

ORIGINAL ARTICLE

# Sedentary Behavior and Physical Activity of Schoolchildren from a Low-income Region in Brazil: Associations with Maternal Variables

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**Abstract**

**Introduction:** In the last decade, an increasing number of studies investigated markers of Sedentary Behavior (SB) and Physical Activity (PA) in school-age children since they lead to nutritional status changes in this group.

**Objective:** To analyze associations between maternal factors and SB and PA of schoolchildren.

**Methods:** This is a cross-sectional study involving 410 mothers of children enrolled between the first and the fifth year in municipal schools of Santa Cruz, RN, Brazil. By applying questionnaires, socioeconomic variables of the family, maternal data, and habits related to SB and PA on weekdays and weekends were investigated. Pearson's chi-square test and Fisher's exact test were used to test associations.

**Results:** It was observed that income below one minimum wage and less maternal education were associated with greater active transportation among children (69.3%,  $p = 0.012$  and 68.4%,  $p = 0.022$ , respectively). Children from low-income families (65.4%,  $p = 0.016$ ) and who had six and seven siblings (8.2%,  $p = 0.023$  and 7.6%,  $p = 0.037$ , respectively) presented lower SB at the weekend. Low level of maternal education was associated with reduced PA during the week (70.8%,  $p = 0.024$ ).

**Conclusion:** Socioeconomic (i.e., family income and number of siblings) and maternal factors (i.e., level of education) are important indicators for time spent on sedentary behavior and physical activity of schoolchildren.

**Keywords:** children, physical inactivity, sedentary lifestyle, socioeconomic level, maternal education.

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## Authors summary

### Why was this study done?

Interviews were conducted using questions elaborated according to the current literature with mothers whose children were enrolled in the municipal urban education network (eight schools) between the first and fifth elementary school grades. The evaluation was carried out in Santa Cruz-RN, an interiorization pole of the Federal University of Rio Grande do Norte, which presents a low human development index. High levels of sedentary behavior and physical inactivity were found; children from families with low socioeconomic conditions showed reduced sedentary behavior and increased physical activity practice; and maternal education was reduced together with weekly physical activity practice.

### What did the researchers do and find?

Interviews were conducted using questions elaborated according to the current literature with mothers whose children were enrolled in the municipal urban education network (eight schools) between the first and fifth elementary school grades. The evaluation was carried out in Santa Cruz-RN, an interiorization pole of the Federal University of Rio Grande do Norte, which presents a low human development index. High levels of sedentary behavior and physical inactivity were found; children from families with low socioeconomic conditions showed reduced sedentary behavior and increased physical activity practice; and maternal education was reduced together with weekly physical activity practice.

### What do these findings mean?

Results point to a strong association between socioeconomic characteristics and maternal education, physical activity, and sedentary behavior in schoolchildren, probably due to lack of places and options for physical activity and the absence of health education to guide children about the importance of an active lifestyle.

## INTRODUCTION

In the last decade, the number of studies investigating sedentary behavior (SB) and physical activity (PA) markers in school-age children has been increasing<sup>1</sup>, once they lead to nutritional status changes in this group<sup>2-6</sup>. SB refers to activities that do not increase energy expenditure above rest, such as sleeping, sitting, lying down, watching television, and other leisure activities using screens (cell phone, computer, and tablet)<sup>3,4</sup>. Physical inactivity, on the other hand, is the absence of PA or regular physical exercise. At least 60 minutes/day of moderate or vigorous physical activity (MVPA) is recommended for children and adolescents to prevent changes in nutritional status<sup>5-8</sup>.

Active lifestyle protects the individual from several health problems. Therefore, it is necessary to promote and support national programs that encourage daily PA practice<sup>5</sup>. However, developing countries do not always have places to practice PA due to the lack of resources for investments in education and health<sup>5,9</sup>. Such a scenario may favor PA practice reduction in schoolchildren, which can also be related to the lack of investment in this area<sup>7,9,10</sup>. The last national assessment conducted with elementary school students revealed that only 9.3% of public schools had adequate places for PA practice, while the national access to leisure areas in schools is 17.7%<sup>9</sup>. The proportion of private school students with access to PA at school is four times higher in the national scenario and six times higher in the northeast region of Brazil, indicating that better socioeconomic conditions reflect on students' access to PA<sup>11</sup>.

Family socioeconomic conditions can also impact the lifestyle of students. According to the National School-based Health Survey, guardians' education was a protective factor for children and adolescents' health<sup>9</sup>. Compared with previous editions of this study, an increase in maternal education (from 8.9% to 13.3% of mothers with university degree) and decrease in illiteracy or incomplete elementary school (from 34.5% to 24.8%) was observed<sup>9</sup>. In addition to maternal education, income and socioeconomic status were associated with children's health promotion, indicating that the lower the family

income, the higher the risk factor. This expresses the need for social programs for sedentary prevention and health promotion<sup>10</sup>. An observational study conducted with adolescents (10-18 years old) analyzed ten studies and assessed associations between family socioeconomic status and PA and SB. The study found that adolescents whose mothers had superior education spent more time in SB and less time in mild and moderate-vigorous PA than adolescents whose mothers had completed high school<sup>12</sup>. These findings suggest that adolescents with low socioeconomic status may have advantages regarding daily PA practice, which differs from the National School-based Health Survey results<sup>9</sup>.

In this sense, the influence of socioeconomic factors on SB and PA of children is still underexplored. Therefore, this study aimed to analyze the maternal factors associated with sedentary behavior (SB) and physical activity (PA) practice of schoolchildren.

## METHODS

### Study design

This is a cross-sectional descriptive-analytical study, with convenience sampling<sup>13</sup>. This study used baseline data from a project entitled "Obesity, physical inactivity and diet in schoolchildren living in the city of Santa Cruz, RN: a longitudinal study", previously approved by the research ethics committee of the Federal University of Rio Grande do Norte (CAAE: 39203314.6.0000.5568).

### Participants

Participants included in the study were mothers whose children were enrolled between the first and fifth grade in municipal schools of the urban region of Santa Cruz - RN, Brazil. Data were collected between May 2015 and November 2017 in eight municipal schools. Santa Cruz has a medium Human Development Index (HDI) (0.635), and its Gross Domestic Product (GDP) per capita is 1/3 of the national average, indicating an unstable sociodemographic reality. Natal (capital of Rio Grande do Norte), despite better development levels, also

presents social vulnerability in some areas, mainly related to the financial situation<sup>14</sup>. In 2015, Santa Cruz had 38,538 thousand inhabitants and eight municipal schools in the urban area. According to the Education Department of the municipality, 1,200 children were enrolled between the first and fifth elementary school grades.

### Data Collection Procedure

All schools in the urban area of Santa Cruz were included after municipal consent. Mothers were invited to attend school on previously scheduled days for an interview. At the time of the interview and data collection, mothers interested in participating in the study signed two copies of the informed consent form. In a single visit, mothers were asked to answer a sociodemographic questionnaire, including questions about nutritional status, family income, educational level, and their child's lifestyle (SB and PA).

Maternal nutritional status was assessed using self-reported weight and body height, used to calculate Body Mass Index (BMI). The family income was assessed by asking the gross value, while educational level was evaluated according to the Brazilian Association of Population Studies (BAPS)<sup>15</sup>. Maternal variables were reported as follows: income (< 1 minimum wage; ≥ 1 minimum wage), education (< complete elementary school; ≥ complete elementary school), age (≤ 35 years; > 35 years), BMI (not overweight: ≤ 24.9 kg/m<sup>2</sup>; overweight: ≥ 25 kg/m<sup>2</sup>), and if they were employed outside the home (yes; no). The number of siblings (no siblings; 1 to 4; 5 or more) and whether the family had a car, DVD device, or motorcycle were also assessed<sup>15</sup>.

SB was evaluated by daily screen time (ST) during week and weekend, considering the number of minutes in which the child remained in front of television, computer, cell phone, and other electronic devices at home. Mothers had to quantify ST duration on a time scale, considering the following categories: i) 0 min, ii) > 0-30 min, iii) > 30-60 min, iv) > 60-120 min, v) > 120-180 min, vi) > 180-240 min, and vii) > 240 min. Questions were adapted from a previously validated protocol<sup>16</sup>. SB was classified as more or less than 120 minutes<sup>17</sup> and categorized as: i) SB during the week (seven days), ii) SB during weekdays, and iii) SB during the weekend.

PA was self-reported and assessed considering the mothers' responses about how long their child performed moderate to vigorous-intensity PA daily (this assessment was performed using child's signs, such as sweating, tiredness, and wheezing). PA was categorized into: "PA during weekdays", "PA during the weekend", and "PA during the week (seven days)". For "MVPA" classification, a 60-minute cut-off time was standardized as recommended by Onis<sup>8</sup>.

As additional PA practice indicators, the existence of a place for leisure activities near the residence (binary variable, exists or does not exist) and the type of transportation to school was also assessed and categorized (binary variable, active or passive transportation).

### Statistical analysis

The Kolmogorov-Smirnov test verified data

normality. Data is described in absolute and relative frequencies. Pearson's chi-square test or Fisher's exact test was used to test associations between family income, maternal education, and lifestyle variables of the students. Statistical significance was assumed for p values < 0.05. Statistical analyzes were performed using SPSS for Windows version 20.0.

## RESULTS

Seven hundred seventeen mothers were interviewed, from which 307 were excluded due to incomplete data (*i.e.*, difficulty to answer some questions because they did not know or want to answer, abandoned the interview, or the school guardian of the child did not live with the child). A total of 410 participants were included once they presented all data to assess the primary outcomes of sedentary behavior and physical activity.

Table 1 shows data regarding maternal sociodemographic characteristics and lifestyle of the students. Mothers were overweight, and most had incomplete elementary school and income below one minimum wage. A higher proportion of children with high SB was observed (ST exposure higher than 2 hours per day). Finally, most children did not meet the minimum recommended time for moderate-vigorous physical activity.

**Table 1:** Maternal socio-demographic characteristics and lifestyle of students (n = 410)

Variables	Mean ± SD or n (%)
Mothers	
Age, years	35.2 ± 9.4
Body mass index, kg/m <sup>2</sup>	27.2 ± 5.4
Income	
< 1 minimum wage	244 (59.5)
Educational level	
Illiterate	30 (7.3)
Incomplete elementary school	233 (56.8)
Complete elementary school	63 (15.4)
Incomplete high school	34 (8.3)
Complete high school	47 (11.5)
Incomplete superior education	3 (0.7)
Students	
Age, years	8.8 ± 2.2
Sedentary behavior, >120 min/day	
Screen time during the week	213 (52.0)
Screen time during the weekend	205 (50.0)
Physical activity, < 60 min/day	
Time of physical activity practice during the week	161 (39.3)
Time of physical activity practice during the weekend	162 (39.5)
Moderate or vigorous physical activity practice	331 (80.7)

Table 2 shows the association between family income and students' lifestyle. Children whose family income was less than one minimum wage and whose

mothers had less education presented more active transportation ( $p = 0.012$ ;  $p = 0.022$ ).

**Table 2:** Association between socioeconomic indicators and both maternal education and lifestyle of students (n = 410)

	< 1 minimum wage	≥ 1 minimum wage	p	< Complete elementary school	> Complete elementary school	p
	n (%)	n (%)		n (%)	n (%)	
Place for leisure activities near the residence						
Yes	113 (46.3)	72 (43.4)	0.557	118 (44.9)	67 (45.6)	0.890
No	131 (53.7)	94 (56.6)		145 (55.1)	80 (54.4)	
Walking or cycling transportation						
Yes	169 (69.3)	95 (57.2)	<b>0.012</b>	180 (68.4)	84 (57.1)	<b>0.022</b>
No	75 (30.7)	71 (42.8)		83 (31.6)	63 (42.9)	

Values in bold correspond to p value of < 0.05.

Table 3 shows the association between SB and sociodemographic variables. Family income below one minimum wage was associated with reduced SB in children during the weekend ( $p = 0.016$ ).

Table 4 shows the association between PA and sociodemographic variables. Lower maternal education and DVD device at home were associated with reduced PA practice in children during weekdays and weekend ( $p = 0.024$ ;  $p = 0.035$ ), respectively.

**Table 3:** Associations between sociodemographic data and lifestyle of children with sedentary behavior (minutes/day)

	SB during the week		p	SB during the weekdays		p	SB during the weekend		p
	> 120 min n (%)	≤ 120 min n (%)		> 120 min n (%)	≤ 120 min n (%)		> 120 min n (%)	≤ 120 min n (%)	
Maternal income (n = 410)									
< 1 minimum wage	156 (58)	88 (62.4)	0.387	121 (56.8)	123 (62.4)	0.246	134 (65.4)	110 (53.7)	<b>0.016</b>
> 1 minimum wage	254 (42)	322 (37.6)		289 (43.2)	287 (37.4)		276 (34.6)	300 (46.3)	
Educational level (n = 410)									
< Complete elementary school	167 (62.1)	96 (68.1)	0.229	133 (62.4)	130 (66)	0.454	136 (66.3)	127 (62)	0.354
> Complete elementary school	102 (37.9)	45 (31.9)		80 (37.6)	67 (34)		69 (33.7)	78 (38)	
Maternal age (n = 410)									
< 35 years	175 (66.1)	81 (57.4)	0.131	141 (66.2)	115 (58.4)	0.479	126 (61.5)	130 (63.4)	0.683
> 35 years	94 (34.9)	60 (42.6)		72 (33.8)	82 (41.6)		79 (38.5)	75 (36.6)	
Maternal Body Mass Index (n = 373)									
Overweight	160 (65.8)	79 (60.8)	0.330	129 (66.2)	110 (61.8)	0.381	117 (62.9)	122 (65.2)	0.638
Not overweight	213 (34.2)	294 (39.2)		244 (33.8)	263 (38.2)		256 (37.1)	251 (34.8)	
Number of siblings (n = 330)									
None	38 (17.9)	18 (17.6)	0.545	27 (16.5)	32 (19.2)	0.904	26 (15.2)	30 (18.9)	0.623
1 to 4	156 (73.6)	86 (11.9)		122 (74.4)	120 (72.3)		127 (74.3)	115 (72.3)	
5 or more	18 (8.5)	14 (88.1)		15 (9.1)	17 (10.2)		18 (10.5)	14 (8.8)	

**Continuation - Table 3:** Associations between sociodemographic data and lifestyle of children with sedentary behavior (minutes/day)

	SB during the week			SB during the weekdays			SB during the weekend		
	> 120 min	≤ 120 min	p	> 120 min	≤ 120 min	p	> 120 min	≤ 120 min	p
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Employed outside home (n = 329)									
Yes	50 (23.8)	36 (30.3)	0.201	40 (24.7)	46 (27.5)	0.556	48 (27.9)	38 (24.2)	0.445
No	160 (76.2)	83 (69.7)		122 (75.3)	121 (72.5)		124 (72.1)	119 (75.8)	
Own a car (n = 232)									
Yes	4 (2.7)	4 (4.7)	0.425 <sup>2</sup>	4 (3.3)	4 (3.6)	0.881	4 (3.6)	4 (3.3)	0.881
No	143 (97.3)	81 (95.3)		118 (96.7)	106 (96.4)		106 (96.4)	118 (96.7)	
Own a DVD (n = 276)									
Yes	124 (69.7)	70 (71.4)	0.759	94 (67.1)	100 (73.5)	0.246	90 (70.9)	104 (69.8)	0.847
No	54 (30.3)	28 (28.6)		46 (32.9)	36 (26.5)		37 (29.1)	45 (30.2)	
Own a motorcycle (n = 161)									
Yes	27 (29.7)	27 (29.7)	0.416	21 (28.4)	31 (35.6)	0.327	30 (31.6)	22 (33.3)	0.815
No	64 (70.3)	45 (64.3)		53 (71.6)	569 (64.4)		65 (68.4)	44 (66.7)	

<sup>1</sup> Pearson's chi-square test; <sup>2</sup> Fisher's Exact Test. Values in bold correspond to p value of < 0.05.

**Table 4:** Associations between sociodemographic data and lifestyle of children with physical activity (minutes/day)

	PA during the week			PA during the weekdays			PA during the weekend		
	< 60 min	≥ 60 min	p	< 60 min	≥ 60 min	p	< 60 min	≥ 60 min	p
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Maternal income (n = 410)									
< 1 minimum wage	55 (57.3)	189 (60.2)	0.613	93 (57.8)	151 (60.6)	0.562	149 (60.1)	95 (58.6)	0.772
> 1 minimum wage	355 (42.7)	221 (39.8)		317 (42.2)	259 (40.8)		251 (40.9)	315 (42.4)	
Maternal educational level (n = 410)									
< Complete elementary school	65 (67.7)	198 (63.1)	0.406	114 (70.8)	149 (59.8)	<b>0.024</b>	154 (62.1)	109 (67.3)	0.284
> Complete elementary school	31 (32.3)	116 (36.9)		47 (29.2)	100 (40.2)		94 (37.9)	53 (32.7)	
Maternal age (n = 410)									
< 35 years	57 (59.4)	199 (63.4)	0.479	94 (58.4)	162 (65.1)	0.173	161 (64.9)	95 (58.6)	0.199
> 35 years	39 (40.6)	115 (36.6)		67 (41.6)	87 (34.9)		87 (35.1)	67 (41.4)	
Maternal Body Mass Index (n = 373)									
Overweight	60 (66.7)	179 (63.3)	0.556	101 (67.8)	138 (61.6)	0.223	145 (65)	94 (62.7)	0.642
Not overweight	30 (33.3)	60 (36.7)		48 (32.2)	86 (38.4)		78 (35)	56 (37.3)	
Number of siblings (n = 330)									
None	43 (16.7)	13 (17.8)	0.386	23 (17.3)	33 (16.8)	0.990	29 (33.9)	27 (20.8)	0.169
1 to 4	186 (72.4)	56 (76.7)		97 (72.9)	145 (73.6)		148 (74)	94 (72.3)	
5 or more	28 (8.5)	4 (5.5)		13 (9.8)	19 (9.6)		23 (11.5)	9 (6.9)	
Employed outside home (n = 329)									
Yes	22 (30.1)	64 (25)	0.378	40 (29.9)	46 (23.6)	0.204	48 (24.1)	38 (29.2)	0.302
No	51 (69.9)	192 (75)		94 (70.1)	149 (76.4)		151 (75.9)	92 (70.8)	

**Continuation - Table 4:** Associations between sociodemographic data and lifestyle of children with physical activity (minutes/day)

	PA during the week			PA during the weekdays			PA during the weekend		
	< 60 min	≥ 60 min	p	< 60 min	≥ 60 min	p	< 60 min	≥ 60 min	p
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Own a car (n = 232)									
Yes	2 (3.9)	6 (3.3)	0.834	4 (4.5)	4 (2.8)	0.474	5 (3.4)	3 (3.5)	0.980
No	230 (96.1)	226 (96.7)		228 (95.5)	228 (97.2)		227 (96.6)	229 (96.5)	
Own a DVD (n = 276)									
Yes	47 (74.6)	147 (69)	0.394	71 (68.9)	123 (71.1)	0.703	111 (65.7)	83 (77.6)	<b>0.035</b>
No	16 (25.4)	66 (31)		21 (31.1)	50 (28.9)		58 (34.3)	24 (22.4)	
Own a motorcycle (n = 161)									
Yes	12 (36.4)	40 (31.2)	0.575	21 (33.3)	31 (31.6)	0.822	31 (29.8)	21 (36.8)	0.361
No	21 (63.6)	88 (68.8)		42 (66.7)	67 (68.4)		73 (70.2)	36 (63.2)	

<sup>1</sup> Pearson's chi-square test; <sup>2</sup> Fisher's Exact Test. Values in bold correspond to p value of < 0.05.

## DISCUSSION

The main findings reveal that children from low-income family present less sedentary behavior on weekends, and less maternal education is associated with reduced physical activity practice during weekdays. Moreover, less than 20% of children participate in moderate-vigorous physical activity for more than 60 minutes per day, which is alarming due to the impact of inactive lifestyle on general health<sup>5</sup>.

In the present study, low-income family and schooling favored active transportation, possibly due to lack of vehicle. However, it is challenging to draw conclusions from this finding alone since distance traveled by children was not investigated. Although sedentary lifestyle is more prevalent in children<sup>8,18</sup>, it is essential to emphasize that the studied population was performed in an inland city of Rio Grande do Norte, in which HDI and GDP is lower than the national average. Moreover, children can walk or cycle (active transportation) in the city due to its size.

Mothers presented low educational level, with a higher prevalence of illiteracy and incomplete elementary education (64.2%) than national and northeast region averages, 24.5% and 32.6%, respectively<sup>9</sup>. Our study corroborates with these findings<sup>12</sup> since children whose mothers have lower education presented increased PA time during the week. This reveals the importance of sociodemographic aspects once mothers with low educational level take their children to school by walking (encouraging active transportation) and had little access to consumer goods to increase SB of the children.

Recent research investigated how maternal and family characteristics affect SB of children<sup>19,20</sup>. In China, the presence of parents or guardians at home reduced ST in portable media rather than TV in schoolchildren<sup>20</sup>. Herein, no significant differences were found in SB when mothers were employed outside the home. However, an association between socioeconomic aspects and ST was observed.

The National School-based Health Survey observed that SB is relatively more frequent in students from public (61.2%) than private schools (51.5%), and physical inactivity follows the same pattern<sup>9</sup>. A study evaluating PA practice in public and private schools of Florianópolis between 2002 and 2007 showed that students from public schools were more inactive in both years<sup>21</sup>.

This is probably related to the fact that children from low-income families go to school walking or cycling. Therefore, an effective action towards adopting an active lifestyle is suggested, reinforcing the importance of the school environment to change this behavior. Further studies with larger samples or direct PA and SB measures are needed to elucidate this behavior.

Although a high prevalence of SB among schoolchildren was found in the present study, a reduction occurs on weekends since most children showed ST inferior to 120 minutes, indicating poverty and lack of access to consumer goods. Corroborating with this information, our findings suggest that DVD player at home reduces PA time even during the weekend. Despite DVD usage has been considerably reduced, it remains a leisure option in Santa Cruz due to the lack of access to computers and internet by most of the population.

Another important feature was the analysis of SB and PA practice between weekdays and weekends. Since schoolchildren spend at least one day shift at school, different behaviors between periods can be assumed, and associations were statistically significant in the present study. No other studies assessing differences between SB and PA on weekdays and weekends in this population were found. Consistently, Tanaka *et al.*<sup>22</sup> compared these variables throughout the school year and summer vacation and reported that higher ST during summer vacation was associated with weight increase.

As study limitations, PA and SB measurements were analyzed indirectly based on the guardians' report. It was not possible to directly assess these dimensions using pedometers or accelerometers. Such method represents

confounding measures inherent to the instrument applied because guardians cannot accurately report the amount of time spent by children on the above-mentioned activities. Furthermore, the exclusion of ~50% of the sample due to incomplete information can also be mentioned.

Despite this, the present study adds important information about lifestyle of this population, especially in regions lacking studies and evidence, such as inland cities of northeast Brazil. Although there are studies in the literature regarding PA levels and SB in schoolchildren<sup>23–25</sup>, this is the first study describing and performing associations in public schoolchildren of northeast Brazil, in which precarious resources for education and health are present, compromising the students' health.

## REFERENCES

1. Saunders TJ, Gray CE, Poitras VJ, Chaput J-P, Janssen I, Katzmarzyk PT, et al. Combinations of physical activity, sedentary behaviour and sleep: relationships with health indicators in school-aged children and youth. *Appl Physiol Nutr Metab.* junho de 2016; 41(6 (Suppl. 3)): S283–93.
2. Simon C, Kellou N, Dugas J, Platat C, Copin N, Schweitzer B, et al. A socio-ecological approach promoting physical activity and limiting sedentary behavior in adolescence showed weight benefits maintained 2.5 years after intervention cessation. *Int J Obes.* julho de 2014; 38(7): 936–43.
3. de Farias Júnior, JC. (In) Atividade física e comportamento sedentário: estamos caminhando para uma mudança de paradigma? . *Revista Brasileira de Atividade Física & Saúde*, v. 16, n. 4, p. 279-280, 2011.
4. Pate RR, O'Neill JR, Lobelo F. The evolving definition of “sedentary”. *Exercise and Sport Sciences Reviews.* outubro de 2008; 36(4): 173–8.
5. Organização Pan-Americana de Saúde (OPAS). Plano de Ação para Prevenção da Obesidade em Crianças e Adolescentes. 2014: 1–36.
6. World Health Organization. Recomendaciones mundiales sobre actividad física para la salud. 2010: 1–56.
7. Guerra PH, Farias Júnior JC de, Florindo AA. Sedentary behavior in Brazilian children and adolescents: a systematic review. *Rev Saúde Pública [Internet]*. 2016 [citado 01 de maio de 2021]; 50(0). Disponível em: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0034-89102016000100501&lng=en&tng=en](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89102016000100501&lng=en&tng=en)
8. de Onis M. Preventing childhood overweight and obesity. *Jornal de Pediatria.* março de 2015; 91(2): 105–7.
9. Instituto Brasileiro de Geografia e Estatística, organizador. Pesquisa nacional de saúde do escolar, 2015. Rio de Janeiro: IBGE; 2016. 126 p.
10. IBGE, Coordenação de População. Síntese de indicadores sociais: uma análise das condições de vida da população brasileira: 2015. Rio de Janeiro: IBGE, 2015.
11. Brazil, organizador. Plano nacional de saúde - pns, 2012-2015. 1a edição. Brasília, DF: Ministério da Saúde; 2012. 110 p. (Série B-Textos básicos de saúde).
12. 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.* junho de 2016; 70(6): 541–8.
13. Zangirolami-Raimundo J, Echeimberg JDO, Leone C. Research methodology topics: Cross-sectional studies. *J Hum Growth Dev.* 28 de novembro de 2018; 28(3): 356–60.
14. Barbosa IR, Gonçalves RCB, Santana RL. Mapa da vulnerabilidade social do município de Natal-RN em nível de setor censitário. *J Hum Growth Dev.* 6 de maio de 2019; 29(1): 48–56.
15. Associação Brasileira de Empresas de Pesquisa. Critério Brasil 2015 e atualização da distribuição de classes para 2016. Critério de Classificação Econômica Brasil, 2016.
16. Rey-López JP, Ruiz JR, Ortega FB, Verloigne M, Vicente-Rodriguez G, Gracia-Marco L, et al. Reliability and validity of a screen time-based sedentary behaviour questionnaire for adolescents: The HELENA study. *European Journal of Public Health.* 1o de junho de 2012; 22(3): 373–7.
17. Council on Communications and Media. Children, adolescents, obesity, and the media. *PEDIATRICS.* 1o de julho de 2011; 128(1): 201–8.

## CONCLUSION

The findings of this study indicate that the prevalence of sedentary behavior and physical inactivity is high. Children from families with low socioeconomic status (*i.e.*, family income and DVD ownership) show less sedentary and more physical activity behaviors. Moreover, mothers with low educational level have children that practice less physical activity during the week.

## Conflict of interest

The authors declare no conflicts of interest.

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18. Reilly J, Jackson D, Montgomery C, Kelly L, Slater C, Grant S, et al. Total energy expenditure and physical activity in young Scottish children: mixed longitudinal study. *The Lancet*. janeiro de 2004; 363(9404): 211–2.
19. Hartson KR, Gance-Cleveland B, Amura CR, Schmiede S. Correlates of physical activity and sedentary behaviors among overweight hispanic school-aged children. *Journal of Pediatric Nursing*. maio de 2018; 40: 1–6.
20. Ye S, Chen L, Wang Q, Li Q. Correlates of screen time among 8–19-year-old students in China. *BMC Public Health*. dezembro de 2018; 18(1): 467.
21. Costa FF da, Assis MAA de, Leal DB, Campos VC, Kupek E, Conde WL. Mudanças no consumo alimentar e atividade física de escolares de Florianópolis, SC, 2002 - 2007. *Rev Saúde Pública*. dezembro de 2012; 46 (suppl 1): 117–25.
22. Tanaka C, Reilly J, Tanaka M, Tanaka S. Changes in weight, sedentary behaviour and physical activity during the school year and summer vacation. *IJERPH*. 4 de maio de 2018; 15(5): 915.
23. Costa FF da, De Assis MAA. Perfil de atividade física e consumo alimentar autorrelatado de escolares de 7 a 10 anos da rede pública e privada . *Rev Bras Cineantropom Desempenho Hum*. 24 de agosto de 2012; 14(5): 497–506.
24. Ferreira RW, Rombaldi AJ, Ricardo LIC, Hallal PC, Azevedo MR. Prevalência de comportamento sedentário de escolares e fatores associados. *Revista Paulista de Pediatria*. março de 2016; 34(1): 56–63.
25. Hallal PC, Knuth AG, Cruz DKA, Mendes MI, Malta DC. Prática de atividade física em adolescentes brasileiros. *Ciênc saúde coletiva*. outubro de 2010; 15 (suppl 2): 3035–42.

## Resumo

**Introdução:** Na última década, um número crescente de estudos tem se preocupado em investigar marcadores de Comportamento Sedentário (CS) e Atividade Física (AF) em crianças na idade escolar, por serem reconhecidos como causadores de alterações do estado nutricional nesta faixa etária.

**Objetivo:** Analisar os fatores associados maternos sobre o CS e AF de escolares.

**Método:** Trata-se de uma pesquisa com delineamento transversal, envolvendo 410 mães de crianças matriculadas entre o primeiro e quinto ano nas escolas municipais de Santa Cruz, RN, Brasil. Por meio da aplicação de questionários, foram investigadas variáveis socioeconômicas da família, dados maternos e hábitos relacionados ao CS e AF dos escolares, nos dias da semana e no final de semana. Para testar associações foi utilizado o teste Qui-quadrado de Pearson e Teste Exato de Fisher.

**Resultados:** Foi observado que uma renda inferior a um salário mínimo e menor escolaridade materna foram associados com maior deslocamento ativo das crianças (69,3%,  $p = 0,012$  e 68,4%  $p = 0,022$ , respectivamente). As crianças de famílias com baixa renda (65,4%,  $p = 0,016$ ) e que tinham seis e sete irmãos (8,2%,  $p = 0,023$  e 7,6%,  $p = 0,037$ , respectivamente) apresentam menor CS no final de semana. Um menor grau de escolaridade materna foi associado com uma menor prática de AF durante a semana (70,8%,  $p = 0,024$ ).

**Conclusão:** Conclui-se que os fatores socioeconômicos (i.e., renda familiar e número de irmãos) e maternos (i.e., nível de escolaridade) são importantes indicadores para o tempo dispendido em comportamento sedentário e atividade física de escolares.

**Palavras-chave:** crianças, inatividade física, estilo de vida sedentário, nível socioeconômico, escolaridade materna.

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