school students spend 15 hr/day studying either at school or at academic institutes. High school students may simply be replacing recreational screen time with academic-related SB due to the increasing academic pressure and workload. For these reasons, a *D* grade would not be an accurate assessment of SB for South Korean children and youth.

Family and Peers: INC

Family and peers could not be graded due to incomplete data. A systematic search of the literature found several studies that showed associations between parental behavior and the PA and SB levels of their children. However, very little is known about how much family members or peers support or coparticipate in PA with children and youth in South Korea; thus, more research is required.

School: D

The 2015 KYRBS data was used as the primary data source for the School indicator. Results showed that 57.2% of middle school students (61.6% in boys, and 52.4% in girls) and 14.8% of high school students (20.8% in boys, and 8.2% in girls) participate in 3 or more PE classes per week. In addition, 66% of elementary school students participated in 3 or more PE classes weekly.¹⁵ The majority of young South Korean children attending child care centers, preschools, and kindergartens participate in less than an hour of “PE” or structured PA per week.^{25–27}

According to the 2015 Korean Educational Development Institute data,²⁸ 99% of elementary schools, 86% of middle schools, and 99% of high schools have PA facilities (eg, outdoor field, gym) in their schools. The majority of child care centers, preschools, and kindergartens had PA facilities within the institute (78%), and only 3.5% of the institutes did not have accessible PA facilities nearby.²⁶

Community and the Built Environment: INC

Community and the built environment could not be graded due to incomplete data. A systematic search of the literature found few studies, and though documents that describe the built environment exist, insufficient evidence was provided to grade this indicator.

Government Strategies and Investment: C

The Ministry of Education has made several investments to promote PA participation among children and youth.²⁹ The School Sports Activation Project targets PA in schools, and requires schools to

provide at least 3 PE classes weekly for students in Grades 3 to 6 at an elementary school-level; 4 hours of PE weekly in middle schools; and 10 PE credits (1 class is 2 credits) during the 6 semesters of high school. They aim to increase school sports club participation of each student to ≥ 17 hour/year, and promise to increase the number of qualified instructors and improve facilities, especially for younger children and girls. The Ministry of Culture, Sport and Tourism have created an Integrated Sports Council in collaboration with the Korea Institute of Sports Science, Ministry of Education, the School Union, the Korean Olympic Committee, and the Korea Council of Sports for All.³⁰ These organizations are working together to promote PA and sports participation to create a healthier and happier South Korea by 2020. Although the increasing interest and investments toward PA and sports have been made in 2016, meaningful changes cannot yet be assessed. It is also unclear how sustainable these changes will be. Therefore, a conservative C grade was given to this indicator.

Cultural Contexts and Limitations

Although the Report Card was able to grade the predefined indicators in accordance with the international criteria, it is important to mention that significant cultural differences exist which need to be taken into consideration when understanding PA and SB among South Korean children and youth. Due to the Confucian ideologies that have influenced South Korean culture (and other East Asian countries), there is a great emphasis placed on education (ie, education fever).^{31,32} Lee et al³² described the highly competitive lifestyle of high school students studying for “examination hell,” often sleeping 3 to 4 hours per day. The degree of importance placed on achieving good grades, and getting accepted at prestigious universities in Seoul, is crucial to South Koreans. Consequently, school curriculum and the daily schedules of students are structured specifically for college entrance examinations from a young age. In particular, high school students are only required to take 2 PE credits per semester and are exempt from taking PE class in their last semester. On top of this, PE class is often replaced with study time. The view that autonomous study and other “more important” subjects (eg, English, math) take precedence over PE is expected in students, parents, schools, and related policy. Therefore, PE is often neglected and considered less important which makes promoting PA challenging in South Korea. Furthermore, cultural norms in gender roles and stereotypes make it particularly difficult for girls to engage in PA in and outside of school.³³ Nonetheless, promoting PA and reducing SB should be a public health priority.

This review has several limitations. First, there was a lack of studies that used objective measures to measure PA and SB. The results of the current Report Card rely heavily on self-reported data which are prone to recall bias. However, the estimates from large, representative samples were supported by 1 or 2 smaller independent studies that attested to the validity of the findings. Second, a systematic search of the literature found that limited research had been done on many of the relatively new indicators such as physical literacy, active play, and environmental influences on behavior. In addition, though data regarding certain indicators were available, studies often used different criteria and cut-offs from the internationally accepted guidelines,⁴ and also from each other. Thus, it is crucial to develop evidence-based PA and SB guidelines for South Korea and to promote their use among researchers, practitioners, and policy makers. Finally, more research is required to evaluate the efficacy of the new policies being implemented so as to maximize their accountability and sustainability.

Conclusion

The different indicators of the Report Card showed that most South Korean children and youth are not sufficiently physically active. Although the majority of institutes have infrastructure to support PA participation, they are not being fully used. Furthermore, schools and PE instructors are not adequately equipping students with the physical skills, knowledge and view of PA that is necessary to develop and maintain a physically active lifestyle.

Nonetheless, for the first time, the Report Card has allowed for the comprehensive baseline assessment of PA and SB among South Korean children and youth which can be used to understand and compare at national and international levels. It is expected that the Report Card will be employed as an advocacy tool and an educational resource to promote PA among South Korean children and youth. More evidence is needed in all areas of PA and SB to build on our findings.

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References

1. Janssen I, LeBlanc AG. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *Int J Behav Nutr Phys Act*. 2010;7:40. [PubMed](#)
2. Eime RM, Young JA, Harvey JT, Charity MJ, Payne WR. A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *Int J Behav Nutr Phys Act*. 2013;10:98. [PubMed](#)
3. Carson V, Hunter S, Kuzik N, et al. Systematic review of sedentary behaviour and health indicators in school-aged children and youth: an update 1. *Appl Physiol Nutr Metab*. 2016;41(6):S240–S265. [PubMed](#) doi:10.1139/apnm-2015-0630
4. World Health Organization. Global recommendations on physical activity for health. Geneva, Switzerland: World Health Organization 2010. http://apps.who.int/iris/bitstream/10665/44399/1/9789241599979_eng.pdf. Accessed June 29, 2016.
5. The Department of Health. Australia's Physical Activity and Sedentary Behaviour Guidelines for Children and Young People. Canberra, Australia; Australian Government; 2014. <http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines>. Accessed June 29, 2016.
6. ParticipACTION. *Canadian 24-hour movement guidelines for children and youth: An integration of physical activity, sedentary behavior, and sleep*. Tronto, ON: ParticipACTION; 2016. <https://www.participation.com/sites/default/files/downloads/participation-24hguidelines-05-17en.pdf>. Accessed June 29, 2016.
7. Department of Health. Physical Health, Health Improvement and Protection. Start Active, Stay Active: A report on Physical Activity for Health from the Four Home Countries. London, UK: Department of Health, Physical Health, Health Improvement and Protection; 2011. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216370/dh_128210.pdf. Accessed June 29, 2016.

8. U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans Midcourse Report: Strategies to increase physical activity Among youth. Washington: U. S. Department of Health and Human Services; 2012. <http://health.gov/paguidelines/midcourse>. Accessed June 29, 2016.
9. Korea Centers for Disease Control and Prevention. Korea Youth Risk Behavior web-based Survey. Chungcheongbuk-do, South Korea: Korea Centers for Disease Control and Prevention; 2015. <http://yhs.cdc.go.kr/>. Accessed June 29, 2016.
10. Korea Centers for Disease Control and Prevention. Korea National Health and Nutrition Examination Survey. Chungcheongbuk-do, South Korea: Korea Centers for Disease Control and Prevention; 2014. <https://knhanes.cdc.go.kr/knhanes/index.do>. Accessed June 29, 2016.
11. Ministry of Education. A report on the growth, development and physical examination of school-aged youth. Sejong, South Korea: Ministry of Education; 2016. <http://www.moe.go.kr/web/100026/ko/board/view.do?bbsId=294&pageSize=10¤tPage=0&encodeYn=N&boardSeq=62361&mode=view>. Accessed June 29, 2016.
12. Ministry of Culture Sport and Tourism. Survey on Citizens' Sports Participation 2015. Sejong, South Korea: Ministry of Culture Sport and Tourism; 2016. http://www.mcst.go.kr/web/s_data/deptData/deptDataView.jsp?pSeq=373. Accessed June 29, 2016.
13. Ra JS, Gang M. Depression moderates between physical activity and quality of life in low-income children. *Appl Nurs Res*. 2016;29:e18–e22. [PubMed doi:10.1016/j.apnr.2015.06.004](#)
14. Ha CD, Cho JK, Lee SH, Kang HS. Serum vitamin D, physical activity, and metabolic risk factors in Korean children. *Med Sci Sports Exerc*. 2013;45(1):102–108. [PubMed doi:10.1249/MSS.0b013e31826c6956](#)
15. Kim B, Lee CY, Kim HS, Ko IS, Park CG, Kim GS. Ecological risk factors of childhood obesity in Korean elementary school students. *West J Nurs Res*. 2012;34(7):952–972. [PubMed doi:10.1177/0193945911401430](#)
16. Kang H, Lee K. Physically active lifestyle of Korean Elementary school students in fifth and sixth grade and an analysis of gender difference. *Korean Society for Early Childhood Physical Education*. 2015;21(1):125–136.
17. Ministry of Education. A report on the Physical Education and Arts curriculum. Sejong, South Korea: Ministry of Education; 2016. <http://www.moe.go.kr/web/100026/ko/board/view.do?bbsId=294&boardSeq=62345>. Accessed June 29, 2016.
18. Spence J, Lee J, Lee E. A comparative study of step-determined physical activity among Korean children in Korea and Canada. *J Sci Med Sport*. 2012;15:S251–S252. [doi:10.1016/j.jsams.2012.11.611](#)
19. Lee E, Carson V, Jeon JY, Spence JC. *Prevalence of physical activity and sitting time among South Korean adolescents: Results from the Korean National Health and Nutrition Examination Survey, 2013*. Asia-Pacific J Pub Health; 2016., 10.1177/1010539516654540.
20. Park HA, Kang JH, Kim KW, Cho YG, Hur YI, Kim OH. Breakfast skipping, related factors, and nutrients intake of 5th grade students. *Korean J Fam Med*. 2011;32(1):11–20. [doi:10.4082/kjfm.2011.32.1.11](#)
21. Lee HH, Park HA, Kang JH, et al. Factors related to body mass index and body mass index change in Korean children: preliminary results from the obesity and metabolic disorders cohort in childhood. *Korean J Fam Med*. 2012;33(3):134–143. [PubMed doi:10.4082/kjfm.2012.33.3.134](#)
22. Cho JH, Han SN, Kim JH, Lee HM. Body image distortion in fifth and sixth grade students may lead to stress, depression, and undesirable dieting behavior. *Nutr Res Pract*. 2012;6(2):175–181. [PubMed doi:10.4162/nrp.2012.6.2.175](#)
23. Lee B, Kim H, Lee S-K, Yoon J, Chung S-J. Effects of exposure to television advertising for energy-dense/nutrient-poor food on children's food intake and obesity in South Korea. *Appetite*. 2014;81:305–311. [PubMed doi:10.1016/j.appet.2014.06.103](#)
24. Byeon H, Hong S. Relationship between television viewing and language delay in toddlers: evidence from a Korea national cross-sectional survey. *PLoS One*. 2015;10(3):e0120663. [PubMed doi:10.1371/journal.pone.0120663](#)
25. Kim J. Diagnosing its problem solving in the physical education of kindergarten. *Korean Society for Early Childhood Physical Education*. 2012;13(2):33–43.
26. Lee I, An E. Study on the relationship between child's physical education program participation and child's physical and psychological well-being. *Korean Society for Early Childhood Physical Education*. 2015;16(1):7–18.
27. Park S, Lee S. Physical activity characteristics of the infant's life personality differences. *Korean Society for Early Childhood Physical Education*. 2015;16(1):33–44.
28. Korean Educational Development Institute. School Sport Facilities Report. Seoul, South Korea: Korean Educational Development Institute; 2015. <https://www.kedi.re.kr/khome/main/webhome/Home.do>. Accessed June 29, 2016.
29. Ministry of Education. School Sports Activation Project. Sejong, South Korea: Ministry of Education; 2016. <http://www.moe.go.kr/web/110410/ko/board/view.do?bbsId=352&boardSeq=62899>. Accessed June 29, 2016.
30. Ministry of Culture Sport and Tourism. Founding of the Integrated Sports Council. Sejong, South Korea: Ministry of Culture Sport and Tourism; 2016. http://www.mcst.go.kr/web/s_notice/press/pressView.jsp?pSeq=14937. Accessed June 29, 2016.
31. Lee M. Korean adolescents' "examination hell" and their use of free time. *New Dir Child Adolesc Dev*. 2003; (99):9–21. [PubMed doi:10.1002/cd.63](#)
32. Lee M, Larson R. The Korean 'examination hell': long hours of studying, distress, and depression. *J Youth Adolesc*. 2000;29(2):249–271. [doi:10.1023/A:1005160717081](#)
33. Lee E, Spence JC, Song Y, Jeon JY. A systematic review of the correlates of Korean girls' physical activity: an ecological perspective. *Health Soc Sci*. 2016;40(12):5–28.