Rev Bras Cineantropom Desempenho Hum review article

https://doi.org/10.1590/1980-0037.2021v23e82645

Sedentary behavior in children and adolescents: an update of the systematic review of the Brazil's Report Card

Comportamento sedentário em crianças e adolescentes brasileiros: uma atualização da revisão sistemática do Report Card Brasil

Kelly Samara Silva[1]
https ://orcid.org/0000-0002-7356-1680
Giseli Minatto[1]
https ://orcid.org/0000-0001-5803-4201
Alexsandra da Silva Bandeira[1]
https ://orcid.org/0000-0001-8922-1042
Priscila Cristina dos Santos[1]
https ://orcid.org/0000-0002-0166-1201
Ana Caroline Ferreira Campos de Sousa[1]
https ://orcid.org/0000-0003-1327-5735
Valter Cordeiro Barbosa Filho[2]
https ://orcid.org/0000-0002-4769-4068

Abstract – This review updated data on sedentary behavior in Brazilian children and adolescents for the Brazil's Report Card 4.0. The searching was carried out in eight databases (PubMed, Scopus, Web of Science, LILACS, SPORTDiscus, BIREME, Scielo, and Google Scholar), based on the the following criteria: original research; samples including Brazilian children and adolescents; to be a observational survey with the prevalence of at least one component of sedentary behavior. In this updated review were included 118 studies (corresponding to 159 papers), being 71 studies (104 papers) previously reviewed in the Report Card 3.0 and 47 studies (55 papers) found in update from 2018 to 2019. Screen time (34.7%) and TV viewing (28.2%) remains the most investigated components, however, two studies investigated cell phone use, and there was an increase in other types of sedentary behavior such as sitting time (from 9% to 25.6%). We found only four studies involving pre-scholars, but four of them covered almost all age groups. Self-reported questionnaire was the instrument more used; however, increased the studies using accelerometers (from 2 to 8 studies). The cut-off point more frequent was 2 hours/day (47.5%), but the use of other measures doubled. Almost 70% of the studies reported that less than 50% (general range: 9.4% to 97.7%) of individuals had < 2 hours/day of sedentary behavior. The updated review found few studies with preschoolers and children; using validated instruments; using accelerometers, with standardization of cutoff points, and prevalences very close to what was observed in the previous review.

Keywords: Adolescent behavior; Brazil; Prevalence; Sedentary lifestyle.

Resumo – *Este revisão atualiza dados de comportamento sedentário em crianças e adolescentes brasileiros para o Report Card Brasil 4.0. A busca foi realizada em oito bases de dados (PubMed, Scopus, Web of Science, LILACS, SPORTDiscus, BIREME, Scielo, and Google Scholar) usando os seguintes critérios: artigos originais; amostras incluindo crianças e adolescentes; estudos observacionais que estimaram a prevalência de pelo menos um componente do CS. Nesta atualização foram incluídos 118 estudos (com publicação de 159 artigos), sendo 71 (104 artigos) revisados anteriormente no Report Card 3.0 e 47 estudos (55 artigos) encontrados na atualização de 2018 a 2019. O tempo de tela (34,7%) e de TV (28,2%) continuam sendo os componentes mais investigados, entretanto, dois estudos investigaram o uso de celular e houve aumento em outros comportamentos sedentários, como o tempo sentado (de 9% para 25,6%). Foram encontrados somente quatro estudos com pré-escolares, mas quatro deles cobriam quase todas as idades. O questionário foi o instrumento mais utilizado; no entanto, aumentou o número de estudos usando acelerômetros (de 2 para 8). O ponto de corte mais frequente foi 2 horas/dia (47,5%), mas o uso de outros medidas duplicou. Quase 70% dos estudos relatou que menos de 50% (variação geral: 9,4% a 97,7%) dos adolescentes atendem às recomendações (<2 horas / dia) de comportamento sedentário. A revisão atualizada mostra ainda poucos estudos com pré-escolares e crianças, com o uso de instrumentos validados, com o uso de acelerômetros, com padronização de pontos de corte, e prevalências muito próximas do observado na revisão anterior.*

Palavras-chave: *Comportamento do adolescente; Brasil; Prevalência; Estilo de vida sedentário.*

[1] Federal University of Santa Catarina. Florianopolis, SC. Brazil.
[2] Federal Institute of Ceará. Campus Aracati. Aracati, CE. Brazil.

Received: December 22, 2020
Accepted: July 05, 2021

How to cite this article
Silva KS, Minatto G, Bandeira AS, Santos PC, Sousa ACFC, Barbosa Filho VC. Sedentary behavior in children and adolescents: an update of the systematic review of the Brazil's Report Card 4.0. Rev Bras Cineantropom Desempenho Hum 2021, 23:e82645. DOI: http://doi.org/10.1590/1980-0037.2021v23e82645

Corresponding author
Kelly Samara Silva.
Campus Universitário Reitor João David Ferreira Lima, Coordenadoria de Pós-Graduação em Educação Física, Universidade Federal de Santa Catarina – UFSC
S/n, 88040-900 Bairro Trindade, Florianópolis (SC), Brazil.
E-mail: kelly.samara@ufsc.br

INTRODUCTION

The sedentary behavior is present in the daily routine of children and young people through various components[1,2]; being the time spent on one or more screen the most frequent[3,4]. This behavior is influenced by technological advances and economic and cultural aspects[5,6], and it tends to increase as more devices and apps are made and available for the population[7]. Therefore, there is need to constantly review and update data to ensure accurate monitoring of sedentary behavior in this population, due to its potential risk in health outcomes when used excessively[8,9].

The Brazil's 2018 Report Card for the sedentary behavior showed that less than half of the adolescents met the recommendations of sedentary behavior (<2 hours/day)[3]. Similar results were found in other systematic reviews with studies arried out in different countries around the world[4]. Furthermore, research is important to understand the different prevalence range among screen components[3,4], changes in the time spent and component patternsover time, and the need to investigate other screen components such as cell phones and objectively-measured sedentary time[10,11].

This update of review will analyze also whether the amount of studies, the prevalence found and the more vulnerable subgrups have changed over time. For example, in the previous review was found few studies including children less than seven years in Brazil; girls spent more time on TV watching while boys on video games use[3]. Thus, the present study aimed to update the systematic review on the prevalence of sedentary behavior among Brazilian children and adolescents up to 18 years of age. The summarized data were used to define the grade and recommendations for Brazil's 2021 Report Card for the sedentary behavior indicator.

METHOD

Measured outcome ans selection criteria

This review is focused on sedentary behavior, which is defined by an activites that had an energy expenditure ≤1.5 metabolic equivalent and they are performed in a sitting, reclining or lying posture[1]. Self-reported information (e.g., questionnaires about sedentary behavior, TV viewing; videogames and computer use; screen time etc) and objective measures were included. Thus, eligible criteria were: (I) original peer-reviewed studies; (II) samples including Brazilian children and adolescents aged 0-19 years (a mean age within this range or a sample comprising other age years, but data for this age group were reported separately); (III) to be a school- or population-based survey with information about the methodological procedures of representation of the target population (e.g., random sampling); (IV) observational studies using any method for sedentary behavior assessment (e.g., self-report, structured interviews, objectively-measured sedentary time, and steps per day); and (V) studies showing the mean or the prevalence of at least one component of sedentary behavior (e.g., TV viewing, use of computer and videogames, sitting time).

Study search strategies

This updated revised considered all search equations that were used in the previous review for the follow databases: Medline (PubMed), Scopus,

Web of Science/Web of Knowledge, LILACS (*Literatura Latino-Americana em Ciências da Saúde*), SPORTDiscus, BIREME (Biblioteca Regional de Medicina) Scielo, and Google Scholar. The search was carried out in August 2020. The umbrella project of the Brazil's Report Card 4.0 was registered at the Open Science Framework (ID: sjgv9).

The search strategy included four groups of descriptors (see Supplementary File 1). The Boolean operator "AND" was used for combinations among descriptor groups. The truncation symbols ($, * or "") specific for each database were also used to increase the range of searches for the descriptor variations. Searches were conducted with the descriptors in English and Portuguese, when needed. The searching was supplemented with a screening of the reference list of retrieved articles in order to find potentially relevant titles (Supplementary File 1).

Selection process

The initial selection was based on the titles and the abstract of manuscripts. The elegible articles were analyzed and the reference lists of them were evaluated (Supplementary File 2). These steps were performed independently and conducted by two pairs of reviewers (AS/GM or PS/AB), and the other pair helped when there were disagreements.

Data extraction and analysis

Data were divided by two authors (PS and AB), and when necessary, a consensus meeting was held with a third author (GM or AS). Due the heterogeneity of the study's data, the results were summarized for the Brazil's Report Card 3.0 and 4.0 separately (Table 1). Firstly, methodological characteristics (year of data collection, region, sample type, sample size, age stage, type of the sedentary behavior measurement, indicators and cutoff points used) of the studies were extracted for report card 3.0 and 4.0 (Supplementary File 3). Secondly, the proportion range of children and adolescents who met the recommendations of sedentary behavior was extracted of the studies, according to the established cut-off point of each article (Supplementary File 4).

Table 1. Publications and methodological characteristics of included studies in the evidence synthesis for Brazil's Report Card 3.0 (n= 104 papers, 71 studies) and 4.0 (n= 55 papers, 47 studies) – sedentary behavior.

Publication/methodological characteristics	Report Card 3.0		Report Card 4.0		Total	
	Studies = 71		Studies = 47		Studies = 118	
	n	%	n	%	n	%
Year (data collect)						
Up to 2010	36	50.7	3	6.4	39	33.1
2011-2014	27	38.0	23	48.9	50	42.4
2015-2017	2	2.8	13	27.7	15	12.7
No informed	6	8.5	8	17.0	14	11.9
Region						
North	3	4.2	3	6.4	6	5.1
Northeast	18	25.4	6	12.8	24	20.3
Mideast	2	2.8	2	4.3	4	3.4

Publication/methodological characteristics	Report Card 3.0		Report Card 4.0		Total	
	Studies = 71		Studies = 47		Studies = 118	
	n	%	n	%	n	%
Southeast	12	16.9	11	23.4	23	19.5
South	32	45.1	20	42.6	52	44.1
Brazil	4	5.6	5	10.6	9	7.6
Sample type						
Population-based	6	8.5	3	6.4	9	7.6
School-based	65	91.5	44	93.6	109	92.4
Sample size (n)						
< 500	9	12.7	12	25.5	21	17.8
501-1000	26	36.6	13	27.7	39	33.1
1001-1500	13	18.3	11	23.4	24	20.3
1501-2000	6	8.5	0	0.0	6	5.1
2000 or more	17	23.9	11	23.4	28	23.7
Age stage (years)						
Pre-school children (up to 4 years-old)	0	0.0	0	0.0	0	0.0
Children (5-12 years-old)	5	7.0	7	14.9	12	10.2
Adolescents (13 or more years-old)	31	43.7	16	34.0	47	39.8
Children and Adolescents	30	42.3	21	44.7	51	43.2
Pre-school children and children	2	2.8	2	4.3	4	3.4
All	3	4.2	1	2.1	4	3.4
Type of the SB measurement						
Self-report	69	97.2	41	87.2	110	93.2
Device-measured (e.g.. accelerometers)	2	2.8	6	12.8	8	6.8

RESULTS

The selection process is summarized in Figure 1. The initial search located 1,401 potential articles. After removal of duplicate articles 1,156 records remained. Titles and abstracts were read, and 97 papers were selected and five other studies were found in the reference lists of these articles. After reading in full, 47 were excluded (see Supplementary File 2) and 55 met the inclusion criteria. Therefore, 159 papers were included in this review, being 104 previously reviewed in the Report Card 3.0[3] and 55 papers found in update from 2018 to 2019. Instead of presenting the results considering the published papers, we are presenting them considering the number of studies studies (total = 118, Report Card 3.0 = 71, Report Card 4.0 = 47) to avoid overestimation of prevalence. Detailed information on each study is found in Supplementary File 3 and 4.

When analyzed separately, the studies of the Report Card 3.0 (up to 2017)[3] and 4.0 (2018-2019 - update) were published from 2004 to 2019 and the data collection from 2001 to 2017. Both reviews had more studies developed in southern Brazil (45.1% and 42.6%, respectively); with school-based design (91.5% and 93.6%, respectively); involving more than 500 individuals (87.3% and 74.5%, respectively); and the target-population of children and adolescents, or exclusively adolescents. In both reviews, most of studies used self-reported questionnaries (97.2% and 87.2%, respectively) (Table 1).

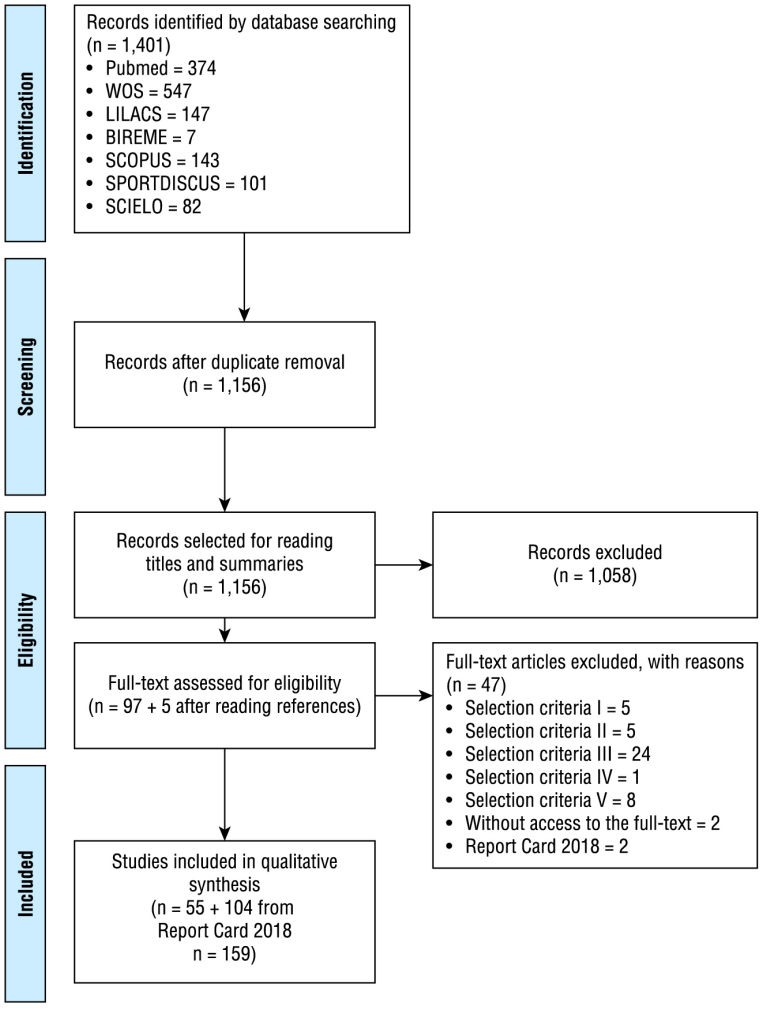

Figure 1. Flowchart of the studies through the phases of the systematic review.

The sedentary behavior indicator more studied was screen time (32.3%) and TV watching time (32.9%) in the Report Card 3.0, and screen time (39.7%) and other indicators (e.g., sitting time: 25.6%) in the the Report Card 4.0 (Figure 2).

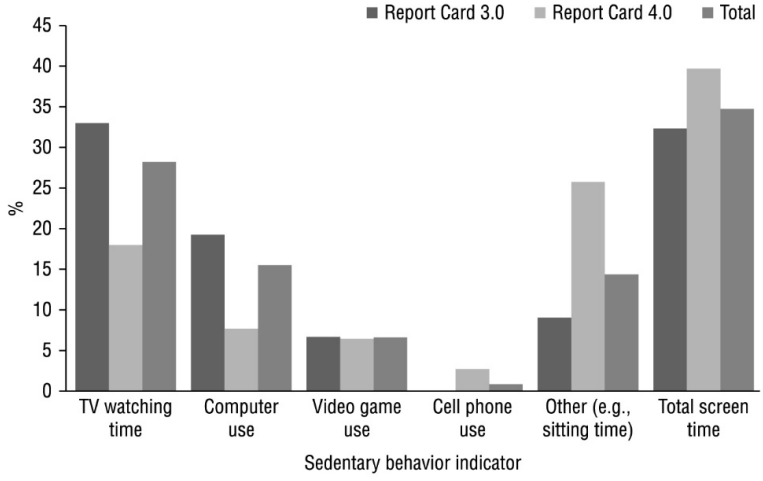

Figure 2. Proportion of sedentary behavior indicators presented in the studies from Report Card 3.0 (n = 71) and 4.0 (n = 47).

In Figure 3 is presented all cutoff points used for sedentary behavior. While the cutoffs ≤ 2 hours/day was more used in both Reports 3.0 and 4.0 (48.3% and 45.9%), other parameters have been presented in the updated version as mean, minutes/day, tertil and other (42.6%). However, several studies considered cut-off points that were not based on meeting of sedentary behavior recommendations. In relationship the prevalence, the results showed that almost 70% of studies reported that less than 50% of individuals had < 2 hours/day of sedentary behavior (Figure 4).

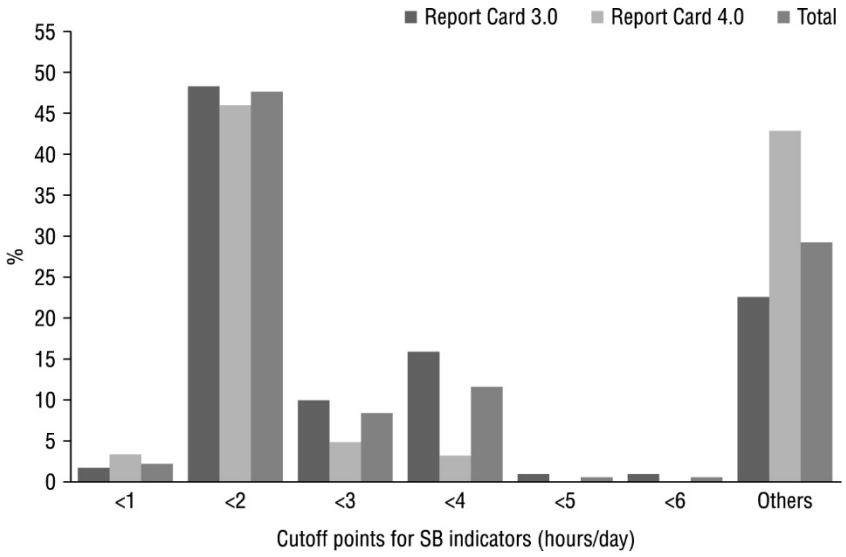

Figure 3. Proportion of diferent cutoff points used to classify the sedentary behavior among studies from Report Card 3.0 (n = 71) and 4.0 (n = 47).

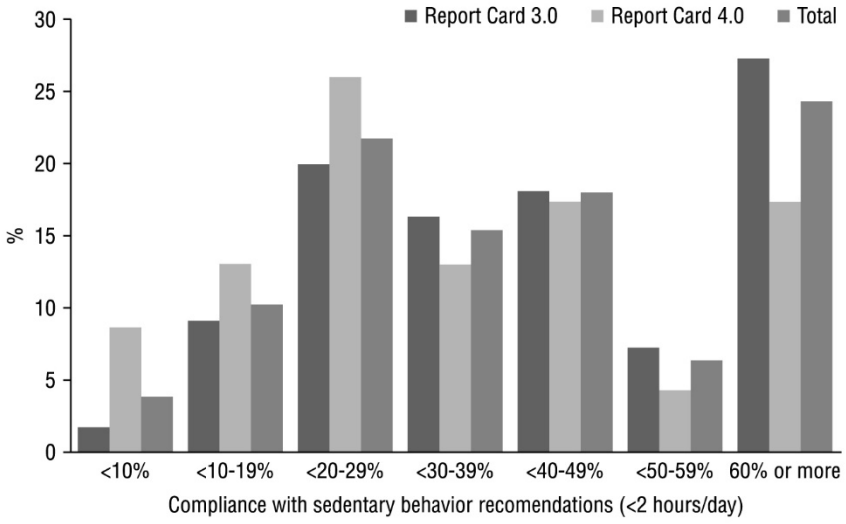

Figure 4. Range of percentages of preschoolers, children and adolescents who met the sedentary behavior recommendations among analyzed studies in the Report Card 3.0 (n = 71) and 4.0 (n = 47).

DISCUSSION

The present review shows data from 118 studies (previous review: 71; update: 47 studies) involving representative samples of Brazilian children and adolescents. The main finding were: i) studies on sedentary behavior involving children under the age of seven remain scarce; ii) the measurement instruments used predominantly are self-reported questionnaires and a few present validation data; iii) screen time is the indicator more investigated, mainly TV viewing; iv) the cutoffs less than 2 hours/day was more used; v) most studies reported a prevalence of compliance with the recommendations below 50%.

Self-reported questionnaires have been the main way to measure sedentary behaviors among Brazilian children and adolescents; however, validation of the instruments was reported by few studies. There is no consensus among the instrument to be used. The lack of information on the validation and the amount of instrument used can impair the understanding of the results and to hindering replication and comparability among studies.

Few studies were conducted with pre-schoolers and children. The World Health Organization guidelines on sedentary behavior, which only considers children over 5 years old, exemplify the complexity of evidence for children in pre-school age[1]. In this age group some children are not yet in school and there is a greater need for parental involvement in studies with this population. However, it is necessary to advance the knowledge of sedentary behavior in pre-school children so that there can be more effective targeting of public policies.

An important finding of our review is that the most current studies has explored continuous data instead use cut-off points. Sistematic reviews[8,9] and longitudinal studies[12] indicated a significant relationship between health indicators and two hours of screen time, being recommended in guidelines from different countries[13,14]. However, there is also a need to modify the metrics for investigating sedentary behavior [1] for more accurate results.

The first studies on sedentary behavior investigated mostly the use of TV[12,15]. However, the use of screen devices has changed over the past few years, especially among young people. Evidence have highlighted the replacement of TV time by other screen devices, such as video games and smartphones[16]. However, only two studies[17,18] investigated smartphone use in our review, and no study evaluated streaming platforms, social media and school-related tasks. Studies have shown that the type of activity may impact health differently[19,20] and analyzing all different screen devices is important since the correlates, determinants and health impacts are different[21].

Accelerometers is still restricted in Brazil research on sedentary behaviors, mainly because the difficulty with the purchase and maintenance of these devices. Researchers point out as a possible strategy to carry out multicentre studies that standardize the entire data collection process and that can carry out multicenter and collaborative studies through the use of accelerometer devices[10].

In this review, most studies showed that less than half of young people reach the recommendations. Despite being a widely used, the cut-off point of 2 hours daily contributes significantly to the non-compliance the recommendation, since the time spent on all electronic devices (included activities as texting) is usually considered[2]. Moreover, there is no consistent evidence on which cut-off point is associated to higher riks of health consequences. For instance, the World Health Organization recommended that children and adolescents should limit their

time in sedentary behavior, especially the time spent on recreational screen time, but it was not defined how long[1]. Therefore, more evidence is needed to define the different cut-off points and sedentary behavior indicators in surveillance and monitoring with children and adolescents.

This review is subject to some limitations: the difficulty in comparing studies due to the high heterogeneity of the sedentary behavior indicators; the different types of instruments and cut-off points used and the lack of assessment of risk bias.

This updated review reinforces that most of children and adolescents did not meet the screen time recommendations. There are still few studies involving younger children. The self-reported questionnaires remain the most used instrument, although other indicators have been released, such as sitting time and use of smartphones. The most used cutoff point is still two hours a day, but studies have explored the continuous variables of sedentary behavior. These results address some important issues that directly affect the wide variation in prevalence: 1) the variety of self-reported measures used, even for the same study; 2) arbitrariness in the use of cut-off points; 3) the number and diversity of sedentary behaviors investigated; 4) the analyzes chosen to treat the variables. Constant efforts should be made to advance in typology and measure of sedentary behavior; to understand the health impact of different indicators of sedentary behavior in children and adolescents; to investigate simultaneously qualitative (e.g. type, content) and quantitative (e.g. ime spent) information about sedentary behavior in order to improve the accuracy of our monitoring and intervene in what really makes sense.

ACKNOWLEDGEMENTS

We would like to acknowledge the financial support provided by CAPES (Coordination of Improvement of Higher Level Personnel) as individual grants to AS Bandeira and PC Santos, and by CNPq (Ministry of Science and Technology, Brazil).

COMPLIANCE WITH ETHICAL STANDARDS

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. This study was funded by the authors.

Ethical approval

This research is in accordance with the standards set by the Declaration of Helsinki.

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

Principal investigator, conceived the idea of the manuscript: KS; Provided substantial contributions to the conception of the study: VBF; Were the operational leads of data extraction: ASB, PCS, GM and ACFCS. All authors read and approved the final manuscript.

References

1. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med 2020;54(24):1451-62. http://dx.doi.org/10.1136/bjsports-2020-102955. PMid:33239350.
2. Tremblay MS, Aubert S, Barnes JD, Saunders TJ, Carson V, Latimer-Cheung AE, et al. Sedentary Behavior Research Network (SBRN) – Terminology Consensus Project process and outcome. Int J Behav Nutr Phys Act 2017;14(1):75. http://dx.doi.org/10.1186/s12966-017-0525-8. PMid:28599680.
3. Silva KS, Bandeira AS, Santos PC, Malheiros LEA, Sousa ACFC, Barbosa VC Fo. Systematic review of childhood and adolescence sedentary behavior: analysis of the Report Card Brazil 2018. Rev Bras Cineantropom Desempenho Hum 2018;20(4):415-45. http://dx.doi.org/10.5007/1980-0037.2018v20n4p415.
4. Aubert S, Barnes JD, Abdeta C, Nader PA, Adeniyi AF, Aguilar-Farias N, et al. Global Matrix 3.0 physical activity report card grades for children and youth: results and analysis from 49 countries. J Phys Act Health 2018;15(s2):S251-73. http://dx.doi.org/10.1123/jpah.2018-0472. PMid:30475137.
5. Chastin SFM, Craemer M, Lien N, Bernaards C, Buck C, Oppert J, et al. The SOS-framework (Systems of Sedentary behaviours): an international transdisciplinary consensus framework for the study of determinants, research priorities and policy on sedentary behaviour across the life course: a DEDIPAC-study. Int J Behav Nutr Phys Act 2016;13(1):83. http://dx.doi.org/10.1186/s12966-016-0409-3. PMid:27421750.
6. Buck C, Loyen A, Foraita R, Cauwenberg J, Craemer M, Donncha CM, et al. Factors influencing sedentary behaviour: a system based analysis using Bayesian networks within DEDIPAC. Plos one 2019;14(1):e0211546. http://dx.doi.org/10.1371/journal.pone.0211546.
7. Lee E, Hesketh KD, Rhodes RE, Rinaldi CM, Spence JC, Carson V. Role of parental and environmental characteristics in toddlers' physical activity and screen time: Bayesian analysis of structural equation models. Int J Behav Nutr Phys Act 2018;15(1):17. http://dx.doi.org/10.1186/s12966-018-0649-5. PMid:29426324.
8. Tremblay MS, Colley RC, Saunders TJ, Healy GN, Owen N. Physiological and health implications of a sedentary lifestyle. Appl Physiol Nutr Metab 2010;35(6):725-40. http://dx.doi.org/10.1139/H10-079. PMid:21164543.
9. American Academy of Pediatrics. American Academy of Pediatrics: children, adolescents, and television. Pediatrics 2001;107(2):423-6. http://dx.doi.org/10.1542/peds.107.2.423. PMid:11158483.
10. Silva I, Sasaki J, Gonçalves P. Mensuração da atividade física e tempo sedentário por meio de acelerômetros: cenário atual, perspectivas e demandas futuras. Rev Bras Ativ Fís Saúde 2016;21(4):293-6. http://dx.doi.org/10.12820/rbafs.v.21n4p293-296.
11. DiPietro L, Al-Ansari SS, Biddle SJH, Borodulin K, Bull FC, Buman MP, et al. Advancing the global physical activity agenda: recommendations for future research by the 2020 WHO physical activity and sedentary behavior guidelines development group. Int J Behav Nutr Phys Act 2020;17(1):143. http://dx.doi.org/10.1186/s12966-020-01042-2. PMid:33239105.

12. Hancox RJ, Milne BJ, Poulton R. Association between child and adolescent television viewing and adult health: a longitudinal birth cohort study. Lancet 2004;364(9430):257-62. http://dx.doi.org/10.1016/S0140-6736(04)16675-0. PMid:15262103.

13. Okely AD, Salmon J, Vella SA, Cliff D, Timperio A, Tremblay M, et al. A systematic review to update the australian physical activity guidelines for children and young people. SSPapers 2012;1246.

14. Tremblay MS, LeBlanc AG, Janssen I, Kho ME, Hicks A, Murumets K, et al. Canadian sedentary behaviour guidelines for children and youth. Appl Physiol Nutr Metab 2011;36(1):59-71. http://dx.doi.org/10.1139/H11-012. PMid:21326378.

15. Biddle SJH, Pearson N, Ross GM, Braithwaite R. Tracking of sedentary behaviours of young people: a systematic review. Prev Med 2010;51(5):345-51. http://dx.doi.org/10.1016/j.ypmed.2010.07.018. PMid:20682330.

16. LeBlanc AG, Gunnell KE, Prince SA, Saunders TJ, Barnes JD, Chaput J-P. The ubiquity of the screen: an overview of the risks and benefits of screen time in our modern world. Translational J ACSM 2017;2(17):104-13.

17. Miranda VPN, Amorim PRS, Bastos RR, Souza VGB, Faria ER, Franceschini SCC, et al. Evaluation of lifestyle of female adolescents through latent class analysis approach. BMC Public Health 2019;19(1):184. http://dx.doi.org/10.1186/s12889-019-6488-8. PMid:30760240.

18. Bordon S, Srebernich SM, Bernardi JLD, Merhi VAL. Screen time, body mass index and neck circumference: is there an association with social class in children? Rev Bras Cineantropom Desempenho Hum 2019;21:e58235. http://dx.doi.org/10.1590/1980-0037.2019v21e58235.

19. Kelly Y, Zilanawala A, Booker C, Sacker A. Social media use and adolescent mental health: findings from the UK Millennium Cohort Study. EClinicalMedicine 2019;6:59-68. http://dx.doi.org/10.1016/j.eclinm.2018.12.005. PMid:31193561.

20. Turel O, Bechara A. Little video-gaming in adolescents can be protective, but too much is associated with increased substance use. Subst Use Misuse 2019;54(3):384-95. http://dx.doi.org/10.1080/10826084.2018.1496455. PMid:30654698.

21. Ngantcha M, Janssen E, Godeau E, Ehlinger V, Le-Nezet O, Beck F, et al. Revisiting factors associated with screen time media use: a structural study among school-aged adolescents. J Phys Act Health 2018;15(6):448-56. http://dx.doi.org/10.1123/jpah.2017-0272. PMid:29569992.

SUPPLEMENTARY MATERIAL

Supplementary material accompanies this paper.
Supplementary File 1. Free access in https://osf.io/tua6f/
Supplementary File 2. Free access in https://osf.io/tua6f/
Supplementary File 3. Free access in https://osf.io/tua6f/
Supplementary File 4. Free access in https://osf.io/tua6f/
This materials are available as part of the online article from http://www.scielo.br/rbcdh