Rev Bras Cineantropom Hum

review article

DOI: http://dx.doi.org/10.5007/1980-0037.2018v20n4p415

Systematic review of childhood and adolescence sedentary behavior: analysis of the Report Card Brazil 2018

Revisão sistemática do comportamento sedentário na infância e adolescência: análise do Report Card Brasil 2018

Kelly Samara Silva[1]
Alexsandra da Silva Bandeira[1]
Priscila Cristina dos Santos[1]
Luís Eduardo Argenta Malheiros[1]
Ana Caroline F. C. de Sousa[1]
Valter Cordeiro Barbosa Filho[2]

Abstract – The aim of this study was to summarize studies examining the prevalence of sedentary behavior among Brazilian children and adolescents. A systematic review conducted on eight databases (PubMed, Scopus, Web of Science, LILACS, SPORTDiscus, BIREME, Scielo, and Google Scholar). The criteria applied were: original research; samples including Brazilian children and adolescents; to be a school- or population-based survey; observational studies using different measures of sedentary behavior; studies showing the prevalence of at least one component of sedentary behavior. Of the 205 studies included, 104 were analyzed. There was a greater concentration of studies in the southern (n=41) and northeastern (n=18) regions. The components more frequently investigated were watching TV (n=36) and screen time (n=32). Only three studies included children under seven years, and the age range more investigated was 10 to 19 years. Most of the studies used a self-reported questionnaire and showed variability in the cut-off point applied (from 2 to 4 hours/day). The prevalence of adolescents who met recommendations ranged from 9.4% to 68.0% for sedentary behavior (<2 hours/day) and from 16.8% to 67.2% for TV viewing (<2 hours/day). The prevalence ranged from 39.1% to 97.7% for computer use and from 47.7% to 98.0% for videogame use. Most of the studies reported that less than half of the adolescents met the recommendations of sedentary behavior and TV viewing. On the other hand, more than half of them devoted less than two hours a day to computer and videogame use.

Key words: Adolescent behavior; Brazil; Prevalence; Sedentary lifestyle.

Resumo – *Objetivou-se sintetizar estudos que estimaram a prevalência de comportamento sedentário (CS) em crianças e adolescentes. Revisão sistemática conduzida em oito base de dados (PubMed, Scopus, Web of Science, LILACS, SPORTDiscus, BIREME, Scielo, and Google Scholar). Os critérios utilizados foram: artigos originais; amostras incluindo crianças e adolescentes; levantamentos de base escolar e populacional; estudos observacionais usando diferentes medida do CS; estudos mostrando a prevalência de pelo menos um componente do CS. Dos 205 estudos incluídos, 104 foram analisados. Houve maior concentração de estudos nas regiões Sul (n=41) e Nordeste (n=18). Os componentes mais investigados foram assistência à TV (n=36) e tempo de tela (n=32). Somente três estudos incluíram dados de crianças com menos de sete anos, e a maioria investigou adolescentes de 10 a 19 anos. A maioria dos estudos usou questionários e apresentou variabilidade no ponto de corte utilizado (de 2 a 4 horas). A prevalência de adolescentes que atendiam às recomendações de CS (<2 horas/dia) variou de 9,4% a 68,0%. A prevalência de adolescentes que assistiam TV (<2 horas/dia) foi de 16,8% a 67,2%. Para o uso de computador, a prevalência variou de 39,1% a 97,7%; e de 47,7% a 98,0% para o videogame. Na maioria dos estudos menos da metade dos adolescentes atendeu às recomendações de CS e de tempo de TV. Por outro lado, mais da metade deles apresentou tempo inferior a duas horas por dia para o uso de computador e videogame.*

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

1 Federal University of Santa Catarina. Florianópolis, SC. Brazil.

2 Federal Institute of Ceará. Campus Boa Viagem. Boa Viagem, CE. Brazil.

Received: May 30, 2018
Accepted: July 20, 2018

INTRODUCTION

Sedentary behavior is defined as any human activity that requires an expenditure of less than 1.5 METs to perform[1] and represents most of the activities that constitute the lifestyle of young people[2]. Excessive time in sedentary behavior has been associated with obesity[3], increased blood pressure[4], and lower cardiorespiratory fitness[5]. Guidelines have been created in order to reduce negative consequences for health, with recommendation of a maximum time of sedentary behavior of less than two hours to be permitted to children and adolescents, specifically directed at screen activities (e.g., TV viewing, playing videogames, using a computer)[4].

A study has shown that estimates of sedentary behavior in the young population have increased significantly around the world[6]. Another study involving 5,844 children from twelve countries observed that children spend an average of 8.6 hours in sedentary behavior, and 54.2% of them did not meet the recommendation[6]. According to a Brazilian survey, 60% of elementary school students reported watching TV for more than two hours a day[7]. Data from several European and North American countries have shown that 68% of girls and 66% of boys spend two or more hours a day watching TV[8]. Wide variability in the prevalence and changes of the investigated components was found in the aforementioned studies.

Exploring the prevalence of different components (screen time, TV viewing, sitting time) according to gender may help identify which indicators are more frequent in daily activities among children and adolescents[8]. Studying these questions helps and clarifies future directions of interventions and public policies aimed at reducing sedentary behavior among boys and girls[9]. Thus, the objective of the present investigation was to summarize studies that analyzed the prevalence of sedentary behavior in Brazilian children and adolescents up to 18 years of age.

METHODOLOGICAL PROCEDURES

Measured Outcome

In this review, sedentary behavior was characterized by an energy expenditure ≤1.5 metabolic equivalent, while 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; and sitting time) and objective measures were included.

Study Search Strategies

A systematic search was performed in the following 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 in February 2018. 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. The searches of the electronic databases were supplemented with a screening of the reference list of retrieved articles in order to find potentially relevant titles.

Selection process

The initial selection was based on the titles of manuscripts, and when there was uncertainty, on the abstract. After this step, articles were obtained in the full text version and subsequently analyzed according to established selection criteria, and the reference lists of the articles were evaluated. All of these steps were performed independently and conducted by two pairs of reviewers (PCS/AC and AB/LM), and a third pair of senior reviewers (KS/VB) helped when there were disagreements.

Selection criteria

To be eligible for inclusion in this systematic review, studies needed to be: (I) original research published in peer-reviewed journals (dissertations and monographs were not included because it was impractical to systematically search them); (II) samples including Brazilian children and adolescents aged 0-18 years (or a mean age within this range) or a sample comprising other age years (when data had been presented 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 different methods for sedentary behavior assessment (e.g., self-report, structured interviews, objectively measured sedentary behavior, and steps per day); and (V) studies showing the prevalence of at least one component of sedentary behavior (e.g., TV viewing, use of computer and videogames, and time in the sitting position).

Data extraction and Analysis

Data extraction was performed by four authors (PCS/AC and AB/LM), half of the references were read by each pair, and a third author (KS or VB) helped when the article did not report the information clearly. The prevalence of sedentary behavior was extracted always in a positive way according to the established cut-off point of each article. For instance, if the article established a cut-off point >2 hours/day of TV viewing, we extracted the prevalence of those who spent less than 2 hours in this behavior. In addition, articles from the same study were coupled in order to avoid duplication of information. Therefore, information from the same study but in different articles, such as cut-off point and strata, was reported in the review, making it clear that they were different articles from the same investigation.

The prevalence of meeting the sedentary behavior recommendations is presented for the sample as a whole and according to gender. The included articles were organized into tables according to the criteria used to identify

the prevalence of sedentary behavior in alphabetical order considering the location of the studies. Additionally, data of its components (watching TV, videogame and computer use) were presented.

RESULTS

The results are summarized in the flowchart in Figure 1. The initial search of eight databases located 1,490 potential articles. After removal of duplicate articles 1096 records remained. Next, titles and abstracts were read, 171 full papers were selected for further review, and 9 other studies were located in the reference lists of these articles. After reviewing the full content of the articles, 76 were excluded (see supplementary material 2) and 104 met the inclusion criteria.

The 104 original studies included were published from 2004[10] to 2018[11,12] and an interval from 2001 to 2015 was observed for the year of data collection. When different articles were found to report results about the same investigation, the articles were grouped, for a total of 81 studies. There was a greater concentration of studies in the southern (n= 41) and northeastern (n= 18) regions, while few studies were carried out in the southeast (n= 12), north (n= 4), or central-west (n= 3), or involved a national scope (n= 3).

Regarding the components of sedentary behavior investigated, TV viewing (n= 36) and screen time (n= 32) were those more investigated in the articles included, followed by computer (n= 22) and videogame (n= 7) use. Few studies[11,13–17] investigated other components of sedentary behavior such as indicators that did not involve screen time.

All samples were considered to be representative, ranging from 328 to 60,973 participants. Age range varied among studies. Younger children were less investigated, with only three studies including children under seven years.[18–20] The age range more investigated was 10 to 19 years.[11–13,21–100] Most of the studies used self-reported questionnaires, but less than half the studies reported information about instrument validity.[9,14,17,18,30–33,36,42,52–54,59–62,65,67–70,73–75,77–81,86,93,94,97,99–106] Only three studies assessed sedentary behavior using accelerometers.[11,15,16]

The cut-off point used in the studies varied considerably from 2 to 4 hours, although most studies used cut-off point of 2 hours of screen time: 20 studies[18,20,21,27,30–33,37,38,41,46,49,52,53,55,57,59,101,107]; for TV viewing: 21 studies[10,19,20,25,33,51,61,65,68,69,71,73,74,76,80,83,84,87,88,94,102]; for computer use: 11 studies[11,19,20,33,51,61,65,76,83,84,87]; and for videogame use: 4 studies[11,20,21,87], followed by cut-off point of 4 hours (screen time: 7 studies[11,12,43,56,58,104,108]; TV viewing: 8 studies;[10,11,13,58,67,70,85,93] computer use: 4 studies;[12,13,58,85] videogame use: 1 study[12]). Six studies[11,18,63,66,83,99] investigated different categories of hours a day or week for components of the sedentary behavior.

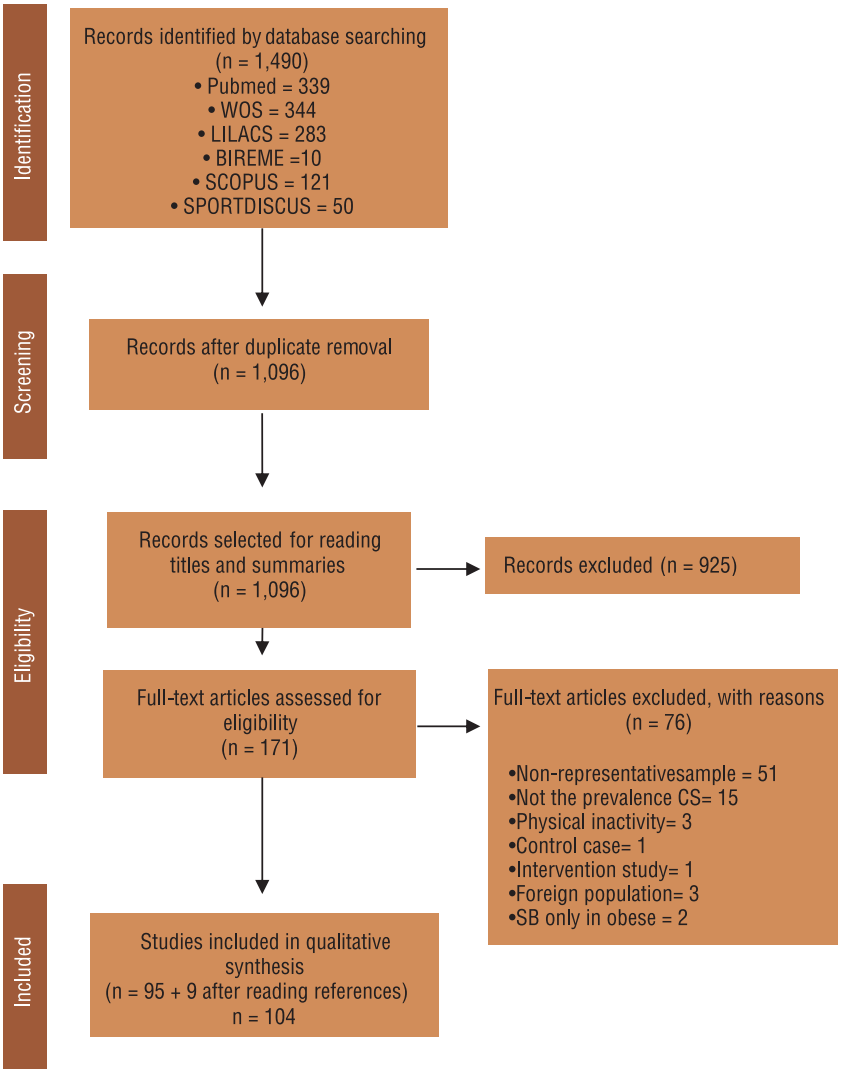

Figure 1. Flowchart of the studies through the phases of the systematic review.

Table 1. Characteristics of the original studies about sedentary behavior among Brazilian children and adolescents included in the present review.

Reference	Location (survey year)	Sample type	Sample (of girls)	Age (years)	Instrument; Mode of administration; recall time
Total Screen Time					
Lima et al.[12] Sousa and Silva[21] Lima and Silva[22] Nunes et al.[23] Gonçalves et al.[24] Castro et al.[25]	São José. SC (2014)	School-based	1103 (54.5)[12] 1085 (54.9)[21] 866 (53.2)[22] 916 (55.4)[23] 879 (n.a.)[24] 930 (52.6)[25]	10-19	Undefined Questionnaire; Self-reported; Habitual day[12,21,24] Self-reported; Previous week[22] Self-reported; n.a.[23,25]
Mielke et al.[11] Schaefer et al.[26] Bergman et al.[27] Dumith et al.[28] Duquia et al.[29]	Pelotas. RS (2004, 2008 and 2011)[11,27] 2004 and 2011[26] 2004 and 2008[28] 2004[29]	Cohort	4452 (50.9), 4349 (51.2), 4106 (50.9)[18,8,19] 4047 (51.0)[27] 4218 (51.0)[28] 4452 (51.0)[29]	11, 15 and 18	Questionnaire; Self-reported; Habitual week Accelerometer: non-dominant wrist for 4-7 days, for 24 h a day, including at least one weekend day
Pinho et al.[30]	Florianópolis. SC (2012-2013)	School-based	963 (59.0)	11-14	Undefined Questionnaire (v); Self-reported; Habitual day
Costa et al.[31]	Campina Grande. PB (2012-2013)	School-based	576 (66.8)	16.8	Q-GSHS (v); Self-reported; Habitual day

Continue...

... continue

Reference	Location (survey year)	Sample type	Sample (of girls)	Age (years)	Instrument; Mode of administration; recall time
Lourenço et al.[32]	Uberaba. MG (2015)	School-based	1,009 (55.0)	14-19	Questionnaire (removed from COMPAC); Self-reported; n.a.
Silva et al.[33]	Caruaru. PE (2014)	School-based	481 (54.1)	14-19	Undefined Questionnaire (v); Self-reported; Habitual week
Pereira et al.[34] Silva et al.[35]	Uruguaiana. RS (2011)	School-based	1,455 (50.9)	10-17	Undefined Questionnaire; Self-reported; n.a.
Cureau et al.[101] Oliveira et al.[36]	Brazil (2013-2014)	School-based	36,956 (60.0)[101] 74,589 (55.3)[36]	12-17	Undefined Questionnaire (v); Self-reported; Habitual day
Geremia et al.[109]	Bento Gonçalves. RS (n.a.)	School-based	590 (58.5)	8-18	Undefined Questionnaire; Self-reported; n.a.
Padro et al.[37]	Viçosa. MG (n.a.)	Cross-sectional	676 (55.9)	10-19	Undefined Questionnaire; Self-reported; n.a.
Christofaro et al.[39] Christofaro et al.[38]	Londrina. PR (2011)	School-based	1231 (58.2)	15.5	Undefined Questionnaire; Self-reported; Habitual day
Coledam et al.[40] Coledam et al.[41]	Londrina. PR (2012)	School-based	738 (53.4)[40] 753 (52.5)[41]	10-17	Undefined Questionnaire; Self-reported; Habitual day
Beck et al.[42]	Três de Maio. RS (2006)	School-based	660 (52.0)	14-18	Undefined Questionnaire (v); Self-reported; Habitual day
Dias et al.[43]	Cuiabá. Mato Grosso (2009 e 2011)	School-based	1716 (49.3)	10-14	Undefined Questionnaire; Self-reported; Habitual week
Moraes et al.[44] Moraes et al.[45] Moraes and Falcão[46]	Maringá. PR (2007)	School-based	682 (54.2)[44] 991 (54.5)[45,46]	14-18	Undefined Questionnaire; Self-reported; Habitual day
Santos et al.[9]	Uberaba. MG (2012)	School-based	649 (52.1)	9-12	Questionnaire (v); Parental-reported (proxy); n.a.
Vasconcelos et al.[47]	Niterói. RJ (2010)	School-based	328 (67.2)	10-18	Undefined Questionnaire; Self-reported; Habitual day
Bergman et al.[48]	Uruguaiana. RS (2011)	School-based	1455 (50.9)	10-17	Undefined Questionnaire; Self-reported; Habitual day
Lucena et al.[49] Martins et al.[50] Farias Junior et al.[51]	João Pessoa. PB (2009)	Shool-based	2874 (57.8)[49,51] 2859 (57.8)[50]	10-19	Undefined Questionnaire; Self-reported; Habitual week
Costa and Assis[20]	Florianópolis. SC (2002)	School-based	2936 (48.8)	7-10	Undefined Questionnaire; Parental-reported; Habitual day
Legnani, et al.[52]	Toledo. PR (2007)	School-based	669 (49.9)	10-15	Q-GSHS (v); Self-reported; Previous week
Mazaro et al.[107]	Sorocaba. SP (2009)	School-based	680 (51)	7-11	Undefined Questionnaire; Self-reported; n.a.
Legnani et al.[53] Legnani et al.[54]	Foz do Iguacu. PR (2005)	School-based	453 (59.2)	15-18	Q-GSHS (v); Self-reported; Previous week
Oliveira et al.[18]	São Luís. MA (2005)	School-based	592 (50.5)	3-16	SAPAC; Self-reported; Previous day
Cimadon et al.[110]	Bento Gonçalves. RS (n.a.)	School-based	590 (58.5)	9-18	Undefined Questionnaire; n.a.
Lancarotte et al.[55]	São Paulo. SP (2010)	School-based	2,125 (50.5)	10-19	Undefined Questionnaire; Self-reported; n.a.
Molina et al.[108]	Vitória. ES (2010)	School-based	1,282 (58)	7-10	Undefined Questionnaire; Self-reported; n.a.
Moraes et al.[56]	Maringá. .PR (2007)	School-based	991 (54.5)	14-18	Undefined Questionnaire; Self-reported; n.a.
Vasques e Lopes[57]	Caxias do Sul. RS (2007)	School-based	1,675 (53.2)	11-17	Undefined Questionnaire; Self-reported; n.a.

Continue...

... continue

Reference	Location (survey year)	Sample type	Sample (of girls)	Age (years)	Instrument; Mode of administration; recall time
Castro et al.[58]	Rio de Janeiro. RJ (2003)	School-based	1684 (52.8)	13-18+	Undefined Questionnaire; Self-reported; n.a.
Silva et al.[59] Silva et al.[104] Silva et al.[61] Silva et al.[62] Lopes et al.[63]	State of Santa Catarina (2001 and 2011)	School-based	2001: 5.028 (59.3) 2011: 6,529 (57.8)	15-19	Undefined Questionnaire (v); Self-reported; Habitual week
Suñe et al.[64]	Capão da Canoa. RS (2004)	School-based	719 (50.2)	11-13	Undefined Questionnaire; Self-reported; n.a.
TV Watching Time					
Lima et al.[12] Sousa and Silva[21] Castro et al.[25]	São José. SC (2014)	School-based	1103 (54.5)[12] 1085 (54.9)[21] 930 (52.6)[25]	10-19	Undefined Questionnaire; Self-reported; Habitual day
Silva et al.[33]	Caruaru. PE	School-based	481 (54.1)	14-19	Undefined Questionnaire (v); Self-reported; Habitual week
Munaro et al.[65]	Jequié. BA (2015)	School-based	1,163 (57.9)	14-15	Questionnaire (v) (removed from COMPAC); Self-reported; n.a.
Regis et al.[13]	Recife. PE (2011)	School-based	6,234 (59.7)	14-19	Undefined Questionnaire; Self-reported; n.a
Silva et al.[111]	Criciúma. SC (2010)	School-based	1,081 (49.6)	10-14	Undefined Questionnaire; Self-reported; Habitual day
Silva et al.[67]	Londrina. PR (2011)	School-based	1,321 (55.2)	10-16	Undefined Questionnaire (v); Self-reported; n.a.
Bezerra et al.[69]	Manaus. AM (2011)	School-based	864 (54.9)	14-19	Questionnaire (v) (removed from COMPAC); Self-reported; Habitual day
Bezerra Jorge et al.[68] Brito et al.[70]	Pernambuco (2006)	School-based	4,207 (40.2)	16.8	Q-GSHS (v); Self-reported; Habitual day
Melzer et al.[19]	Santos. SP (2010)	School-based	357 (45.9)	3-10	YRBS questionnaire (v); Self-reported; n.a
Fronza et al.[71]	São Bonifácio. SC (2010)	School-based	283 (46.6)	10-19	Undefined Questionnaire; Self-reported; Habitual day
Santos Martins et al.[72]	Fortaleza. CE (2011)	School-based	964 (51.5)	17-19	Undefined Questionnaire; Self-reported; Habitual day
Ferreira et al.[73]	Brazil (2012)	School-based	109,104 (52.2)	13-16	Q-GSHS; Self-reported; Habitual day
Dutra et al.[102]	Pelotas,.RS (2002)	Population-based	616 (n.a.)	8	PAQ-C; Parental-reported; Previous week
Silva et al.[74] Silva et al.[75]	Aracaju. SE (2011)	School-based	2,259 (62.3)	13-18	Self-reported; n.a.
Santos et al.[9]	Uberaba. MG (2012)	School-based	649 (52.1)	9-12	Questionnaire Life habits; Parental-reported (proxy); n.a.
Vitta et al.[76]	Bauru. SP (2009)	School-based	524 (46.9)	10-14	Undefined Questionnaire; Self-reported; n.a.
Vasconcelos et al.[47]	Niterói. RJ (2010)	School-based	328 (67.2)	10-18	Undefined Questionnaire; Self-reported; Habitual day
Lucena et al.[49] Martins et al.[50] Farias Junior et al.[51]	João Pessoa. PB (2009)	Shool-based	2874 (57.8)[49,51] 2859 (57.8)[50]	10-19	Undefined Questionnaire; Self-reported; Habitual week
Barbosa Filho et al.[77] Barbosa Filho et al.[78]	Curitiba. PR (2011)	School-based	1,555 (52.6)[77] 1,628 (47.5)[78]	11-17.9	Q-GSHS (v); Self-reported; n.a.
Costa and Assis[20]	Florianópolis. SC (2002)	School-based	2936 (48.8)	7-10	Undefined Questionnaire; Parental-reported; Habitual day

Continue...

... continue

Reference	Location (survey year)	Sample type	Sample (of girls)	Age (years)	Instrument; Mode of administration; recall time
Camelo et al.[79] Hallal et al.[80] Malta et al.[81]	Brazilian capitals and Federal District (2009)	School-based	59,809 (52.7)[79] 60,973 (n.a)[80,81]	13-16 [79] 13-15 [80,81]	Questionnaire (v); Self-reported; Habitual day[79] Questionnaire (v); Self-reported; Habitual week [80,81]
Alves et al.[82]	Salvador. BA (n.a)	School-based	803 (50.6)	10-14	Undefined Questionnaire; Self-reported; n.a.
Farias et al.[83]	Rio Bran.co. AC (2009)	School-based	741 (54.1)	14-18	Undefined Questionnaire; Self-reported; n.a.
Vitta et al.[84]	Bauru. SP (2007)	School-based	1236 (51.7)	11-14	Undefined Questionnaire; Self-reported; n.a.
Fermino et al.[85]	Curitiba. PR (2006)	School-based	1518 (59.2)	14-18	Undefined Questionnaire; Self-reported; Habitual week
Rivera et al.[103]	Maceió. AL (2001)	School-based	1,253 (56.3)	7-17	PAQ-C (v); Self-reported; n.a.
Tenório et al.[86]	Permambuco (2006)		4210 (59,8)	10-20	Q-GSHS (v); Self-reported; Previous week
Pelegrini et al.[87]	Florianópolis. SC (2007)	School-based	NR (67)	14-18	Undefined Questionnaire; Self-reported; n.a.
Silva et al.[60]	Aracaju. SE (NR)	School-based	1,118 (56.7)	Mean: 15,25	PAQ-C (v); Self-reported; n.a
Mielke et al.[11] Wells et al.[88] Hallal et al.[89] Dumith et al.[90]	Pelotas. RS (2004, 2008 and 2011) 2004 e 2005	Cohort	4452 (50.9) 4349 (51.2) 4106 (50.9)[11,88] 4,452 (49.2)[89] 4431 (n.a.)[90]	10-12[11] 11, 15 and 18[88] 10-12[89] 11.0 [90]	Questionnaire; Self-reported; Habitual week Accelerometer: non-dominant wrist for 4–7 days, for 24 h a day, including at least one weekend day Self-reported; n.a. [89] Self-reported; Habitual day[90]
Fernandes et al.[91] Fernandes et al.[92]	Presidente Prudente. SP (2007)	School-based	1630 (54.0)	11-17	Questionnaire Baecke (v); Self-reported: previous 4 months
Campagnolo et al.[94] Campagnolo et al.[93]	São Leopoldo. RS (2002-2003)	Population-based	722 (59.4)	10-19	7-DPAR (v); Self-reported; Previous week
Castro et al.(2008)[58]	Rio de Janeiro. RJ (2003)	School-based	1684 (52.8)	13-18+	Undefined Questionnaire; Self-reported; n.a.
Silva et al.[59] Silva et al.[104] Silva et al.[61] Silva et al.[62] Lopes et al.[63]	Santa Catarina (2001 e 2011)	School-based	2001: 5.028 (59,3) 2011: 6,529 (57.8)	15-19	Undefined Questionnaire (v); Self-reported; Habitual week
Detsch et al.[95]	São Leopoldo. RS (2004)	School-based	495 (100.0)	14-18	Undefined Questionnaire; Self-reported; n.a.
Costa et al.[10]	Teixeira de Freitas. BA (2001)	School-based	354 (38.4)	17-19	Undefined Questionnaire; Self-reported; n.a.
Computer Use Time					
Mielke et al.[11] Hallal et al[89] Dumith et al.[90]	Pelotas. RS (2004, 2008 and 2011)	Cohort	4,452 (50.9), 4,349 (51.2), 4,106 (50.9)[11] 4,452 (49.2)[89] 4431 (n.a.)[90]	11, 15 and 18[11] 11-12[89] mean 11.0[90]	Self-reported; Habitual week Accelerometer: non-dominant wrist for 4–7 days, for 24 h a day, including at least one weekend day Self-reported; n.a.[89]
Lima et al.[12] Sousa and Silva[21] Castro et al.[25]	São José. SC (2014)	School-based	1103 (54.5)[12] 1085 (54.9)[21] 930 (52.6)[25]	10-19[12,21] 16.1[25]	Undefined Questionnaire; Self-reported; Habitual day[12,21] Self-reported; n.a.[25]
Silva et al.[33]	Caruaru. PE	School-based	481 (54.1)	14-19	Undefined Questionnaire (v); Self-reported; Habitual week
Munaro et al.[65]	Jequié. BA (2015)	School-based	1,163 (57.9)	14-15	Questionnaire (v) (removed from COMPAC); Self-reported; n.a.
Regis et al.[13]	Recife. PE (2011)	School-based	6,234 (59.7)	14-19	Undefined Questionnaire; Self-reported; n.a.

Continue...

... continue

Reference	Location (survey year)	Sample type	Sample (of girls)	Age (years)	Instrument; Mode of administration; recall time
Silva et al. [66]	Recife. PE (2011)	School-based	961 (61.6)	14-19	Undefined Questionnaire; Self-reported; n.a
.Bezerra et al.[69]	Manaus. AM (2011)	School-based	864 (54.9)	14-19	Questionnaire (removed from COMPAC); Self-reported; Habitual day
Santos Martins et al. [72]	Fortaleza. CE (2011)	School-based	964 (51.5)	17-19	Undefined Questionnaire; Self-reported; Habitual day
Melzer et al.[19]	Santos. SP (2010)	School-based	357 (45.9)	3-10	YRBS questionnaire (v); Self-reported; n.a.
Barbosa Filho et al.[77]	Curitiba. PR (2011)	School-based	1,555 (52.6)	11-17.9	Q-GSHS; Self-reported; n.a.
Vasconcelos et al.[47]	Niterói. RJ (2010)	School-based	328 (67.2)	10-18	Undefined Questionnaire; Self-reported; Habitual day
Santos et al.[9]	Uberaba. MG (2012)	School-based	649 (52.1)	9-12	Questionnaire Life habits (v); Parenal-reported (proxy); n.a
Vitta et al.[76]	Bauru. SP (2009)	School-based	524 (46.9)	10-14	Questionnaire; Self-reported; n.a.
Lucena et al. [49] Martins et al. [50] Farias Junior et al. [51]	João Pessoa. PB (2009)	Shool-based	2874 (57.8)[49,51] 2859 (57.8)[50]	10-19	Undefined Questionnaire; Self-reported; Habitual week
Costa and Assis[20]	Florianópolis. SC (2002)	School-based	2936 (48.8)	7-10	Undefined Questionnaire; Parental-reported; Habitual day
Farias et al. [83]	Rio Branco. AC (2009)	School-based	741 (54.1)	14-18	Undefined Questionnaire; Self-reported; n.a.
Vitta et al. [84]	Bauru. SP (2007)	School-based	1236 (51.7)	11-14	Undefined Questionnaire; Self-reported; n.a.
Fermino et al.[85]	Curitiba. PR (2006)	School-based	1518 (59.2)	14-18	Undefined Questionnaire; Self-reported; Habitual week
Pelegrini et al.[87]	Florianópolis. SC (2007)	School-based	n.a. (67)	14-18	Undefined Questionnaire; Self-reported; n.a.
Silva et al. [59] Silva et al.[104] Silva et al.[61] Silva et al.[62] Lopes et al.[63]	State of Santa Catarina (2001 e 2011)	School-based	2001: 5.028 (59,3) 2011: 6,529 (57.8)	15-19	Undefined Questionnaire (v); Self-reported; Habitual week
Castro et al.[58]	Rio de Janeiro. RJ (2003)	School-based	1684 (52.8)	13-18+	Undefined Questionnaire; Self-reported; n.a.
Detsch et al.[95]	São Leopoldo. RS (2004)	School-based	495 (100.0)	14-18	Undefined Questionnaire; Self-reported; n.a.
Videogame					
Mielke et al.[11] Hallal et al.[89] Dumith et al.[90]	Pelotas. RS (2004, 2008 and 2011) 2004-2005[84,85]	Cohort	4,452 (50.9), 4,349 (51.2), 4,106 (50.9)[11] 4,452 (49.2)[89] 4431 (n.a.)[90]	11, 15 and 18[11] 10-12[89]	Undefined Questionnaire; Self-reported; Habitual week Accelerometer: non-dominant wrist for 4–7 days, for 24 h a day, including at least one weekend day Self-reported; n.a[89]
Lima et al.[12] Sousa and Silva[21] Castro et al.[25]	São José. SC (2014)	School-based	1103 (54.5)[12] 1085 (54.9)[21] 930 (52.6)[25]	10-19[12,21] 16.1[25]	Undefined Questionnaire; Self-reported; Habitual day[12,21] Self-reported; n.a.[25]
Silva et al.[33]	Recife. PE (2011)	School-based	961 (61.6)	14-19	Undefined Questionnaire; Self-reported; n.a.
Santos et al.[9]	Uberaba. MG (2012)	School-based	649 (52.1)	9-12	Questionnaire Hábitos de Vida (v); Parental-reported (proxy); n.a.

Continue...

... continue

Reference	Location (survey year)	Sample type	Sample (of girls)	Age (years)	Instrument; Mode of administration; recall time
Vasconcelos et al.[47]	Niterói. RJ (2010)	School-based	328 (67.2)	10-18	Undefined Questionnaire; Self-reported; Habitual day
Costa and Assis [20]	Florianópolis. SC (2002)	School-based	2936 (48.8)	7-10	Undefined Questionnaire; Parental-reported; Habitual day
Pelegrini et al.[87]	Florianópolis. SC (2007)	School-based	(67)	14-18	Undefined Questionnaire; Self-reported; n.a.
Other Sedentary Behaviors					
Mielke et al.[11]	Pelotas. RS (2004, 2008 and 2011)	Cohort	4,452 (50.9), 4,349 (51.2) 4,106 (50.9)	11, 15 and 18	Self-reported; Habitual week Accelerometer: non-dominant wrist for 4–7 days, for 24 h a day, including at least one weekend day
Regis et al.[13]	Recife. PE (2011)	School-based	6,234 (59.7)	14-19	Undefined Questionnaire; Self-reported; n.a.
Silva et al.[96] Silva et al.[112]	Aracaju. SE (2011)	School-based	3,992 (61.3)	14-19	Undefined Questionnaire; Self-reported; Habitual day
Felden et al.[113]	Maravilha. SC (n.a.)	School-based	516 (50.1)	10-19	IPAQ (v); Self-reported; Habitual day
Alexandre et al.[97]	Cuiaba. MT (2011)	Population-based	399 (59.0)	12-19	Q-GSHS (v); Self-reported; Habitual day
Barbosa et al.[15]	Londrina. PR (2013)	School-based	370 (50.6)	4-6	Accelerometer; School day
Bezerra et al.[69]	Manaus. AM (2011)	School-based	864(54.9)	14-19	COMPAC 2 (v); Self-reported; Habitual day
Farah et al.[98]	PE (2011)	School-based	4619 (60.4)	14-9	Undefined Questionnaire; Self-reported; Habitual day
Hildebrand et al.[16]	Pelotas. RS (2006-2007)	Cross-sectional and observational	10,793 (53) Pelotas: 426 (47)	13-14	Accelerometer; 24 hours wear protocol
Ferreira et al.[105] Azeredo et al.[99] Rezende et al.[114]	Brazil (2012)	School-based	109, 104 (52.2)	13-16	Q-GSHS (v); Self-reported; Habitual day
Guimarães et al.[115]	Curitiba. PR (2011)	School-based	572 (57)	12-17.9	QASA (v); Self-reported; Previous week
Guedes and Souza[17]	João Pessoa. PB (2008)	School-based	1,268 (50.3)	15-18	IPAQ (v); Self-reported; Previous week

Note. States of Brazil: AC: Acre; AM: Amazonas; SE: Sergipe; AL: Alagoas; CE: Ceará; PE: Pernambuco; BA: Bahia; MA: Maranhão; MG: Minas Gerais; MT: Mato Grosso; PR: Paraná; ES: Espírito Santo; RJ: Rio de Janeiro; SP: São Paulo; SC: Santa Catarina; RS: Rio Grande do Sul. Undefined Questionnaire (v): Undefined Questionnaire Validated; 1DPAR: 1-day physical activity record; HA-D: habitual day; HA-W: habitual week; n.a.: not available; PAR-Q: Physical Activity Questionnaire for Older Children; PR-D: previous day; PR-W: previous week; PR-4M: previous 4 months; Q-GSHS: questionnaires based on Global School-based Student Health Survey and/or YRBS: Youth Risk Behaviors Surveillance instruments; 7-DPAR: 7-day Physical Activity Recall Scale; SAPC: Self-Administered Physical Activity Checklist; PAQ-C: physical activity questionnaire for children and adolescents.

In this review, the results were synthetized according to the components of the sedentary behavior used, considering a cut-off-point of 2 hours. In general, no specific trend was observed in the results, with 9.4%[116] to 68%[53] of adolescents, for example, meeting the recommended screen time of 2 hours/day. In summary, most of the studies reported a prevalence of less than 50% of youths that met the recommendation. Considering sex, the prevalence was similar for boys (range: 4.4%[46] to 60.8%[53]) and girls (range: 3.1%[46] to 65.7%[53]) (Table 2).

For TV time, the range for adolescents who met the recommendations was 16.8%[69] to 67.2%[65]. For this component, most of the studies also reported a prevalence below 50% of subjects meeting the recommendation. Among girls, all studies showed a prevalence of less than 50% of adolescents who met the

recommendation (prevalence range: 20.5%[80] to 58.4%[68]) while for boys, three studies reported a prevalence higher than 50% (prevalence range: 20.5%[71,80] to 56.3%[10]) (Table 2).

Regarding computer use, most studies showed a higher prevalence of youths that met recommendations. In nine[11,19,20,33,51,65,84,87,116] out of eleven studies, the prevalence of youths that met recommendations was higher than 50% (prevalence range: 39.1%[83] to 97.7%[11]). Regarding girls, seven[12,20,51,69,84,87,116] out of eight studies reported a prevalence above 50% of subjects who met recommendations (prevalence range: 43.1%[116] to 98.0%[20]), whereas among boys five[20,51,84,87,116] out of eight studies reported that more than 50% met recommendations (prevalence range: 34.4%[116] to 85%[20]) (Table 2).

Four studies[11,20,25,87] included in this review investigated videogame use. The prevalence of youths who met recommendations was higher than 50% in three[11,20,25] of the four studies analyzed (prevalence range: 47.7%[87] to 98.0%[20]). Three studies[20,21,87] investigated the prevalence stratified by sex: for girls the range was of 51.6%[87] to 100%[87], and for boys, the range was of 39.8%[87] to 92.0%[20] of adolescents who met recommendations (Table 2).

Table 2. Description of the prevalence of sedentary behaviors among Brazilian children and adolescents.

Reference	Location (survey year)	Definition	Prevalence of Sedentary Behavior		
			All	Boys	Girls
Total Screen Time					
Lima et al.[12] Lima and Silva[22] Nunes et al.[23]	São José. SC (2014)	< 4 hours/day[12,22,23]	17.6[12] 13.8[22] 12.6[23]		
Sousa and Silva[21] Gonçalves et al.[24] Castro et al.[25]	São José. SC (2014)	< 2 hours/day[21,24,25]	13.6[21] 14.6[24] 12.8[25]	9.1[21]	17.3[21]
Mielke et al.[11] Duquia et al.[29]	Pelotas. RS (2004 and 2011)[11] 2004[29]	< 4 hours/day[11,29]	11 years: 56.8 15 years: 47.3 18 years: 50.6[11] 49.5[29]		
Schaefer et al.[26] Bergman et al.[27]	Pelotas. RS (2004. 2008 and 2011)[26,27]	< 2 hours/day[26,27]	11 years: 15.5 18 years: 14.0[26] 11 years: 25.0 12 years: 19.8 13 years: 22.6[27]	11 years: 15.7 18 years: 13.5[26]	11 years: 15.2 18 years: 14.6[26]
Dumith et al.[28]	Pelotas. RS (2004 and 2008)[2]8	Mean (min/day)[28]	256[28]		
Pinho et al.[30]	Florianópolis. SC (2012-2013)	≤ 2 hours/day	60.9	55.4	64.5
Costa et al.[31]	Campina Grande. PB (2012-2013)	< 2 hours/day	n.a.	24.6	20.3
Lourenço et al.[32]	Uberaba. MG (2015)	< 2 hours/day	18.1		
Silva et al.[33]	Caruaru. PE (2014)	< 2 hours/day	42.1		
Pereira et al.[34] Silva et al.[35]	Uruguaiana/RS (2011)	< 3 hours/day	35.8[34]	38.2[35]	33.5[35]
Oliveira et al.[36] Cureau et al.[101]	Brazil (2013-2014)	≤ 2 hours/day	26.5[36] 40.5[101]	25.6[36]	27.7[36]
Geremia et al.[109]	Bento Gonçalves. RS (n.a.)	Mean (hours/day)	5.3 ± 2.8	5.6 ± 2.9	5.2 ± 2.8

Continue...

... continue

Reference	Location (survey year)	Definition	Prevalence of Sedentary Behavior		
			All	Boys	Girls
Prado et al.[37]	Viçosa. MG (n.a.)	≤ 2 hours/day	35.2	58.4	41.6
Christofaro et al.[38] Christofaro et al.[39]	Londrina. PR (2011)	< 2 hours/day	10.0[39]	6.2[38]	12.8[38]
Coledam et al.[40] Coledam et al.[41]	Londrina. PR (2012)	< 2 hours/day	36.5[41]	33.7[40]	23.6[40]
Beck et al.[42]	Três de Maio. RS (2006)	Mean (hours/day)	4.4 ± 2.4	4.2 ± 2.5	4.5 ± 2.2
Dias et al.[43]	Cuiabá. MT (2009 and 2011)	< 4 hours/day	41.9	43.2	40.5
Moraes et al.[44]	Maringá. PR (2007)	Cluster: Sedentary[44]	n.a.	44.7[44]	17.8[44]
Moraes et al.[45]	Maringá. PR (2007)	Mean (hours/day)[45]	n.a.	7.1[45]	6.0[45]
Moraes and Falcão[46]	Maringá. PR (2007)	< 2 hours/day[46]	n.a.	4.4[46]	3.1[46]
Santos et al.[9]	Uberaba-MG (2012)	Mean (min/day)	225.0 ± 195.0	240.0	195.0
Vasconcelos et al.[47]	Niterói. RJ (2010)	Mean (hours/week)	n.a.	41.2 ± 2.2	38.8 ± 1.4
Bergman et al.[48]	Uruguaiana. RS (2011)	≤ 3 hours/day	35.8	n.a.	n.a.
Lucena et al.[49]	João Pessoa. PB (2009)	≤ 2 hours/day	20.5	15.7	23.9
Costa and Assis[20]	Florianópolis. SC (2002)	< 2 hours/day	Public school: 22.0 Private school: 21.0	Public school: 19.0 Private school: 17.0	Public school: 25.0 Private school: 24.0
Legnani et al.[52]	Toledo-PR (2007)	< 2 hours/day	52.3	10-12 years: 54.7 13-15 years: 43.7	10-12 years: 55 13-15 years: 56.7
Mazaro et al.[107]	Sorocaba-SP (2009)	< 2 hours/day	35.0		
Legnani et al.[53] Legnani et al.[54]	Foz do Iguacu-PR (2005)	< 2 hours/day	68.0[53] 67.2[54]	60.8[53]	65.7[53]
Oliveira et al.[18]	São Luís. MA (2005)	≤ 2 hours/day	46.1	n.a.	n.a.
Cimadon et al.[110]	Bento Gonçalves. RS (n.a.)	< 5 hours/day	57.5	n.a.	n.a.
Lancarotte et al.[55]	São Paulo-SP (2010)	< 2 hours /day	n.a	34.1	29.5
Molina et al.[108]	Vitória-ES (2010)	< 4 hours/day	51.3	46.2	55
Moraes et al.[56]	Maringá-PR (2007)	< 4 hours/day	18.3		
Vasques and Lopes[57]	Caxias do Sul. RS (2007)	< 2 hours/day	13.4	10.4	16
Castro et al.[58]	Rio de Janeiro. RJ (2003)	< 4 hours/day	28.3	28.1	28.5
Silva et al.[61]	Santa Catarina State (2001 e 2011) 2011	< 2 hours/day[59,61]	2001: 24.0 2011: 9.4[61]	2001: 23.2 2011: 9.1[61] 15 years: 27.5 16 years: 25.2 17 years: 27.2 18 years: 24.9 19 years: 28.9[59]	2001: 24.5 2011: 9.7[61] 15 years: 27.0 16 years: 25.8 17 years: 30.1 18 years: 27.3 19 years: 29.1[59]
Silva et al.[59]					
Silva et al.[104] Silva et al.[62]	State of Santa Catarina (2001 e 2011)	< 4 hours/day[104, 62]	61.5[104]	37.7[104] 39.0[62]	39.1[104] 40.4[62]
Suñe et al.[64]	Capão da Canoa. RS (2004)	< 4.5 hours/day	68.6		
TV Watching Time					
Sousa and Silva[21] Castro et al.[25]	São José. SC (2014)	< 2 hours/day[21,25]	48.4[21] 21.4[25]	52.8[21]	44.8[21]
Silva et al.[33]	Caruaru. PE (2014)	< 2 hours/day	28.3		
Munaro et al.[65]	Jequié – BA (2015)	< 2 hours/day	67.2		

Continue...

... continue

Reference	Location (survey year)	Definition	Prevalence of Sedentary Behavior		
			All	Boys	Girls
Regis et al.[13]	Recife-PE (2011)	< 4 hours/day	86.5		
Silva et al.[111]	Criciúma- SC (2010)	Mean (min/day)	n.a.	6.0 ±3.0	6.0 ±3.0
Silva et al.[67]	Londrina-PR (2011)	< 4 hours/day	55.0	55.6	54.5
Bezerra et al.[69]	Manaus. AM (2011)	≤ 2 hours/day	n.a.	Weekdays: 39.3 Weekends: 40.3	Weekdays: 44.3 Weekends: 36.0
Bezerra et al.[68] Brito et al.[70]	Pernambuco State (2006)	≤ 2 hours/day[68] ≤ 4 hours/day[70]	Weekdays: 59.2[68] Weekend: 50.1[68] 81.3[70]	Weekdays: 60.3[68] Weekend: 46.0[68] 83.5[70]	Weekdays: 58.4[68] Weekend: 52.9[68] 79.8[70]
Melzer et al.[19]	Santos. SP (2010)	< 2 hours/day	16.8		
Fronza et al.[71]	São Bonifácio. SC (2010)	< 2 hours/day	Weekdays: 23.3 Weekend: 21.6	20.5	26.5
Martins et al.[72]	Fortaleza. CE (2011)	< 3 hours/day	48.9	49.5	50.5
Ferreira et al.[73]	Brazil (2012)	≤ 2 hours/day	36.3	n.a.	n.a.
Dutra et al.[102]	Pelotas. RS (2002)	< 2 hours/day	40.6	n.a.	n.a.
Silva et al.[74] Silva et al.[75]	Aracaju. SE (2011)	< 2 hours/day[74,75]	n.a.	33.2 [74] 33.8[75]	29 [74] 29.1 [75]
Santos et al.[9]	Uberaba. MG (2012)	n.a.	n.a.	Weekdays: 120 min/day Weekend: 180 min/day	Weekdays: 120 min/day Weekend: 180 min/day
Vitta et al.[76]	Bauru- SP (2009)	< 2 hours/day	29.2	29.2	29.5
Vasconcelos et al.[47]	Niterói. RJ (2010)	Mean (hours/week)	24.2	20.3 ± 1.3	26.1 ± 1.1
Martins et al.[50] Farias Junior et al.[51]	João Pessoa. PB (2009)	≤ 2 hours/day	26.8[50] Weekdays: 33.0[51] Weekend: 42.2[51]	25.8[50] Weekdays: 33.3[51] Weekend: 41.3[51]	27.7[50] Weekdays: 34.3[51] Weekend: 42.7[51]
Barbosa Filho et al.[77] Barbosa Filho et al.[78]	Curitiba. PR (2011)	< 3 hours/day	23.5[77] 71.2[78]	22.4[77] 68.6[78]	24.6[77] 73.7[78]
Costa and Assis[20]	Florianópolis. SC (2002)	< 2 hours/day	Public school: 32.0 Private school: 40.0	Public school: 34.0 Private school: 43.0	Public school: 30.0 Private school: 37.0
Camelo et al. [79] Hallal et al.[80] Malta et al. [81]	Brazil (2009)	≤ 2 hours/day	35.0[79] 20.8[80] 20.5[81]	37.0[79] 20.6[80] 20.6[81]	33.2[79] 20.5[80] 20.5[81]
Alves et al.[82]	Salvador. BA (n.a.)	< 3.3 hours/day	48.7	n.a.	n.a.
Farias et al..[83]	Rio Branco. AC (2009)	< 2 hours/day	60.1	n.a.	n.a.
de Vitta et al.[84]	Bauru. SP (2007)	≤ 2 hours/day	27.0	28.9	25.5
Fermino et al.[85]	Curitiba. PR (2006)	≤ 4 hours/day	70.0	71.6	68.8
Rivera et al.[103]	Maceió. AL (2001)	≤ 3 hours/day	35.0		
Tenório et al.[86]	Permambuco State (2006)	< 3 hours/day	59.1	46.0	52.9
Pelegrini et al.[87]	Florianópolis. SC (2007)	< 2 hours/day	43.5	53.6	41.6
Silva et al.[60]	Aracaju. SE (n.a.)	Mean (hours/day)	n.a.	5.50 ±3.54	5.70 ±4.16
Mielke et al.[11]	Pelotas. RS (2004. 2008 and 2011)	< 4 hours/day	11 years: 70.3 15 years: 76.9 18 years: 98.2		
Wells et al.[88]	Pelotas. RS (2004. 2008 and 2011)	≤ 2 hours/day	27.1	29.9	24.5

Continue...

... continue

Reference	Location (survey year)	Definition	Prevalence of Sedentary Behavior		
			All	Boys	Girls
Hallal et al.[89]	Pelotas. RS (2004. 2008 and 2011)	Tertil	1st tertile: 1579 (35.6) 2nd tertile 1401 (31.6) 3rd tertile 1457 (32.8)		
Dumith et al.[90]	Pelotas. RS (2004. 2008 and 2011)	Mean (min/day)	197.0	190.0	203.0
Fernandes et al.[91] Fernandes et al.[92]	Presidente Prudente. SP (2007)	TV viewing (use frequency: % low use= never and seldom)	n.a	70.8[91] 11.2[92]	56.0[91] 6.4[92]
Campagnolo et al.[94] Campagnolo et al.[93]	São Leopoldo. RS (2002-2003)	≤ 2 hours/day[94] ≤ 4 hours/day[93]	24.9[94] 59.0[93]	24.3[94] 59.7[93]	25.4[94] 58.3[93]
Castro et al.[58]	Rio de Janeiro. RJ (2003)	< 4 hours/day	44.3	49.7	39.5
Silva et al.[61] Lopes et al.[63]	Santa Catarina State (2001 e 2011)	< 2 hours/day[61,63]	2001: 23.2 2011:38.5[61]	2001: 23.3 2011: 41.4[61] 2001 Week: 52.8 Weekend: 29.4[63] 2011: Week:74.1 Weekend: 51.0[63]	2001: 23.3 2011: 36.2[61] 2001 Week: 49.3 Weekend: 26.1[63] 2011: Week: 63.7 Weekend: 49.3[63]
Detsch et al.[95]	São Leopoldo. RS (2004)	≤ 10 hours/week	n.a.	n.a.	67.5
Costa et al.[10]	Teixeira de Freitas. BA (2001)	< 2 hours/day	52.5	56.3	46.6
Computer Use Time					
Mielke et al.[11]	Pelotas. RS (2004. 2008 and 2011)	< 2 hours/day	11 years 97.7 15 years 78.8 18 years 73.4		
Hallal et al.[89]	Pelotas. RS (2004. 2008 and 2011)	< 1 hour/day	90.3		
Dumith et al.[90]	Pelotas. RS (2004. 2008 and 2011)	Mean (min/day)	17	20	13
Lima et al.[12] Castro et al.[25]	São José. SC (2014)	< 4 hours/day[12,25]	44.7[12] 31.3[25]		
Sousa and Silva[21]	São José. SC (2014)	< 2 hours/day[21]		37.7[21]	50.4[21]
Silva et al.[33]	Caruaru. PE (2014)	< 2 hours/day	43.7		
Munaro et al.[65]	Jequié. BA (2015)	< 2 hours/day	72.7		
Regis et al.[13]	Recife.PE (2011)	< 4 hours/day	90.5		
Silva et al.[66]	Recife-PE (2011)	Mean (hours/day)	5.5 (±2.1)	5.5 (±2.1)	5.5 (±2.1)
Bezerra et al.[69]	Manaus. AM (2011)	≤ 2 hours/day	n.a.	48.0	57.2
Martins et al.[72]	Fortaleza. CE (2011)	< 3 hours/day	78.2	45.0	55.0
Melzer et al.[19]	Santos. SP (2010)	< 2 hours/day	79.0		
Barbosa Filho et al.[77]	Curitiba. PR (2011)	< 3 hours/day	64.3	57.9	70.0
Vasconcelos et al.[47]	Niterói. RJ (2010)	Mean (hours/week)	n.a.	11.9 (±1.3)	10.6 (±0.9)
Santos et al.[9]	Uberaba. MG (2012)	Median (minutes/day)	n.a.	Weekdays: 15 Weekend: 30	Weekdays: 30 Weekend: 30
Vitta et al.[76]	Bauru. SP (2009)	< 2 hours/day	43.1	41.9	44.5
Farias Junior et al.[51]	João Pessoa. PB (2009)	≤ 2 hours/day	Weekdays: 61.3 Weekend: 60.8	Weekdays: 54.4 Weekend: 53.2	Weekdays: 66.4 Weekend: 66.3
Costa and Assis[20]	Florianópolis. SC (2002)	< 2 hours/day	Public school: 90.0 Private school: 96.0	Public school: 85.0 Private school: 92.0	Public school: 98.0 Private school: 94.0

Continue...

... continue

Reference	Location (survey year)	Definition	Prevalence of Sedentary Behavior		
			All	Boys	Girls
Farias et al.[83]	Rio Branco. AC (2009)	< 2 hours/day	39.1	n.a.	n.a.
Vitta et al.[84]	Bauru. SP (2007)	≤ 2 hours/day	68.3	58.2	76.9
Fermino et al.[85]	Curitiba. PR (2006)	≤ 4 hours/day	77.3	71.3	81.4
Pelegrini et al.[87]	Florianopolis. SC (2007)	< 2 hours/day	82.5	83.7	82
Silva et al.[61]	Santa Catarina State (2001 and 2011)	< 2 hours/day	2001: 62.1 2011: 39.4	2001: 58.9 2011: 34.4	2001: 64.6 2011: 43.1
Lopes et al.[63]	Santa Catarina State (2001 and 2011)	≤ 1 h		2001 Weekdays: 30.2 Weekend: 13.2 2011 Weekdays: 52.0 Weekend: 29.8	2001 Weekdays: 28.8 Weekend:9.7 2011 Weekdays: 44.2 Weekend: 30.3
Castro et al.[58]	Rio de Janeiro. RJ (2003)	< 4 hours/day	89.4	82.8	95.2
Detsch et al.[95]	São Leopoldo. RS (2004)	≤ 6 hours/week	n.a.	n.a.	82.8
Videogame					
Mielke et al.[11] Hallal et al..[89] Dumith et al.[90]	Pelotas. RS (2004. 2008 and 2011) 2004-2005[89,90]	< 2 hours/day[11] < 1 hour[89] Mean minutes/d[90]	11 years 93.5 15 years 92.8 18 years 94.6[11] 90.3[89] 36 min/d[90]	55 min/d[90]	18min/d[90]
Lima et al.[12]	São José. SC (2014)	< 4 hours/day[12]	84.6		
Sousa and Silva[21] Castro et al.[25]	São José. SC (2014)	< 2 hours/day[21,25]	72.0[25]	75.0[21]	92.5[21]
Silva et al. [33]	Recife. PE (2011)	Mean (hours/day)	2.37 ± 2.50	3.25 ± 2.55	1.82 ± 2.30
Santos et al.[9]	Uberaba. MG (2012)	Median (minutes/day)	n.a.	Weekdays: 30 Weekend: 60	Weekdays: 0 Weekend: 0
Vasconcelos et al.[47]	Niterói. RJ (2010)	Mean (hours/week)	n.a.	8.9 ± 1.0	2.1 ± 0.3
Costa and Assis[20]	Florianópolis. SC (2002)	< 2 hours/day	Public school: 98.0 Private school: 93.0	Public school: 85.0 Private school: 92.0	Public school: 96.0 Private school: 100.0
Pelegrini et al.[87]	Florianópolis.SC (2007)	< 2 hours/day	47.7	39.8	51.6
Other Sedentary Behaviors					
Mielke et al.[11]	Pelotas. RS (2004. 2008 and 2011)	Mean (hours/day)	11.5 (±1.5)		
Regis et al.[13]	Recife. PE (2011)	< 4 hours/day (sitting down with no screen)	85.4		
Silva et al.[96] Silva et al.[112]	Aracaju-SE (2011)	≤ 2 hours/day (sum of sitting time: TV viewing, videogame play, computer use, chatting with friends, play cards or domino)	53.3	50.6[96] 57.5[112]	57.5[96] 50.6[112]
Felden et al.[113]	Maravilha. SC (n.a.)	Mean minutes/day (sitting time)	382.2 ± 234.1	352.1 ± 225.8	413.6 ± 238.9
Alexandre et al.[97]	Cuiaba. MT (2011)	≤ 2 hours/day (sum of sitting time: TV viewing, videogame play, computer use, chatting with friends, play cards or domino)	45.1	n.a.	n.a.

Continue...

... continue

Reference	Location (survey year)	Definition	Prevalence of Sedentary Behavior		
			All	Boys	Girls
Barbosa et al.[15]	Londrina. PR (2013)	Mean minutes/week	n.a.	n.a.	n.a.
Farah et al.[98]	Pernambuco (2011)	< 3 hours/day (sum of sitting time: TV viewing, videogame play, computer use, chatting with friends, play cards or domino)	49.1	61.6	38.4
Hildebrand et al.[16]	Pelotas-RS (2006-2007)	Mean minutes/day	389.0 (±132.0)		
Ferreira et al.[105] Azeredo et al.[99] Rezende et al.[114]	Brazil (2012)	< 3 hours/day (sum of sitting time: TV viewing, videogame play, computer use, chatting with friends, play cards or other sitting activities)	38.0	40.9	35.4
Guimarães et al.[115]	Curitiba. PR (2011)	Median (minimum – maximum in minutes) (sum of time in sedentary activities: electronics, educational, transportation, cultural, social)	n.a.	12-13.9 years: 4800 (1590-12055) 14-15.9 years: 5215 (2224-8235) 16-17.9 years: 5458 (1336-8880)	12-13.9 years: 5305 (1940-10050) 14-15.9 years: 5065 (1605-10050) 16-17.9 years: 5135 (1785-9424)
Guedes and Souza[17]	João Pessoa. PB (2008)	Median Sitting (min./week) (time spent studying, working, relaxing, leisure, domestic activities)	n.a.	15 years: 2380 16 years: 2730 17 years: 3500 18 years: 4620	15 years: 3360 16 years: 4200 17 years: 5250 18 years: 6790

Note. States of Brazil: AC: Acre; AM: Amazonas; SE: Sergipe; AL: Alagoas; CE: Ceará; PE: Pernambuco; BA: Bahia; MA: Maranhão; MG: Minas Gerais; MT: Mato Grosso; PR: Paraná; ES: Espírito Santo; RJ: Rio de Janeiro; SP: São Paulo; SC: Santa Catarina; RS: Rio Grande do Sul. n.a.: not available.

DISCUSSION

This systematic review included data from 105 studies involving representative samples of Brazilian children and adolescents. Most of the studies showed that less than half the participants met the recommendations of total screen and TV time; however, more than half the participants met the recommendations regarding computer or videogame use. Thus, the findings revealed: i) a higher concentration of studies in the southern and northeastern regions of Brazil; ii) few studies with children less than seven years of age; iii) the components more investigated were TV time and screen time; iv) there was higher methodological variability of the components assessed, measurement tools and cut-off points used to examine the sedentary behavior.

In the last ten years, the number of publications on this subject has increased and consequently also their quality, based on sophisticated instruments and statistical analyses[11,16]. This scenario has also been observed in Brazil[117,118]. The first Brazilian studies on sedentary behavior focused on TV viewing time[10,95], followed by studies analyzing other screen components such

as computer[87], videogames[12], and sitting time[13]. Moreover, a considerable imbalance of published data was observed among the various Brazilian regions. Ramires et al.[118] suggested the need to implement research centers in the Center-West and North regions of the country with the objective of guaranteeing the dissemination of knowledge.

In the present review, there was wide variation in the proportion of young people who complied with the recommendation of less than two hours daily among studies (screen time: 9.4% to 68.0%; TV: 16.8% to 67.2%; computer: 39.1% to 97.7%; videogame: 47.7% to 98%). Part of this fluctuation can be explained by the use of different questionnaires (some of them not validated), as reported in a previous study[119]. Other methodological aspects have also been reported in another review[117], including the variability among the components of sedentary behavior investigated and the cut-off points (e.g. ≤ 2 hours, 3 hours and ≤ 4 hours) used. These differences impair the examination of the trend of sedentary behavior over the years; as well as the comparison of estimated prevalence.

Specifically for screen time and TV, most of the studies that used a cut-off point of ≤ 2 hours a day (screen time: 17 of 20 studies; TV: 15 of 19) reported that less than half the boys and girls met the recommendations. Regarding screen time, the sum of the use of electronic devices may contribute to the failure to comply with recommendations. Perhaps the cut-off point for screen time should be different, considering that we have grouped a total time of use into screen activities. In contrast to computers and videogames, most Brazilian households have access to television, which may explain the lower variability in the proportion of TV viewing among studies[120].

In contrast, for computer and videogames, studies with a cut-off point of ≤ 2 hours a day (computer: 9 of 11 studies, videogame: 3 of 4) reported that more than 60% of adolescents comply with the recommendation. Despite the growing use of computers and videogames by adolescents[116], these electronic devices are not yet accessible to most Brazilian households[120]. Another aspect that can contribute to the greater variability of these components in Brazilian data might be social and income inequality[43,116,121].

Considering the use of computer for boys and girls, five out of eight studies reported that more than half the boys met the recommendation, whereas for girls seven out of eight studies reported that more than half met the recommendation. For videogames, two out of three studies reported that more than half the boys complied with the recommendation, and for girls all studies (three) reported this result. Regarding computers, other studies also showed that boys spend more time using computers than girls[63,122], mostly with games[122]. Girls spent more time on social networking sites, listening to music, and online reading[123] Several factors can influence these differences between genders, such as the lack of social interaction and the violence present in the context of games, which may be related to less use by girls[124].

Several limitations of this review are difficulty in comparing studies

due to the high heterogeneity of the components of sedentary behavior investigated, the instruments and cut-off points used (problems that could be avoided with the inclusion of more delimited criteria); absence of assessment of risk bias, and the choice to analyze only studies that used a cut-off point of less two hours (current recommendations), although all other studies were described in the tables.

In summary, less than half the children and adolescents met the recommendations of screen time and TV viewing, and most of them followed the recommendations regarding time spent using the computer or videogames. Only computer use differed between genders, with boys meeting recommendations less than girls.

We suggest that studies be conducted in the northern and central-western regions of Brazil to determine the reality of these populations, as well as studies with preschool children. In addition, we recommend standardizing and validating questionnaires and the use of cut-off points according to international guidelines. New components of sedentary behavior could also be investigated such as cell phones and tablets, as well as the type of subject consumed or activity chosen during the time in front of the screens. Finally, attention is drawn to the high prevalence of young people who do not meet the recommended use of screen time, and even exceed this time in a single component.

Acknowledgments

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) as individual grants to LEA Malheiros.

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.

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

KS is the principal investigator, conceived the idea of the manuscript, and draft of the first version of the paper. VBF provided substantial contributions to the conception of the study. ASL, PCS, LEAM and ACFCS provided were the operational leads of data extraction. All authors read and approved the final manuscript.

REFERENCES

1. Pate RR, O'Neill JR, Lobelo F. The evolving definition of "sedentary." Exerc Sport Sci Rev 2008;36(4):173-8.
2. Koedijk JB, van Rijswijk J, Oranje WA, van den Bergh JP, Bours SP, Savelberg HH, et al. Sedentary behaviour and bone health in children, adolescents and young adults: a systematic review. Osteoporos Int 2017;28(9):2507-19.
3. Tremblay MS, Colley RC, Saunders TJ, Healy GN, Owen N. Physiological and health implications of a sedentary lifestyle. Appl Physiol Nutr Metab Physiol 2010;35(6):725-40.
4. Tremblay MS, Leblanc AG, Kho ME, Saunders TJ, Larouche R, Colley RC, et al. Systematic review of sedentary behaviour and health indicators in school-aged children and youth. Int J Behav Nutr Phys Act 2011; 8:98.
5. Sandercock GRH, Ogunleye AA. Screen time and passive school travel as independent predictors of cardiorespiratory fitness in youth. Prev Med 2012;54(5):319-22.
6. Leblanc AG, Katzmarzyk PT, Barreira TV, Broyles ST, Chaput JP, Church TS, et al. Correlates of Total Sedentary Time and Screen Time in 9-11 Year-Old Children around the World: The International Study of Childhood Obesity, Lifestyle and the Environment. Plos One 2015;10(6):e0129622.
7. Instituto Brasileiro de Geografia e Estatística, editor. Pesquisa nacional de saúde do escolar, 2015. Rio de Janeiro: IBGE; 2016. Available from: <https://biblioteca.ibge.gov.br/visualizacao/livros/liv97870.pdf> [2018 may 18]
8. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U. Global physical activity levels: surveillance progress, pitfalls, and prospects. Lancet 2012;380(9838):247-57.
9. Santos A, Andaki ACR, Amorim PR dos S, Mendes EL. Factors associated with sedentary behavior in 9- to 12-year-old school children. Motriz: J Phys Ed 2013;19(3):25-34.
10. Costa MCO, Silva MCM, Santos JS, Teles C, Souza KEP de, Melo BO. Estilo de vida de adolescentes: consumo alimentar, de bebida alcóolica e atividade física em Teixeira de Freitas - Bahia. Rev Baiana Saúde Pública 2004;28(2):151-66.
11. Mielke GI, Brown WJ, Ekelund U, Brage S, Gonçalves H, Wehrmeister FC, et al. Socioeconomic position and sedentary behavior in Brazilian adolescents: A life-course approach. Prev Med 2018;107(2):29-35.
12. De Lima TR, Silva DAS. Prevalence of physical activity among adolescents in southern Brazil. J Bodyw Mov Ther 2018;22(1):57-63.
13. Regis MF, de Oliveira LMFT, dos Santos ARM, Leonidio A da CR, Diniz PRB, de Freitas CMSM. Urban versus rural lifestyle in adolescents: associations between environment, physical activity levels and sedentary behavior. Einstein 2016;14(4):461-7.
14. Felden ÉPG, Filipin D, Barbosa DG, Andrade RD, Meyer C, Beltrame TS, et al. Adolescentes com sonolência diurna excessiva passam mais tempo em comportamento sedentário. Rev Bras Med Esporte 2016;22(3):186-90.
15. Barbosa SC, Coledam DHC, Neto AS, Elias RGM, Oliveira AR de. Ambiente escolar, comportamento sedentário e atividade física em pré-escolares. Rev Paul Pediatr 2016;34(3):301-8.
16. Hildebrand M, Kolle E, Hansen BH, Collings PJ, Wijndaele K, Kordas K, et al. Association between birth weight and objectively measured sedentary time is mediated by central adiposity: data in 10,793 youth from the International Children's Accelerometry Database. Am J Clin Nutr 2015;101(5):983-90.
17. Guedes DP, Souza MV, Ferreirinha JE, Silva AJRM. Physical activity and determinants of sedentary behavior in Brazilian adolescents from an underdeveloped region. Percept Mot Skills 2012;114(2):542-52.
18. Oliveira TC de, Silva AAM da, Santos C de JN dos, Silva JS e, Conceição SIO da. Physical activity and sedentary lifestyle among children from private and public schools in Northern Brazil. Rev Saúde Pública 2010;44(6):996-1004.

19. Melzer MRTF, Magrini IM, Domene SMÁ, Martins PA. Factors associated with abdominal obesity in children. Rev Paul Pediatr 2015;33(4):437-44.
20. Costa FF da, Assis MAA. Nível de atividade física e comportamentos sedentários de escolares de sete a dez anos de Florianópolis-SC. Rev Bras Ativ Fís Saúde 2011;16(1):48-54.
21. Sousa GR, Silva DAS. Sedentary behavior based on screen time: prevalence and associated sociodemographic factors in adolescents. Cien Saude Colet 2017;22(12):4061-72.
22. Lima TR, Silva DAS. Clusters of negative health-related physical fitness indicators and associated factors in adolescents. Rev Bras Cineantropom Desempenho Hum 2017;19(4):436-49.
23. Nunes HEG, Gonçalves EC de A, Vieira JAJ, Silva DAS. Clustering of Risk Factors for Non-Communicable Diseases among Adolescents from Southern Brazil. Plos One 2016;11(7):e0159037.
24. Gonçalves ECA, Silva DAS. Factors associated with low levels of aerobic fitness among adolescents. Rev Paul Pediatr 2016;34(2):141-7.
25. Castro JAC, Nunes HEG, Silva DAS, Castro JAC, Nunes HEG, Silva DAS. Prevalence of abdominal obesity in adolescents: association between sociodemographic factors and lifestyle. Rev Paul Pediatr 2016;34(3):343-51.
26. Schäfer AA, Domingues MR, Dahly DL, Meller FO, Gonçalves H, Wehrmeister FC, et al. Correlates of self-reported weekday sleep duration in adolescents: the 18-year follow-up of the 1993 Pelotas (Brazil) Birth Cohort Study. Sleep Med 2016;23:81-8.
27. Bergmann GG, Bertoldi AD, Mielke GI, Camargo AL, Matijasevich A, Hallal PC. Atividade física, tempo de tela e utilização de medicamentos em adolescentes: coorte de nascimentos de Pelotas, Rio Grande do Sul, Brasil, 1993. Cad Saúde Pública 2016;32(4):e00011715.
28. Dumith SC, Garcia LMT, da Silva KS, Menezes AMB, Hallal PC. Predictors and health consequences of screen-time change during adolescence--1993 Pelotas (Brazil) birth cohort study. J Adolesc Health 2012;51(Suppl. 6):S16-21.
29. Duquia RP, Dumith S de C, Reichert FF, Madruga SW, Duro LN, Menezes AMB, et al. Epidemiologia das pregas cutâneas triciptal e subescapular elevadas em adolescentes. Cad Saúde Pública 2008;24(1):113-21.
30. Pinho MGM de, Adami F, Benedet J, Vasconcelos F de AG de. Association between screen time and dietary patterns and overweight/obesity among adolescents. Rev Nutr 2017;30(3):377-89.
31. Costa IFAF da, Medeiros CCM, Costa FDAF da, Farias CRL de, Souza DR, Adriano WS, et al. Adolescentes: comportamento e risco cardiovascular. J Vasc Bras 2017;16(3):205-13.
32. Lourenço CLM, Pires MR, Leite MAF de J, Sousa TF de, Mendes EL. Deslocamento passivo para escola e fatores associados em adolescentes. J Phys Educ 2017;28:e2831.
33. Silva AO da, Oliveira LMFT de, Santos MAM dos, Tassitano RM. Tempo de tela, percepção da qualidade de sono e episódios de parassonia em adolescentes. Rev Bras Med Esporte 2017;23(5):375-9.
34. Pereira TA, Bergmann ML de A, Bergmann GG. Fatores associados à baixa aptidão física de adolescentes. Rev Bras Med Esporte 2016;22(3):176-81.
35. Silva T, Oliveira H, Bergmann M, Bergmann G. Associação entre atividade física e tempo de tela com o nível socioeconômico em adolescentes. Rev Bras Ativ Fís Saúde 2015;20(5):503-13.
36. Oliveira JS, Barufaldi LA, Abreu G de A, Leal VS, Brunken GS, Vasconcelos SML, et al. ERICA: use of screens and consumption of meals and snacks by Brazilian adolescents. Rev Saúde Pública 2016;50(suppl. 1):7.
37. Do Prado Junior PP, de Faria FR, de Faria ER, Franceschini S do CC, Priore SE. Cardiovascular risk and associated factors in adolescents. Nutr Hosp 2015;32(2):897-904.

38. Christofaro DGD, De Andrade SM, Mesas AE, Fernandes RA, Farias Júnior JC. Higher screen time is associated with overweight, poor dietary habits and physical inactivity in Brazilian adolescents, mainly among girls. Eur J Sport Sci 2016;16(4):498-506.
39. Christofaro DGD, De Andrade SM, Cardoso JR, Mesas AE, Codogno JS, Fernandes RA. High blood pressure and sedentary behavior in adolescents are associated even after controlling for confounding factors. Blood Press 2015;24(5):317-23.
40. Coledam DHC, Ferraiol PF, Pires Júnior R, Ribeiro EAG, Ferreira MAC, Oliveira AR de. Concordância entre dois pontos de corte para atividade física e fatores associados em jovens. Rev Paul Pediatr 2014;32(3):215-22.
41. Coledam DHC, Ferraiol PF, Pires Júnior R, Greca JP de A, Oliveira AR de. O sobrepeso e a obesidade não estão associados com a pressão arterial elevada em jovens praticantes de esportes. Cien Saude Colet 2017;22(12):4051-60.
42. Beck CC, Lopes A da S, Júnior F, De JC, Beck CC, Lopes AS, et al. Factors associated with serum lipids of adolescents from the Brazilian South. Rev Nutr 2014;27(1):35-43.
43. Dias PJP, Domingos IP, Ferreira MG, Muraro AP, Sichieri R, Gonçalves-Silva RMV. Prevalência e fatores associados aos comportamentos sedentários em adolescentes. Rev Saúde Pública 2014;48(2):266-74.
44. De Moraes ACF, Fernández-Alvira JM, Rendo-Urteaga T, Julián-Almárcegui C, Beghin L, Kafatos A, et al. Effects of clustering of multiple lifestyle-related behaviors on blood pressure in adolescents from two observational studies. Prev Med 2016;82(1):111-7.
45. De Moraes ACF, Carvalho HB, Rey-López JP, Gracia-Marco L, Beghin L, Kafatos A, et al. Independent and combined effects of physical activity and sedentary behavior on blood pressure in adolescents: gender differences in two cross-sectional studies. Plos One 2013;8(5):e62006.
46. Moraes ACF de, Falcão MC. Lifestyle factors and socioeconomic variables associated with abdominal obesity in Brazilian adolescents. Ann Hum Biol 2013;40(1):1-8.
47. Vasconcellos MB de, Anjos LA dos, Vasconcellos MTL. Estado nutricional e tempo de tela de escolares da Rede Pública de Ensino Fundamental de Niterói, Rio de Janeiro, Brasil. Cad Saúde Pública 2013;29(4):713-22.
48. Bergmann GG, Bergmann ML de A, Marques AC, Hallal PC. Prevalence of physical inactivity and associated factors among adolescents from public schools in Uruguaiana, Rio Grande do Sul State, Brazil. Cad Saúde Pública 2013;29(11):2217-29.
49. Lucena JMS de, Cheng LA, Cavalcante TLM, Silva VA da, Farias Júnior, JC. Prevalence of excessive screen time and associated factors in adolescents. Rev Paul Pediatr 2015;33(4):407-14.
50. Martins MO, Cavalcante VLF, Holanda GS, Oliveira CG, Maia FES, Meneses Júnior JR, et al. Associação entre comportamento sedentário e fatores psicossociais e ambientais em adolescentes da região nordeste do Brasil. Rev Bras Ativ Fís Saúde ;2012;17(2):e201204.
51. Farias Júnior, JC, Lopes A da S, Mota J, Hallal PC. Physical activity practice and associated factors in adolescents in Northeastern Brazil. Rev Saúde Pública 2012;46(3):505-15.
52. Legnani E, Legnani RF, Dellagrana RA, Silva MP, Barbosa Filho VC, Campos W. Comportamentos de risco à saúde e excesso de peso corporal em escolares de Toledo, Paraná, Brasil. Motricidade 2012;8(3):59-70.
53. Legnani E, Legnani RFS, Filho B, Cordeiro V, Gasparotto G da S, Campos W, et al. Fatores de risco à saúde cardiovascular em escolares da Tríplice Fronteira. Motriz: J Phys Ed 2011;17(4):640-9.
54. Legnani E, Legnani RFS, Filho VCB, Krinski K, Elsangedy HM, de Campos W, et al. Fatores associados ao excesso de peso corporal em escolares da tríplice fronteira: Argentina, Brasil e Paraguai. Arch Latinoam Nutr 2010;60(4):340-7.
55. Lancarotte I, Nobre MR, Zanetta R, Polydoro M. Lifestyle and cardiovascular health in school adolescents from São Paulo. Arq Bras Cardiol 2010;95(1):61-9.

56. Moraes ACF, Fernandes CAM, Elias RGM, Nakashima ATA, Reichert FF, Falcão MC. Prevalência de inatividade física e fatores associados em adolescentes. Rev Assoc Médica Bras 2009;55(5):523-8.
57. Vasques DG, Lopes A da S. Fatores associados à atividade física e aos comportamentos sedentários em adolescentes. Rev Bras Cineantropom Desempenho Hum 2009;11(1):59-66.
58. Castro IRR de, Cardoso LO, Engstrom EM, Levy RB, Monteiro CA. Vigilância de fatores de risco para doenças não transmissíveis entre adolescentes: a experiência da cidade do Rio de Janeiro, Brasil. Cad Saúde Pública 2008;24(10):2279-88.
59. Silva KS da, Nahas MV, Hoefelmann LP, Lopes A da S, Oliveira ES de. Associações entre atividade física, índice de massa corporal e comportamentos sedentários em adolescentes. Rev Bras Epidemiol 2008;11(1):159-68.
60. Silva DAS, Lima JO, Silva RJS, Prado RL. Nível de atividade física e comportamento sedentário em escolares. Rev Bras Cineantropom Desempenho Hum 2009;11(3):299-306.
61. Silva KS, da Silva Lopes A, Dumith SC, Garcia LMT, Bezerra J, Nahas MV. Changes in television viewing and computers/videogames use among high school students in Southern Brazil between 2001 and 2011. Int J Public Health 2014;59(1):77-86.
62. Silva KS, Barbosa Filho VC, Del Duca GF, Peres MA, Mota J, Lopes AS, et al. Gender differences in the clustering patterns of risk behaviours associated with non-communicable diseases in Brazilian adolescents. Prev Med 2014;65(8):77-81.
63. Lopes AS, Silva KS, Barbosa Filho VC, Bezerra J, de Oliveira ESA, Nahas MV. Trends in screen time on week and weekend days in a representative sample of Southern Brazil students. J Public Health 2014;36(4):608-14.
64. Suñé FR, Dias-da-Costa JS, Olinto MTA, Pattussi MP. Prevalence of overweight and obesity and associated factors among schoolchildren in a southern Brazilian city. Cad Saúde Pública 2007;23(6):1361-71.
65. Munaro HLR, Silva DAS, Lopes ADS. Prevalência de tempo excessivo de tela e fatores associados em escolares de uma cidade do nordeste. J Hum Growth Dev 2016;26(3):360-7.
66. Silva GRR, Pitangui ACR, Xavier MKA, Correia-Júnior MAV, De Araújo RC. Prevalence of musculoskeletal pain in adolescents and association with computer and videogame use. J Pediatr 2016;92(2):188-96.
67. Silva DR, Ohara D, Tomeleri CM, Batista MB, Fernandes RA, Ronque ER, et al. Association between risk behaviors and adiposity indicators in adolescents from Southern Brazil: A methodological approach. J Child Health Care 2016;20(3):314-23.
68. Bezerra J, Lopes AS, Hardmam CM, Tassitano RM, Tenório MCM, de Barros MVG. Consumo de bebidas alcoólicas e tabagismo: associação com inatividade física no lazer e comportamento sedentário. Rev Andal Med Deporte 2015;8(1):1-6.
69. Bezerra E de S, Neves EB, Rossato M, Santos JOL dos, Nahas MV, Barbosa TM dos SP. The influence of gender on the practice of physical activityin high school adolescents in the city of Manaus. Mundo Saúde 2016;40(3):302-309.
70. Brito AL da S, Hardman CM, Barros MVG de. Prevalence and factors associated with the co-occurrence of health risk behaviors in adolescents. Rev Paul Pediatr 2015;33(4):423-30.
71. Fronza FCAO, Minatto G, Martins CR, Petroski EL. Excessive TV Viewing Time and Associated Factors in Brazilian Adolescents from a Rural Area. Hum Mov 2015;16(1):20-27.
72. Martins JS, Souza EA de, Trompieri Filho N. Fatores associados ao tempo de tela em estudantes do ensino médio de Fortaleza, região Nordeste do Brasil. Sci Med Porto Alegre Online 2015;25(4):20985-20985.
73. Ferreira NL, Claro RM, Lopes ACS. Consumption of sugar-rich food products among Brazilian students:National School Health Survey (PeNSE 2012). Cad Saude Publica 2015;31(12):2493-504.

74. Silva RJ dos S, Silva DAS, Oliveira AC. Low physical activity levels and associated factors in Brazilian adolescents from public high schools. J Phys Act Health 2014;11(7):1438-45.
75. Silva DAS, Tremblay MS, Gonçalves ECA, Silva RJS. Television Time among Brazilian Adolescents: Correlated Factors are Different between Boys and Girls. Sci World J 2014:794539.
76. Vitta AD, Barros DS de, Palma R, Soares MVF, Conti MHSD, Gatti MAN, et al. Prevalência e fatores associados à adiposidade central e periférica em estudantes do ensino fundamental brasileiro. J Hum Growth Dev 2013;23(3):365-71.
77. Barbosa Filho VC, Lopes A da S, Bozza R, Rech CR, de Campos W. Correlates of cardiorespiratory and muscular fitness among Brazilian adolescents. Am J Health Behav 2014;38(1):4252.
78. Barbosa Filho VC, de Campos W, Bozza R, Lopes A da S. The prevalence and correlates of behavioral risk factors for cardiovascular health among Southern Brazil adolescents: a cross-sectional study. BMC Pediatr 2012;12:130.
79. Camelo L do V, Rodrigues JF de C, Giatti L, Barreto SM. Lazer sedentário e consumo de alimentos entre adolescentes brasileiros: Pesquisa Nacional de Saúde do Escolar (PeNSE), 2009. Cad Saúde Pública- 2012;28(11):2155-62.
80. Hallal PC, Knuth AG, Cruz DKA, Mendes MI, Malta DC. Physical activity practice among Brazilian adolescents. Cien Saude Colet 2010:15(2)3035-42.
81. Malta DC, Sardinha LMV, Mendes I, Barreto SM, Giatti L, Castro IRR de, et al. Prevalence of risk health behavior among adolescents: results from the 2009 National Adolescent School-based Health Survey (PeNSE). Cien Saude Colet 2010;15(2):3009-19.
82. Alves CF de A, Silva R de CR, Assis AMO, Souza C de O, Pinto E de J, Frainer DES. Factors associated with physical inactivity in adolescents aged 10-14 years, enrolled in the public school network of the city of Salvador, Brazil. Rev Bras Epidemiol 2012;15(4):858-70.
83. Farias E dos S, Santos AP dos, Farias-Júnior JC de, Ferreira CRT, Carvalho WRG de, Gonçalves EM, et al. Excess weight and associated factors in adolescents. Rev Nutr 2012;25(2):229-36.
84. De Vitta A, Martinez MG, Piza NT, Simeão SF de AP, Ferreira NP. Prevalence of lower back pain and associated factors in students. Cad Saúde Pública 2011;27(8):1520-8.
85. Fermino RC, Rech CR, Hino AAF, Rodriguez Añez CR, Reis RS. Physical activity and associated factors in high-school adolescents in Southern Brazil. Rev Saude Publica 2010;44(6):986-95.
86. Tenório MCM, Barros MVG de, Tassitano RM, Bezerra J, Tenório JM, Hallal PC. Physical activity and sedentary behavior among adolescent high school students. Rev Bras Epidemiol 2010;13(1):105-17.
87. Pelegrini A, Petroski EL. Inatividade física e sua associação com estado nutricional, insatisfação com a imagem corporal e comportamentos sedentários em adolescentes de escolas públicas. Rev Paul Pediatr 2009;27(4):366-73.
88. Wells JCK, Hallal PC, Reichert FF, Menezes AMB, Araújo CLP, Victora CG. Sleep patterns and television viewing in relation to obesity and blood pressure: evidence from an adolescent Brazilian birth cohort. Int J Obes 200;32(7):1042-9.
89. Hallal PC, Bertoldi AD, Gonçalves H, Victora CG. Prevalence of sedentary lifestyle and associated factors in adolescents 10 to 12 years of age. Cad Saúde Pública 2006;22(6):1277-87.
90. Dumith SC, Hallal PC, Menezes AMB, Araújo CL. Sedentary behavior in adolescents: the 11-year follow-up of the 1993 Pelotas (Brazil) birth cohort study. Cad Saúde Pública 2010;26(10):1928-36.
91. Fernandes RA, Christofaro DGD, Casonatto J, Kawaguti SS, Ronque ERV, Cardoso JR, et al. Associação transversal entre hábitos alimentares saudáveis e não saudáveis e atividade física de lazer em adolescentes. J Pediatr 2011;87(3):252-6.

92. Fernandes RA, Freitas Júnior IF, Cardoso JR, Vaz Ronque ER, Loch MR, Oliveira AR. Association between regular participation in sports and leisure time behaviors in Brazilian adolescents: a cross-sectional study. BMC Public Health. 2008;8:329.
93. Campagnolo PDB, Vitolo MR, Gama CM, Stein AT. Prevalence of overweight and associated factors in southern Brazilian adolescents. Public Health 2008;122(5):509-15.
94. Campagnolo PDB, Vitolo MR, Gama CM. Fatores associados ao hábito de assistir TV em excesso entre adolescentes. Rev Bras Med Esporte 2008;14(3):197-200.
95. Detsch C, Luz AMH, Candotti CT, Oliveira DS de, Lazaron F, Guimarães LK, et al. Prevalência de alterações posturais em escolares do ensino médio em uma cidade no Sul do Brasil. Rev Panam Salud Pública 2007;21(4):231-8.
96. Silva FM de A, Smith-Menezes A, Duarte M de F da S. Consumption of fruits and vegetables associated with other risk behaviors among adolescents in Northeast Brazil. Rev Paul Pediatr 2016;34(3):309-15.
97. Alexandre M, Silva AM, Coelho-Ravagnani C. Comportamento sedentário em adolescentes atendidos pela Estratégia de Saúde da Família em Cuiabá, Brasil. Rev Bras Ativ Fís Saúde 2016;21(4):344-54.
98. Farah BQ, Christofaro DGD, Balagopal PB, Cavalcante BR, Barros MVG de, Ritti-Dias RM. Association between resting heart rate and cardiovascular risk factors in adolescents. Eur J Pediatr 2015-;174(12):1621-8.
99. Azeredo CM, Levy RB, Peres MFT, Menezes PR, Araya R. Patterns of health-related behaviours among adolescents: a cross-sectional study based on the National Survey of School Health Brazil 2012. BMJ Open 2016;6(11):e011571.
100. Rezende LFM de, Lopes MR, Rey-López JP, Matsudo VKR, Luiz O do C. Sedentary Behavior and Health Outcomes: An Overview of Systematic Reviews. Plos One 2014;9(8):e105620.
101. Cureau FV, Ekelund U, Bloch KV, Schaan BD. Does body mass index modify the association between physical activity and screen time with cardiometabolic risk factors in adolescents? Findings from a country-wide survey. Int J Obes 2017;41(4):551-9.
102. Dutra GF, Kaufmann CC, Pretto ADB, Albernaz EP, Dutra GF, Kaufmann CC, et al. Television viewing habits and their influence on physical activity and childhood overweight. J Pediatr 2015;91(4):346-51.
103. Rivera IR, Silva MAM da, Silva RDTA, Oliveira BAV de, Carvalho ACC. Physical inactivity, TV-watching hours and body composition in children and adolescents. Arq Bras Cardiol 2010;95(2):159-65.
104. Silva KS da, Nahas MV, Peres KG, Lopes A da S. Factors associated with physical activity, sedentary behavior, and participation in physical education among high school students in Santa Catarina State, Brazil. Cad Saúde Pública 2009;25(10):2187-200.
105. Ferreira NL, Claro RM, Mingoti SA, Lopes ACS. Coexistence of risk behaviors for being overweight among Brazilian adolescents. Prev Med 2017;100(7):135-42.
106. Guimarães R de F, Silva MP da, Mazzardo O, Martins RV, Campos W de. Association between sedentary behavior and anthropometric and metabolic profiles among adolescents. Motriz: J Phys Ed 2013;19(4):753-62.
107. Ramos Mazaro IA, Lurdes Zanolli M de, R.G.M. Antonio MÂ, Moreno Morcillo A, Porto Zambon M. Obesidade e fatores de risco cardiovascular em estudantes de Sorocaba, SP. Rev Assoc Médica Bras 2011;57(6):674-80.
108. Molina M del CB, Faria CP de, Montero MP, Cade NV, Mill JG. Cardiovascular risk factors in 7-to-10-year-old children in Vitória, Espírito Santo State, Brazil. Cad Saúde Pública 2010;26(5):909-17.
109. Geremia R, Cimadon HMS, de Souza WB, Pellanda LC. Childhood overweight and obesity in a region of Italian immigration in Southern Brazil: a cross-sectional study. Ital J Pediatr 2015;41:28.
110. Cimadon HMS, Geremia R, Pellanda LC. Dietary habits and risk factors for atherosclerosis in students from Bento Gonçalves (state of Rio Grande do Sul). Arq Bras Cardiol 2010;95(2):166-72.

111. Silva DAS, Teixeira DM, Oliveira G, Petroski EL, Farias JM. Aerobic fitness in adolescents in southern Brazil: Association with sociodemographic aspects, lifestyle and nutritional status. Rev Andal Med Deporte 2016;9(1):17-22.
112. Silva FMA, Smith-Menezes A. Sedentary behavior and associated factors in adolescents of northeastern Brazil. Sci Sports 2017;32(3):e93-100.
113. Felden ÉPG, Filipin D, Barbosa DG, Andrade RD, Meyer C, Louzada FM, et al. Factors associated with short sleep duration in adolescents. Rev Paul Pediatr 2016;34(1):64-70.
114. Rezende LFM, Azeredo CM, Canella DS, Claro RM, Castro IRR, Levy RB, et al. Sociodemographic and behavioral factors associated with physical activity in Brazilian adolescents. BMC Public Health 2014;14:485.
115. Guimarães R de F, Silva MP da, Mazzardo O, Martins RV, Campos W de. Association between sedentary behavior and anthropometric and metabolic profiles among adolescents. Motriz: J Phys Ed 2013;19(4):753-62.
116. Silva KS, da Silva Lopes A, Dumith SC, Garcia LMT, Bezerra J, Nahas MV. Changes in television viewing and computers/videogames use among high school students in Southern Brazil between 2001 and 2011. Int J Public Health 2014;59(1):77-86.
117. Guerra PH, Farias Júnior JC de, Florindo AA. Sedentary behavior in Brazilian children and adolescents: a systematic review. Rev Saude Publica. 2016;50:9.
118. Ramires V, Becker L, Sadovsky A, Zago A, Bielemann R, Guerra P. Evolução da pesquisa epidemiológica em atividade física e comportamento sedentário no Brasil: atualização de uma revisão sistemática. Rev Bras Ativ Fís Saúde 2014;19(5): 529-547.
119. Hidding LM, Altenburg TM, Mokkink LB, Terwee CB, Chinapaw MJM. Systematic Review of Childhood Sedentary Behavior Questionnaires: What do We Know and What is Next? Sports Med 2017;47(4):677-99.
120. IBGE. Síntese de indicadores sociais : uma análise das condições de vida da população brasileira : 2015. 35th ed. Rio de Janeiro: IBGE; 2015. Available from: < https://biblioteca.ibge.gov.br/visualizacao/livros/liv95011.pdf> [2018 may].
121. Aros LJL, Germano-Soares AH, Silva CR de M, Silva AO da, Tassitano RM. Trends in television and computer/videogame use and total screen time in high school students from Caruaru city, Pernambuco, Brazil: A repeated panel study between 2007 and 2012. Motriz: J Phys Ed 2017;23(SPE2): e101793.
122. Cotten SR, Shank DB, Anderson WA. Gender, technology use and ownership, and media-based multitasking among middle school students. Comput Hum Behav 2014;35(6):99-106.
123. Rideout VJ, Foehr UG, Roberts DF. Generation M2: Media in the Lives of 8–18 Year-Olds. 2010. Available from: <https://files.eric.ed.gov/fulltext/ED527859.pdf> [2018 may].
124. Hartmann T, Klimmt C. Gender and Computer Games: Exploring Females' Dislikes. J Comput-Mediat Commun 2006;11(4):910-31.

CORRESPONDING AUTHOR

Kelly Samara Silva
Campus Universitário Reitor João David Ferreira Lima, Coordenadoria de Pós-Graduação em Educação Física, s/n.
Bairro Trindade, Florianópolis, Santa Catarina, Brazil.
Zip code: 88040-900.
E-mail: kelly.samara@ufsc.br

SUPPLEMENTARY FILE

File 1

Descriptors used during the search in electronic databases for summarize studies examining the prevalence of sedentary behavior in Brazilian children and adolescents up to 18 years-old.

Groups	Descriptors
Outcome (SB)	("physical inactivity" [Text Word] OR sedentarism [Text Word] OR inactivity [Text Word] OR sedentary behavio* [Text Word] OR sedentary lifestyle [Text Word] OR computer use [Text Word] OR screen view* [Text Word] OR sitting time [Text Word] OR computer game [Text Word] OR video game [Text Word] OR television watch* [Text Word] OR TV watch* [Text Word] OR TV view* [Text Word] OR screen time [Text Word] OR smartphone [Text Word] OR smart phone [Text Word] OR mobile phone [Text Word] OR small screen* [Text Word] OR ("screen based entertainment") OR ("screen-based entertainment"))
Population of interest	(youth [Text Word] OR teenage [Text Word] OR adolescent [MeSH Terms] OR adolescent [Text Word] OR adolescence [Text Word] OR students [MeSH Terms] OR student [Text Word] OR child [Text Word] OR children [Text Word] OR "young people" [Text Word])
Instrument	(self-report OR checklist OR recall OR 24h OR interviews OR questionnaire OR diary OR assessment OR survey OR measurement OR Acceleromet* OR pedomet OR inclinomet OR ((objectiv* measur*) OR (direct* measure*))) AND (Brazil* OR Brazilian)

SB: Sedentary Behavior. The Boolean operator "AND" was used for combinations among descriptor groups. The truncation symbols ($, * or "") specific to 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 required. The search of the electronic databases was supplemented by a screening of the reference list of retrieved articles in order to find potentially relevant titles and the personal library.

SUPPLEMENTARY FILE

File 2

List of studies excluded in the process of full-text screening

Reference of search conducted in 2018	Reasons for excluded
1.Alberico CO, Schipperijn J, Reis RS. Use of global positioning system for physical activity research in youth: ESPAÇOS Adolescentes, Brazil. Prev Med. 2017 Oct;103S:S59–65.	Non-representative sample.
2.Alves JGB, Siqueira PP, Figueiroa JN. Overweight and physical inactivity in children living in favelas in the metropolitan region of Recife, Brazil. Jornal de Pediatria. 2009 Feb;85(1):67–71.	Did not report SB
3.Andrade Neto F, Eto FN, Pereira TSS, Carletti L, Molina M del CB. Active and sedentary behaviours in children aged 7 to 10 years old: the urban and rural contexts, Brazil. BMC Public Health. 2014 Nov 18;14:1174.	Non-representative sample
5.Azeredo CM, de Rezende LFM, Canella DS, Moreira Claro R, de Castro IRR, Luiz O do C, et al. Dietary intake of Brazilian adolescents. Public Health Nutr. 2015 May;18(7):1215–24.	Did not report SB
6.Beck CC, Lopes A da S, Giuliano I de CB, Borgatto AF. Cardiovacular risk factors in adolescents from a town in the Brazilian South: prevalence and association with sociodemographic variables. Revista Brasileira de Epidemiologia. 2011 Mar;14(1):36–49.	SB = Inactivity
7.Bezerra J, Lopes A da S, Duca D, Firpo G, Filho B, Cordeiro V, et al. Leisure-time physical activity and associated factors among adolescents of Pernambuco, Brazil: From 2006 to 2011. Revista Brasileira de Cineantropometria & Desempenho Humano. 2016 Feb;18(1):114–26.	Did not report SB
8.Bielemann RM, Cascaes AM, Reichert FF, Domingues MR, Gigante DP. Objectively Measured Physical Activity in Children From a Southern Brazilian City: A Population-Based Study. Journal of Physical Activity and Health. 2013 Nov 1;10(8):1145–52.	Non-representative sample
9.Borges TT, Rombaldi AJ, Knuth AG, Hallal PC. [Knowledge on risk factors for chronic diseases: a population-based study]. Cad Saude Publica. 2009 Jul;25(7):1511–20.	Did not report SB
10.Ceschini FL, Andrade DR, Oliveira LC, Júnior A, F J, Matsudo VKR. Prevalence of physical inactivity and associated factors among high school students from state's public schools. Jornal de Pediatria. 2009 Aug;85(4):301–6.	Non-representative sample

Continue...

... continue

Reference of search conducted in 2018	Reasons for excluded
11.Chaput J-P, Weippert M, LeBlanc AG, Hjorth MF, Michaelsen KF, Katzmarzyk PT, et al. Are Children Like Werewolves? Full Moon and Its Association with Sleep and Activity Behaviors in an International Sample of Children. Front Pediatr. 2016;4:24.	Non-representative sample, SB not reported by country
12.Cooper AR, Goodman A, Page AS, Sherar LB, Esliger DW, van Sluijs EMF, et al. Objectively measured physical activity and sedentary time in youth: the International children's accelerometry database (ICAD). Int J Behav Nutr Phys Act. 2015 Sep 17;12:113.	Did not report SB by country
13.Costa SMM, Horta PM, dos Santos LC. Food advertising and television exposure: influence on eating behavior and nutritional status of children and adolescents. Arch Latinoam Nutr. 2012 Mar;62(1):53–9.	Non-representative sample.
14.Crispim PAA, Peixoto M do RG, Jardim PCBV. Risk Factors Associated with High Blood Pressure in Two-to Five-Year-Old Children. Arq Bras Cardiol. 2014 Jan;102(1):39–46.	Non-representative sample
15.da Costa BGG, da Silva KS, George AM, de Assis MAA. Sedentary behavior during school-time: Sociodemographic, weight status, physical education class, and school performance correlates in Brazilian schoolchildren. J Sci Med Sport. 2017 Jan;20(1):70–4.	Non-representative sample
16.de Moraes ACF, Adami F, Falcão MC. Understanding the correlates of adolescents' dietary intake patterns. A multivariate analysis. Appetite. 2012 Jun;58(3):1057–62.	Did not report SB
17.Dias PJP, Domingos IP, Ferreira MG, Muraro AP, Sichieri R, Gonçalves-Silva RMV. Prevalence and factors associated with sedentary behavior in adolescents. Rev Saude Publica. 2014 Apr;48(2):266–74.	Non-representative sample
18.Dumith SC, Gigante DP, Domingues MR, Hallal PC, Menezes AMB, Kohl HW. Predictors of physical activity change during adolescence: a 3.5-year follow-up. Public Health Nutr. 2012 Dec;15(12):2237–45.	Did not report SB
19.Dumuid D, Olds T, Lewis LK, Martin-Fernández JA, Katzmarzyk PT, Barreira T, et al. Health-Related Quality of Life and Lifestyle Behavior Clusters in School-Aged Children from 12 Countries. J Pediatr. 2017 Apr;183:178-183.e2.	Did not report SB by country
20.Duncan S, Duncan EK, Fernandes RA, Buonani C, Bastos KD-N, Segatto AF, et al. Modifiable risk factors for overweight and obesity in children and adolescents from São Paulo, Brazil. BMC Public Health. 2011 Jul 22;11:585.	Non-representative sample
21.Enes CC, Lucchini BG, Enes CC, Lucchini BG. Excessive television-viewing time and its influence on adolescent food intake. Revista de Nutrição. 2016 Jun;29(3):391–9.	Non-representative sample
22.Enes CC, Pegolo GE, Silva MV da. Influência do consumo alimentar e do padrão de atividade física sobre o estado nutricional de adolescentes de Piedade, São Paulo. Revista Paulista de Pediatria. 2009 Sep;27(3):265–71.	Non-representative sample
23.Fernandes RA, Christofaro DGD, Cardoso JR, Ronque ERV, Júnior F, Forte I, et al. Socioeconomic status as determinant of risk factors for overweight in adolescents. Ciência & Saúde Coletiva. 2011 Oct;16(10):4051–7.	Did not report SB
24.Fernandes RA, Christofaro DGD, Dias RMR, Codogno JS, Oliveira AR de, Fernandes RA, et al. Malnutrition and its association with activities during leisure time among adolescents. Ciência & Saúde Coletiva. 2014 Mar;19(3):875–80.	Non-representative sample
25.Ferrari GL, Araujo TL, Oliveira L, Matsudo V, Mire E, Barreira TV, et al. Association Between Television Viewing and Physical Activity in 10-Year-Old Brazilian Children. J Phys Act Health. 2015 Oct;12(10):1401–8.	Non-representative sample
26.Ferrari GL de M, Araújo TL, Oliveira LC, Matsudo V, Fisberg M. Association between electronic equipment in the bedroom and sedentary lifestyle, physical activity, and body mass index of children. J Pediatr (Rio J). 2015 Dec;91(6):574–82.	Non-representative sample

Continue...

... continue

Reference of search conducted in 2018	Reasons for excluded
27.Ferrari GL de M, Matsudo V, Katzmarzyk PT, Fisberg M. Prevalence and factors associated with body mass index in children aged 9-11 years. J Pediatr (Rio J). 2017 Dec;93(6):601–9.	Non-representative sample
28.Ferrari GL de M, Oliveira LC, Araujo TL, Matsudo V, Barreira TV, Tudor-Locke C, et al. Moderate-to-Vigorous Physical Activity and Sedentary Behavior: Independent Associations With Body Composition Variables in Brazilian Children. Pediatr Exerc Sci. 2015 Aug;27(3):380–9.	Non-representative sample
29.Ferreira RW, Rombaldi AJ, Ricardo LIC, Hallal PC, Azevedo MR. Prevalência de comportamento sedentário de escolares e fatores associados. Revista Paulista de Pediatria. 2016 Mar 1;34(1):56–63.	Non-representative sample
30.Fonseca V de M, Sichieri R, Veiga GV da. Factors associated with obesity among adolescents. Revista de Saúde Pública. 1998 Dec;32(6):541–9.	Did not report SB
31.Gambardella AMD, Gotlieb SLD. Energy expenditure by adolescents in night school. Revista de Saúde Pública. 1998 Oct;32(5):413–9.	Did not report SB
32.Giugliano R, Carneiro EC. Factors associated with obesity in school children. Jornal de Pediatria. 2004 Feb;80(1):17–22.	Non-representative sample
33.Greca JP de A, Silva DAS. Sedentary Behavior During School Recess in Southern Brazil. Percept Mot Skills. 2017 Feb 1;124(1):105–17.	Non-representative sample
35.Greca JP de A, Silva DAS, Loch MR, Greca JP de A, Silva DAS, Loch MR. Physical activity and screen time in children and adolescents in a medium size town in the South of Brazil. Revista Paulista de Pediatria. 2016 Sep;34(3):316–22.	Non-representative sample
36.Guedes DP, Guedes JERP, Barbosa DS, Oliveira JA de. Níveis de prática de atividade física habitual em adolescentes. Revista Brasileira de Medicina do Esporte. 2001 Dec;7(6):187–99.	Non-representative sample
37.Hoefelmann LP, Silva KS, Filho B, Cordeiro V, Silva JA da, Nahas MV, et al. Behaviors associated to sleep among high school students: cross-sectional and prospective analysis. Revista Brasileira de Cineantropometria & Desempenho Humano. 2014 Jul;16:68–78.	Intervention study (saúde na boa)
38.Júdice PB, Silva AM, Berria J, Petroski EL, Ekelund U, Sardinha LB. Sedentary patterns, physical activity and health-related physical fitness in youth: a cross-sectional study. Int J Behav Nutr Phys Act. 2017 04;14(1):25.	Sample composed of Portuguese students
39.Katzmarzyk PT, Barreira TV, Broyles ST, Champagne CM, Chaput J-P, Fogelholm M, et al. Relationship between lifestyle behaviors and obesity in children ages 9-11: Results from a 12-country study. Obesity (Silver Spring). 2015 Aug;23(8):1696–702.	Non-representative sample ISCOLE
40.Katzmarzyk PT, Barreira TV, Broyles ST, Champagne CM, Chaput J-P, Fogelholm M, et al. Physical Activity, Sedentary Time, and Obesity in an International Sample of Children. Med Sci Sports Exerc. 2015 Oct;47(10):2062–9.	Non-representative sample ISCOLE
41.LeBlanc AG, Katzmarzyk PT, Barreira TV, Broyles ST, Chaput J-P, Church TS, et al. Correlates of Total Sedentary Time and Screen Time in 9-11 Year-Old Children around the World: The International Study of Childhood Obesity, Lifestyle and the Environment. PLoS ONE. 2015;10(6):e0129622.	Non-representative sample ISCOLE
42.Lima MCC, Romaldini CC, Romaldini JH. Frequency of obesity and related risk factors among school children and adolescents in a low-income community. A cross-sectional study. Sao Paulo Med J. 2015 Apr;133(2):125–30.	Non-representative sample
43.Lippo BRS, Silva IM da, Aca CRP, Lira PIC de, Silva GAP da, Motta MEFA. Determinants of physical inactivity among urban adolescents. J Pediatr (Rio J). 2010 Dec;86(6):520–4.	Case-control
44.Louzada ML da C, Rauber F, Campagnolo PDB, Vitolo MR. Sleep duration and body mass index among southern Brazilian preschoolers. Arq Bras Cardiol. 2012 Dec;99(6):1156–8.	Non-representative sample

Continue...

... continue

Reference of search conducted in 2018	Reasons for excluded
45.Luciano A de P, Bertoli CJ, Adami F, Abreu LC de. NÍVEL DE ATIVIDADE FÍSICA EM ADOLESCENTES SAUDÁVEIS. Revista Brasileira de Medicina do Esporte. 2016 Jun;22(3):191–4.	Non-representative sample
46.Machado-Rodrigues AM, Leite N, Coelho-e-Silva MJ, Enes F, Fernandes R, Mascarenhas LPG, et al. Metabolic risk and television time in adolescent females. Int J Public Health. 2015 Feb;60(2):157–65.	Sample composed of Portuguese students
47.Menezes AS, Duarte M de F da S, Menezes AS, Duarte M de F da S. Living conditions, physical inactivity and sedentary behavior in young people in urban and rural areas. Revista Brasileira de Medicina do Esporte. 2015 Oct;21(5):338–44.	Did not report SB
48.Milagres LC, Rocha NP, Albuquerque FM, Castro APP, Filgueiras MS, Pessoa MC, et al. Sedentary behavior is associated with lower serum concentrations of vitamin D in Brazilian children. Public Health. 2017 Nov;152:75–8.	Did not report SB
49.Nascente FMN, Jardim TV, Peixoto M do RG, Carneiro C de S, Mendonça KL, Póvoa TIR, et al. Sedentary lifestyle and its associated factors among adolescents from public and private schools of a Brazilian state capital. BMC Public Health. 2016 21;16(1):1177.	SB = Inactivity
50.Nascimento A, Fiates G. A qualitative study of Brazilian children's habits. Nutrition & Food Science. 2013 Oct 28;43(6):527–34.	Non-representative sample and Did not report SB
51.Nobre MRC, Domingues RZ de L, Silva AR da, Colugnati FAB, Taddei JA de AC. Prevalence of overweight, obesity and lyfe style associated with cardiovascular risk among middle school students. Revista da Associação Médica Brasileira. 2006 Apr;52(2):118–24.	Did not report SB
53.Nogueira JAD, Macedo da Costa TH. Gender differences in physical activity, sedentary behavior, and their relation to body composition in active Brazilian adolescents. J Phys Act Health. 2009 Jan;6(1):93–8.	Sample only with activity youngs
54.Pardo IMCG, Jorge JS, Souza RGMA, Nascimento SRD, Santucci VCR, Martinez JE. Prevalência de comportamento sedentário em adolescentes de escola particular de ensino fundamental. Revista da Faculdade de Ciências Médicas de Sorocaba. 2011 Dec 22;13(4):13–8.	Non-representative sample
55.Petribú M de MV, Tassitano RM, Nascimento WMF do, Santos EMC, Cabral PC. Factors associated with overweight and obesity among public high school students of the city of Caruaru, Northeast Brazil. Revista Paulista de Pediatria. 2011 Dec;29(4):536–45.	SB only in obeses
56.Pitanga FJ, Alves CF, Pamponet ML, Medina MG, Pitanga FJ, Alves CF, et al. Screen time as discriminator for overweight, obesity and abdominal obesity in adolescents. Revista Brasileira de Cineantropometria & Desempenho Humano. 2016 Oct;18(5):539–47.	Non-representative sample
57.Qiao Y, Zhang T, Liu H, Katzmarzyk PT, Chaput J-P, Fogelholm M, et al. Joint association of birth weight and physical activity/sedentary behavior with obesity in children ages 9-11 years from 12 countries. Obesity (Silver Spring). 2017 Jun;25(6):1091–7.	Non-representative sample ISCOLE
58.Rendo-Urteaga T, de Moraes ACF, Collese TS, Manios Y, Hagströmer M, Sjöström M, et al. The combined effect of physical activity and sedentary behaviors on a clustered cardio-metabolic risk score: The Helena study. Int J Cardiol. 2015;186:186–95.	Only europeans children/adolescents
59.Reuter CP, Burgos MS, Pritsch CV, Silva PT da, Marques KC, Souza S de, et al. Obesidade, aptidão cardiorrespiratória, atividade física e tempo de tela em escolares da zona urbana e rural de Santa Cruz do Sul-RS. Cinergis [Internet]. 2015 Jul 9 [cited 2018 May 8];16(1). Available from: https://online.unisc.br/seer/index.php/cinergis/article/view/6271	Non-representative sample
60.Rodrigues VM, Fiates GMR. Children's eating habits and consumer behavior: influence of household income and television viewing habits. Revista de Nutrição. 2012 Jun;25(3):353–62.	Non-representative sample e resultado quali

Continue...

... continue

Reference of search conducted in 2018	Reasons for excluded
61.Roman-Viñas B, Chaput J-P, Katzmarzyk PT, Fogelholm M, Lambert EV, Maher C, et al. Proportion of children meeting recommendations for 24-hour movement guidelines and associations with adiposity in a 12-country study. Int J Behav Nutr Phys Act. 2016 Nov 25;13(1):123.	Non-representative sample ISCOLE
62.Sampasa-Kanyinga H, Standage M, Tremblay MS, Katzmarzyk PT, Hu G, Kuriyan R, et al. Associations between meeting combinations of 24-h movement guidelines and health-related quality of life in children from 12 countries. Public Health. 2017 Dec;153:16–24.	Non-representative sample ISCOLE
63.Santos A, Silva-Santos S, Andaki A, Mendes EL, Vale S, Mota J, et al. Screen time between Portuguese and Brazilian children: a cross-cultural study. Motriz: Revista de Educação Física [Internet]. 2017 [cited 2018 May 8];23(2). Available from: http://www.scielo.br/scielo.php?script=sci_abstract&pid=S1980-65742017000200306&lng=en&nrm=iso&tlng=en	Non-representative sample
64.Sherar LB, Griffin TP, Ekelund U, Cooper AR, Esliger DW, van Sluijs EMF, et al. Association between maternal education and objectively measured physical activity and sedentary time in adolescents. J Epidemiol Community Health. 2016 Jun;70(6):541–8.	Non-representative sample ISCOLE
65.Silva DAS, Silva RJ dos S. Soccer practice is associated with health-related behaviours among Brazilian male adolescents. Sport Sci Health. 2016 Aug 1;12(2):167–74.	Non-representative sample
66.Silva MAM da, Rivera IR, Ferraz MRMT, Pinheiro AJT, Alves SW dos S, Moura AÁ, et al. Prevalence of cardiovascular risk factors in child and adolescent students in the city of Maceió. Arquivos Brasileiros de Cardiologia. 2005 May;84(5):387–92.	SB = Inactivity
68.Silva MP da, Gasparotto G da S, Smolarek A de C, Dellagrana RA, Mascarenhas LPG, Campos W de, et al. COMPORTAMENTO SEDENTÁRIO RELACIONADO AO SOBREPESO E OBESIDADE EM CRIANÇAS E ADOLESCENTES. Pensar a Prática [Internet]. 2010 Sep 1 [cited 2018 May 8];13(2). Available from: https://www.revistas.ufg.br/fef/article/view/6709	Non-representative sample
69.Silva RJ dos S, Silva DAS, Oliveira AC. Low physical activity levels and associated factors in Brazilian adolescents from public high schools. J Phys Act Health. 2014 Sep;11(7):1438–45.	Did not report SB
70.Silva RCR da, Malina RM. Level of physical activity in adolescents from Niterói, Rio de Janeiro, Brazil. Cadernos de Saúde Pública. 2000 Dec;16(4):1091–7.	Non-representative sample
71.Siqueira PP, Alves JGB, Figueiroa JN. Variables associated with overweight in children from a shantytown in the Northeast of Brazil. Revista Paulista de Pediatria. 2009 Sep;27(3):251–7.	Non-representative sample
72.Smouter L, Silva KV da, Tozetto WR, Smolarek A de C, Mascarenhas LPG. O TEMPO DE ATIVIDADE SEDENTÁRIA EM ADOLESCENTES DE DIFERENTES FAIXAS ETÁRIAS. Arquivos de Ciências da Saúde. 2017 Mar 23;24(1):65–9.	Non-representative sample
73.Sousa GR de, Silva DAS. Sedentary behavior in adolescents in small city in the south of the country. Medicina (Ribeirao Preto Online). 2016 Jun 8;49(3):212–22.	Non-representative sample
74.Straatmann VS, Oliveira AJ, Rostila M, Lopes CS. Changes in physical activity and screen time related to psychological well-being in early adolescence: findings from longitudinal study ELANA. BMC Public Health. 2016 15;16:977.	SB only in obeses
75.Tassitano RM, Barros MVG de, Tenório MCM, Bezerra J, Hallal PC. Prevalence of overweight and obesity and associated factors among public high school students in Pernambuco State, Brazil. Cadernos de Saúde Pública. 2009 Dec;25(12):2639–52.	Non-representative sample
76.Victo ER de, Ferrari GL de M, Junior S, Da JP, Araújo TL, Matsudo VKR. INDICADORES DE ESTILO DE VIDA E APTIDÃO CARDIORRESPIRATÓRIA DE ADOLESCENTES. Revista Paulista de Pediatria. 2017 Mar;35(1):61–8.	Non-representative sample

Continue...

... continue

Reference of search conducted in 2018	Reasons for excluded
77.Vitorino PV de O, Barbosa MA, Sousa ALL, Jardim PCBV, Ferreira SS, Vitorino PV de O, et al. Prevalence of sedentary lifestyle among adolescents. Acta Paulista de Enfermagem. 2015 Apr;28(2):166–71.	Non-representative sample
78.Wainer J, Dwyer T, Dutra RS, Covic A, Magalhães VB, Ferreira LRR, et al. Too much computer and Internet use is bad for your grades, especially if you are young and poor: Results from the 2001 Brazilian SAEB. Computers & Education. 2008 Dec 1;51(4):1417–29.	Non-representative sample
79.Xavier M, Bielemann R, Maciel F, Neutzling M, Gigante D. Variação temporal no excesso de peso e obesidade em adolescentes de escola privada do Sul do Brasil. 1. 2014 Feb 10;19(1):74–74.	Non-representative sample
80.Zapata AL, Moraes AJP, Leone C, Doria-Filho U, Silva CAA. Pain and musculoskeletal pain syndromes related to computer and video game use in adolescents. Eur J Pediatr. 2006 Jun;165(6):408–14.	Non-representative sample

SB: Sedentary Behaviour.