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Eating habits, physical activity and sedentary behavior among Brazilian schoolchildren: National Student Health Survey, 2015

Hábitos alimentares, atividade física e comportamento sedentário entre escolares brasileiros: Pesquisa Nacional de Saúde do Escolar, 2015

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ABSTRACT: ***Introduction***: Urbanization and industrialization have contributed to changes in eating patterns, as well as the emergence of sedentary behaviors and reduced physical activity. ***Objectives***: To identify and describe the prevalence of eating habits, physical activity and sedentary behavior in Brazilian schoolchildren, and to analyze their association with sociodemographic characteristics. ***Methods***: Data from the National Student Health Survey (PeNSE) of 2015 were used. Prevalence rates, prevalence ratios, and 95% confidence intervals (95%CI) were calculated. The analyses were adjusted for age and maternal schooling. Results: The majority of adolescents: consumed beans (65.1%) and snacks (52.3%); had more than three days of physical education at school (50.7%); practiced physical activity out of school for more than three days (55.4%); had a sedentary behavior (73.3%); and, had physical activity during 60min/day for less than four days a week (72.7%). In general, girls were more exposed to unhealthy eating habits and sedentary behavior, and a higher socioeconomic level was associated with higher prevalence of the indicators studied. High consumption of unhealthy foods, increased sedentary behavior and reduction in the practice of physical activity. ***Conclusion***: An association of unhealthy attitudes with sociodemographic characteristics was observed among schoolchildren. Strategies that focus on reducing these behaviors will contribute to health promotion actions in the school and family environments.

Keywords: Adolescent. School. Food habits. Physical activity.

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RESUMO: ***Introdução***: A urbanização e a industrialização colaboraram para a alteração nos padrões de alimentação, bem como para o surgimento de comportamentos sedentários e a redução da atividade física. ***Objetivos***: Identificar e descrever a prevalência de hábitos alimentares, prática de atividade física e comportamento sedentário em escolares brasileiros e analisar sua associação com as características sociodemográficas. ***Métodos***: Foram utilizados dados da Pesquisa Nacional de Saúde do Escolar de 2015. Foram calculadas prevalências, razões de prevalências e intervalos de 95% de confiança (IC95%). As análises foram ajustadas para idade escolaridade materna. ***Resultados***: A maioria consumia feijão (65,1%) e guloseimas (52,3%), teve mais de três dias de aula de Educação Física escolar (50,7%), realizava atividade física fora da escola por mais de três dias (55,4%), tinha comportamento sedentário (73,3%) e realizava atividade física durante 60 min/dia por menos de quatro dias na semana (72,7%). Em geral, as meninas estavam mais expostas a práticas alimentares não desejáveis e ao comportamento sedentário, e o melhor nível socioeconômico associou-se a maiores prevalências dos indicadores estudados. Elevado consumo de alimentos não saudáveis, aumento do comportamento sedentário e redução na prática de atividade física. ***Conclusão***: Observou-se associação de atitudes não saudáveis com características sociodemográficas entre os escolares. Estratégias que foquem na redução desses comportamentos irão contribuir para ações de promoção da saúde nos ambientes escolar e familiar.

Palavras-chave: Adolescente. Escola. Hábitos alimentares. Atividade física.

INTRODUCTION

Important changes in the dietary patterns and physical activity (PA) habits of the world population characterize the food and nutritional transition[1]. Urbanization and industrialization contributed to the change in eating patterns[2], as well as to the emergence of sedentary behaviors (SB) and the reduction of PA[3].

Recently, there has been a rapid increase of this transition in developing countries, which are in the process of social, economic and technological changes, generating greater purchasing power and access to industrialized products of low nutritional quality[4,5].

In our country, the eating habits of adolescents have been characterized by the high consumption of ultra-processed foods (UPF)[6] that are rich in fats, sugar and sodium, and by the low consumption of fruits and vegetables[7-11]. In middle-income countries, such as Brazil, UPF consumption is growing rapidly[6]. Examples of these products include sandwich cookies, packaged snacks, soft drinks, instant noodles, among others[5].

Concomitantly, among adolescents, the time spent in SB with little movement and generally in a sitting or reclined position having an energy expenditure of less than 1.5 MET, such as watching television and using video games and computers, has also grown over time[12,13,14]. The habit of sitting for longer times is associated with a series of unfavorable health outcomes[13], including obesity[3], and can lead to greater consumption of UPF[13] due to the convenience of ingesting these products, since they are purchased in packages, ready to eat or to warm up[5].

Childhood and adolescence are particularly relevant times for the study of SB, as it is characterized by marked physical and mental changes[15]. In this sense, there is evidence that SB has a direct impact on health outcomes, such as obesity, metabolic syndrome and cardiovascular diseases[16,17], also having been described as related to reductions in life expectancy[18,19].

Thus, insufficient levels of PA practice can also cause damage to health and well-being and increase the risk of cardiovascular disease, high blood pressure, diabetes, certain types of cancer, obesity and early mortality[20]. Clinical and epidemiological studies have reported that people with insufficient levels of PA are more affected by depression and anxiety[21].

Despite having evidence that PA can act to prevent diseases and promote quality of life, a large population remains exposed to insufficient levels of PA practice. In Brazil, for example, data from the National School Health Survey (PeNSE) identified that 56.9% of Brazilian students in the 9th grade of elementary school did not meet the recommendations for PA practice (≥ 300 minutes per week)[22]. Recent research has shown that more than 70% of adolescents from different countries do not reach the recommendations for PA practice[23].

Thus, the objectives of this study were to identify and describe the prevalence of eating habits, PA practice and sedentary behavior in Brazilian schoolchildren and to analyze their association with sociodemographic characteristics.

METHODS

STUDY DESIGN AND POPULATION

Cross-sectional study, with information from PeNSE, a survey carried out with 51,192 students from the 9th grade from 26 federal capitals and the Federal District, in 2015.

In the sample of PeNSE 2015, the 2013 School Census register was used, and schools that reported having 9th grade classes in elementary school (formerly 8th grade) had their morning classes period included. The sample was dimensioned in order to estimate population parameters (proportions or prevalence) in several geographical domains, covering the 27 capitals and the five major geographic regions of the country.

DATA COLLECTION

Data collection was carried out in classrooms anonymously and individually, through a self-administered questionnaire, using a handheld computer, the personal digital assistant. The questionnaire was organized into thematic modules that included sociodemographic and family context characteristics, as well as exposure to various health risk and protection factors. More methodological details are described in the specific reports for each survey[24].

Only data regarding 9th grade students from the federal capitals and the Federal District were included. The choice of the 9th grade was justified by the minimum schooling considered

necessary to answer the self-administered questionnaire, in addition to the proximity of the reference age (13 to 15 years) recommended by the World Health Organization.

STUDY VARIABLES

Food consumption was measured using the frequency of consumption, in the seven days preceding the survey, of seven foods: beans, vegetables, fresh fruit; soft drinks, sweets, fried snacks and lunch meats. The first three were considered healthy eating markers, and the last four were considered unhealthy eating markers. This classification was based on nutritional recommendations for the prevention of chronic non-communicable diseases, and also on evidence that suggests the association of these variables with overweight and other risk factors for chronic non-communicable diseases, such as dyslipidemias[25-27].

The consumption of these foods was expressed in two ways:

- by the percentage distribution of the weekly consumption frequency for each food;
- by an indicator that expressed the proportion of adolescents who consumed each of the selected foods more frequently (five to seven days preceding the study) and less frequently (between zero and four days of the seven days preceding the study), an indicator already used in a risk factor surveillance system in the city of Rio de Janeiro (RJ)[28].

SB was evaluated in hours per day, collected through the following question: On an ordinary weekday, how long do you sit watching television, using a computer, playing video games, talking with friends or doing other activities? (Do not count Saturday, Sunday, holidays and time spent sitting at school). The response options were: up to 1 hour a day; more than 1 hour and up to 2 hours a day; more than 2 and up to 3; more than 3 and up to 4; more than 4 and up to 5; more than 5 and up to 6; more than 6 and up to 7; more than 7 and up to 8; more than 8 hours a day.

The time spent on SB was dichotomized in ≤ 2 hours or > 2 hours. This cutoff point was based on the American Academy of Pediatrics[29], which recommends two hours as a maximum screen time limit for children over two years old and for teenagers.

The following variables were included in the analyzes as possible confounders: gender (male, female), age (≤ 13, 14, 15 and 16 years old or over), self-reported skin color (white, black, yellow/indigenous, mixed race), maternal schooling (didn't study; incomplete elementary school; incomplete high school; incomplete higher education; complete higher education), asset index (in fifths) and geographic region. The asset index was constructed based on possession of a landline telephone, a computer (desktop or notebook, laptop, etc.), car and/or motorcycle, as well as the number of bathrooms with shower and internet access at home. The possession of a cell phone by the adolescents and the hiring of a maid at home (for three or more days a week) were also questioned. The construction of the asset index was done using the first component obtained based on an analysis of main components[30].

Regarding PA, it was decided to re-analyze only specific questions about leisure PA and active commuting to school. Physically active adolescents were defined as those who added 300 min/week or more of PA practice, including all domains (physical education classes at school, PA outside and inside the school). Also, the following percentages were estimated:

- sedentary adolescents (do not practice PA);
- those who watch TV for two or more hours a day;
- those who had two or more Physical Education classes in the week prior to the interview.

DATA ANALYSIS

Descriptive analyzes were performed and the absolute and relative frequencies of dependent and independent variables were calculated. Statistical analyzes were carried out using the Stata 12.0 statistical package (Statacorp LP, College Station, United States).

Bivariate analyzes were carried out on the associations and χ^2 test was performed for heterogeneity and for linear trend in the case of ordinal variables. Logistic regressions with variance were used to estimate odd and adjusted and unadjusted ratios. For comparison between the sexes, the χ^2 test was used. The results were expressed by adjusted odds ratios (OR) with respective 95% confidence intervals (95%CI), considering a statistically significant association of $p<0.05$.

ETHICAL ASPECTS

This study was based on public data (http://www.ibge.gov.br), and the original project of the survey was approved by the National Research Ethics Commission (CONEP), of the National Health Council, which regulates and approves health research involving human beings, through CONEP opinion No. 1.006.467, of March 30, 2015.

The Informed Consent Term was included in the smartphone, and the participants indicated that they were aware of participation in the research. Total anonymity and privacy were guaranteed to the participants; the Brazilian Institute of Geography and Statistics does not provide variables that can identify the participants in their database.

RESULTS

Of the 51,192 adolescents studied, 48.6% were female, and 51.4% were male (Table 1). Of the total, 41.7% were mixed race, 52.4% were 14 years old, 44.6% were from the Southeast Region, 25.8% of mothers had completed elementary school, and 26.2% were in the 4th income quintile (Table 1).

Table 1. Characteristics of PeNSE 2015 participants.

Variables	Girls				Boys			
	n	%	95%CI		n	%	95%CI	
Race								
White	8.607	35.2	34.2	36.2	8.784	37.8	36.7	38.8
Black	2.998	11.7	11	12.4	3.707	15.3	14.3	16
Yellow	1.533	6.1	5.6	6.6	962	3.9	3.5	4.3
Mixed Race	12.307	44	42.9	45	1.045	39.4	38.3	40.4
Indigenous	861	2.8	2.5	3.1	960	3.5	3.1	3.8
Age								
≤ 13	5.382	22.9	22	23.9	3.861	17.3	16.7	18.5
14	14.330	53.6	52.6	54.7	1.266	51.3	50	52.2
15	4.539	16.3	15.6	17.1	5.372	20.3	19.8	21.4
≥ 16	2.073	6.9	6.5	7.3	3.019	10.6	10	11.1
Region								
North	6.373	12.7	12.2	13.2	6.039	12.8	12.3	13.3
Northeast	9.106	24.5	23.8	25.1	8.313	23.1	22.4	23.8
Southeast	4.400	44	42.9	45.1	4.254	45.2	44.1	46.4
South	2.220	5.9	5.6	6.1	2.204	6.1	5.8	6.4
Midwest	4.225	12.8	12.3	13.2	4.058	12.5	12	13
MS								
DNS	5.067	19.5	18.7	20.4	3.940	15.5	14.7	16.3
IE	3.173	12.2	11.6	12.9	2.929	12.2	11.5	13
CE	6.862	26.3	25.4	27.2	6.321	25.3	24.3	26.2
CHS	5.452	19.7	18.8	20.5	5.503	21.1	20.2	22
CHE	5.716	22	21.1	22.9	6.104	25.6	24.7	26.6
Income (quintiles)								
1	5.584	17.3	16.6	18.2	4.632	15.2	14.5	15.9
2	5.483	19.3	18.5	20.8	4.905	19	18.2	19.8
3	5.312	21.3	20.4	22.2	5.037	21.4	20.5	22.3
4	5.478	25.7	24.7	26.8	5.628	26.8	25.8	27.8
5	4.385	16.3	15.5	17.5	4.569	17.4	16.6	18.2

95% CI: 95% confidence interval; MS: maternal schooling; SI: did not study; IE: incomplete elementary; CE: complete elementary; CHS: complete high school; CHE: complete higher education.

Table 2 shows the comparison between girls and boys in eating habits and PA, with a significant difference ($p \leq 0.001$) between the consumption of beans and fruits, which was more frequent in boys. Regarding the consumption of fried snacks, sweets and lunch meats, it was higher in girls ($p \leq 0.001$). It was observed that girls practiced more PA in physical education classes, while boys practiced PA outside of school more than three days/week, thus showing a significant difference when compared to girls ($p \leq 0.001$).

Regarding SB, 73.7% of students reported staying for up to two hours in front of the TV (Table 2). When asked about PA recommendations (60 min/day), it was observed that boys were more active compared to girls ($p \leq 0.001$) (Table 2).

The associations between regular consumption of healthy eating markers and the recommendation of PA and maternal schooling and income are shown in Table 3.

Regarding the association between the level of maternal schooling (complete high school) and the consumption of beans, it was found that boys whose mothers had completed high school had 20% (OR = 0.8; 95%CI 0.73 – 0.87) were less likely to consume beans compared to boys whose mothers did not formally study.

As for the association between the level of maternal schooling (complete high school) and the consumption of vegetables, it was found that boys whose mothers had completed elementary school had 30% (OR = 1.3; 95%CI 1.2 – 1.4) more likely to consume vegetables compared to boys whose mothers did not formally study.

We found no associations between income and healthy eating.

Table 4 shows the associations between regular consumption of unhealthy food and SB markers and maternal schooling and income. We noticed associations between the consumption of soft drinks, lunch meats and fried snacks with maternal schooling.

DISCUSSION

The results presented revealed that, among adolescents in the Brazilian capitals, there was frequent consumption of unhealthy food markers, that is, lower than recommended[31,32], in addition to the increase in SB and the reduction in the practice of PA.

The 2008-2009 Household Budget Survey (POF) found that adolescents had inadequate food consumption and that they had a worse diet than adults and the elderly[33]. The POF also found that adolescents consumed four times more sandwich cookies (12.3 g/day) and twice as much soda as adults[33].

These data refer to the importance of building healthy eating habits, due to their relevance both as a protective factor to the development of diseases and to the improvement of health conditions in adulthood when the appropriate measures are adopted from an earlier ages[34,35].

The Brazilian industrialized standard was composed of high consumption of foods such as fried snacks, soft drinks, sweets and lunch meats. This pattern of food consumption is

similar to that identified in children from Salvador (BA), consisting of fried foods, sweets, snacks and soft drinks/artificial juice[36].

Data from the second edition of PeNSE 2012 showed prevalence rates of regular consumption (≥ 5 days/week) of sweets, soft drinks, cookies, fried snacks and packaged snacks in,

Table 2. Characteristics and comparison of eating habits and physical activity by sex of PeNSE students, 2015.

	Girls		Boys		p
	n (%)	95%CI	n (%)	95%CI	
Bean					
yes	14.937 (60.3)	59.3 – 61.3	16.612 (70.1)	69.1 – 71	≤ 0.001
no	11.353 (39.6)	38.6 – 40.6	8.201 (29.9)	28.9 – 30.8	
Vegetables					
yes	12.032 (47)	46 – 48.1	11.865 (48)	46.9 – 49.1	0.20
no	14.259 (52.9)	51.8 – 53.9	12.942 (51.9)	50.8 – 53	
Fruit					
yes	10.486 (41.2)	40.1 – 42.2	10.690 (43.7)	42.6 – 44.8	≤ 0.001
no	15.801(58.7)	57.7 – 59.8	14.118 (56.2)	55.1 – 57.3	
Soft drinks					
yes	9.183 (35.7)	34.7 – 36.7	9.694 (40.7)	39.6 – 41.8	≤ 0.001
no	17.109 (64.2)	63.2 – 65.2	15.116 (59.2)	58.1 – 60.3	
Sweets					
yes	14.697 (57.7)	56.7 – 58.7	10.995 (46.7)	45.6 – 47.7	≤ 0.001
no	11.595 (42.2)	41.2 – 43.2	13.810 (53.2)	52.2 – 54.3	
Lunch meats					
yes	12.094 (46.8)	45.8 – 47.8	10.656 (43.7)	42.68 – 44.8	≤ 0.001
no	14.189 (53.1)	52.1 – 54.1	14.134 (56.2)	55.1 – 57.3	
Fried snacks					
yes	5.771 (21.5)	20.6 – 22.3	4.967 (20.2)	19.4 – 21.1	0.04
no	20.519 (78.4)	77.6 – 79.3	19.842 (79.7)	78.8 – 80.5	
Practiced PA for 60 min/day					
≤ 4 days	2.1425 (81.5)	80.7 – 82.4	15.693 (63.6)	62.5 – 64.6	≤ 0.001
≥ 5 days	4.766 (18.4)	17.5 – 19.2	9.020 (36.4)	35.3 – 37.4	

95%CI: 95% confidence interval; PA: physical activity.

Table 3. Association between regular consumption of healthy foods and recommendation of physical activity and the sociodemographic data of students.

Variable	Beans		Vegetables		Fruit		PA	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Boys								
MS								
DNS	1.00	-	1.00	-	1.00	-	1.00	-
IE	1.0	0.9 – 1.1	1.1	1.0 – 1.3	1.0	0.9 – 1.1	1.0	0.9 – 1.1
CE	1.0	0.9 – 1.1	1.3	1.2 – 1.4	1.0	0.9 – 1.3	1.0	0.9 – 1.1
CHS	0.8	0.7 – 0.8	1.6	1.4 – 1.7	1.1	1.0 – 1.2	1.0	0.9 – 1.1
CHE	0.9	0.9 – 1.0	0.9	0.8 – 1.0	1.0	0.9 – 1.1	0.9	0.8 – 1.0
Income (quintiles)								
1	1.00	-	1.00	-	1.00	-	1.00	-
2	1.2	1.1 – 1.3*	1.1	1.0 – 1.3	1.1	1.0 – 1.2	0.9	0.8 – 1.0
3	1.4	1.2 – 1.5*	1.3	1.2 – 1.4	1.2	1.1 – 1.3*	0.9	0.8 – 1.0
4	1.3	1.2 – 1.4*	1.5	1.4 – 1.7	1.1	1.0 – 1.2	0.9	0.8 – 1.0
5	0.9	0.8 – 1.0	1.6	1.5 – 1.8	1.2	1.1 – 1.4*	1.0	0.9 – 1.1
Girls								
MS								
DNS	1.00	-	1.00	-	1.00	-	1.00	-
IE	1.0	0.9 – 1.1	1.1	1.0 – 1.2	1.0	0.9 – 1.1	0.9	0.8 – 1.0
CE	0.9	0.9 – 1.0	1.3	1.2 – 1.4*	0.9	0.9 – 1.0	0.9	0.8 – 1.0
CHS	0.7	0.6 – 0.7*	1.5	1.4 – 1.6*	1.1	1.0 – 1.2	1.1	1.0 – 1.3
CHE	0.9	0.8 – 1.0	0.9	0.8 – 1.0	0.9	0.8 – 1.0	0.9	0.8 – 1.0
Income (quintiles)								
1	1.00	-	1.00	-	1.00	-	1.00	-
2	1.1	1.0 – 1.1	1.1	1.0 – 1.2	1.2	1.1 – 1.3*	0.9	0.8 – 1.0
3	1.0	1.0 – 1.1	1.3	1.2 – 1.4*	1.1	1.0 – 1.2	0.9	0.8 – 1.0
4	1.0	0.9 – 1.1	1.6	1.5 – 1.8*	1.0	1.0 – 1.1	0.8	0.7 – 0.9*
5	0.8	0.7 – 0.9*	1.6	1.5 – 1.8*	1.3	1.2 – 1.4*	1.1	1.0 – 1.2

OR: odds ratio; 95%CI: 95% confidence interval; MS: maternal schooling; SI: did not study; IE: incomplete elementary; CE: complete elementary; CHS: complete high school; CHE: complete higher education. PA: physical activity; * $p < 0.05$.

Table 4. Association between regular consumption (≥ 5 days/week) of foods that are indications of unhealthy eating and sedentary behavior according to the sociodemographic data of the PeNSE students, 2015.

Variable	Sweets		Soft drinks		Lunch meats		Snacks		SB	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Boys										
MS										
DNS	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
IE	1.0	0.9 – 1.1	1.0	0.9 – 1.1	1.1	1.0 – 1.2	0.9	0.8 – 1.0	1.2	1.1 – 1.3*
CE	1.0	0.9 – 1.1	1.0	0.9 – 1.1	1.3	1.1 – 1.4*	0.9	0.8 – 1.0	1.4	1.3 – 1.5*
CHS	1.0	0.9 – 1.1	0.8	0.8 – 0.9*	1.6	1.4 – 1.7*	0.9	0.8 – 1.0	1.6	1.4 – 1.7*
CHE	1.0	0.9 – 1.1	1.1	1.0 – 1.2	1.0	0.9 – 1.1	0.8	0.7 – 0.9	1.0	0.9 – 1.1
Income (quintiles)										
1	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
2	1.1	1.0 – 1.2	1.1	1.0 – 1.2	1.2	1.1 – 1.3	1.1	1.0 – 1.2	1.8	1.6 – 1.9
3	1.0	0.9 – 1.1	1.2	1.1 – 1.3*	1.4	1.3 – 1.5*	1.2	1.0 – 1.3	2.0	1.8 – 2.2
4	1.1	1.0 – 1.2	1.3	1.2 – 1.4*	1.5	1.4 – 1.6*	1.1	0.9 – 1.2	2.5	2.2 – 2.7
5	1.0	0.9 – 1.1	1.2	1.1 – 1.3*	2.0	1.8 – 2.2*	1.2	1.1 – 1.3*	2.4	2.1 – 2.6
Girls										
MS										
DNS	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
IE	1.1	1.0 – 1.3	1.0	0.9 – 1.1	0.9	0.8 – 1.0	1.0	0.9 – 1.1	1.2	1.0 – 1.3*
CE	1.1	1.0 – 1.2	0.9	0.9 – 1.0	1.2	1.1 – 1.3*	1.0	0.9 – 1.1	1.4	1.3 – 1.6*
CHS	1.1	1.0 – 1.2	0.7	0.7 – 0.8*	1.4	1.3 – 1.5*	0.9	0.8 – 1.0	1.5	1.3 – 1.6*
CHE	1.0	1.0 – 1.1	1.0	0.9 – 1.1	0.8	0.8 – 0.9	1.0	0.9 – 1.1	0.8	0.8 – 0.9
Income (quintiles)										
1	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
2	1.0	0.9 – 1.1	1.1	1.0 – 1.2	1.3	1.2 – 1.4*	1.1	1.0 – 1.3	1.6	1.5 – 1.8*
3	1.1	1.0 – 1.2	1.1	1.0 – 1.3	1.4	1.3 – 1.5*	1.1	1.0 – 1.3	2.1	1.9 – 2.3*
4	1.2	1.1 – 1.3*	1.0	0.9 – 1.1	1.6	1.4 – 1.7*	1.1	1.0 – 1.2	2.3	2.1 – 2.5*
5	1.1	1.0 – 1.3	0.8	0.7 – 0.9*	1.8	1.7 – 2.0*	1.1	1.0 – 1.2	2.0	1.9 – 2.2*

OR: odds ratio; 95%CI: 95% confidence interval; MS: maternal schooling; SI: did not study; IE: incomplete elementary; CE: complete elementary; CHS: complete high school; CHE: complete higher education. SB: sedentary behavior; * $p < 0.05$.

respectively, 41.3, 33.3, 32.5, 15.8 and 13% of adolescents[37]. The present study showed a high prevalence of Brazilian schoolchildren with inadequate eating habits (Table 2), such as: soft drinks (girls = 35.7% and boys = 40.7%), sweets (girls = 57.7% and boys = 46.7%), lunch meats (girls = 46.8% and boys = 43.7%) and fried snacks (girls = 21.5% and boys = 20.2%).

It was observed that more than 80% of girls and 63% of boys did not reach the recommendation of 300 min/week of PA (Table 2), although 50% of schools offer Physical Education classes three days a week. Currently, there is a great concern from physical education teachers with regard to their praxis, considering that a large number of students do not participate effectively in physical education classes. There are several reasons that influence this lack of interest, including the lack of adequate materials and facilities for the class, the lack of trained professionals, as well as social and family problems, which can also trigger discouragement for participating in classes, which normally follow a routine action of walking to the court and simply settling down.

Thus, it is up to Physical Education teachers to use the knowledge acquired in their academic training to strengthen the understanding of physical education as a curricular discipline that introduces and integrates students into body culture.

Reduced participation in physical education classes is not an isolated phenomenon in our country. According to the results of the Youth Risk Behavior Surveillance System, which has been monitoring adolescent PA practice since 1991[32,33], only 55% of high school students were enrolled in physical education classes in 2003, and of these, only 28% regularly attended these classes.

A recent systematic review of Latin American literature in the field of PA interventions concluded that the promotion of PA in the school environment is highly recommended and effective[34].

There is strong evidence showing that physical education classes can be an effective strategy to increase PA among students[35], especially in Brazil, where school physical education is mandatory.[36]. In the same direction, school meals are offered free of charge in most public schools in the country, which could be better used to promote healthy eating habits[37]. However, some barriers (unmotivated and/or unprepared professionals, lack of financial, physical and material resources and outdated curriculum structure) would need to be overcome for schools to offer quality physical education and food, in line with the goals of health promotion[38,39]. In this context, school can emerge as a privileged environment for the development and learning of health skills as a structuring concept, also involving different levels of management, teacher training and curricular adaptations, helping to define a sustainable policy for health in the school community[40,41].

Hallal et al.[42] demonstrated a positive relationship between the number of hours per day watching television and physical inactivity in schoolchildren. There is a current trend to use screen time as an indicator of sedentary life, as it is an easily obtainable variable and because it is a habit that may decrease the practice of PA.

A study conducted with adolescents from Santa Catarina, Brazil, found that more than 70% watched television or used a computer/videogame for more than two hours a day[43],

a result similar to that observed in the present study. Gordon-Larsen et al.[44], when assessing longitudinal trends in sedentary behavior, showed that, among the adolescents participating in the study, a quarter showed sedentary behavior ≤ 2 hours a day and maintained this habit in adulthood.

In addition to the high prevalence of SN among PeNSE students, the results show that this habit is associated with a higher consumption of sweets and lunch meats, regardless of sociodemographic characteristics. Our findings are worrisome and consistent with those of other national studies[45,46].

The high prevalence of elevated time in front of TV is of particular concern because of the obesogenic role of TV. Studies on the topic show that this effect can be more attributed to the increased intake of high energy density foods while watching TV than due to the decrease in PA levels[47,48].

Our study observed that the lower the level of maternal schooling, the greater the likelihood that the adolescent will have a poor quality diet. These data are in line with the study by Molina et al.[49], who observed that low maternal schooling increased the likelihood of children consuming lower quality food, as maternal schooling probably determines the ability to buy healthier foods, as well as access to adequate information.

This study has some limitations, which refer to the impossibility of making causal inferences between the outcome under study and the inclusion of only adolescents who were attending school and present in the classroom when the questionnaire was applied, a decision that may have caused some bias in the results, since absenteeism or school dropout rates may be related to the factor studied. However, this limitation does not make the results unfeasible, as the study was carried out with an expressive sample. The information collected on the adolescents, which was self-reported, allows underestimates or overestimates of the indicators studied, depending on the lesser or greater social acceptance of the behaviors asked. As this is a cross-sectional survey, caution is required when interpreting the results, as it is not possible to establish a temporality or causality relationship for part of the associations found.

PeNSE 2015 is a school-based and nationwide survey, which is a strong point in the studies carried out using its database. It can also be highlighted that, when comparing other data from the first two editions of PeNSE (2009 and 2012), this study adds information, as it verifies associations between unhealthy behaviors and sociodemographic characteristics, data that were not evaluated in national surveys with schoolchildren.

The consumption of unhealthy foods and physical inactivity plus SB have increased in the Brazilian population, and the prevalence among adolescents was shown to be high in the present study. In this sense, more studies should be carried out focusing on reducing these prevalence rates. There is a need for wide dissemination of the importance of good nutrition and the practice of regular PA, with a focus on public policies at school.

Thus, it is important to reduce prolonged sitting time, in addition to increasing PA practice. Thus, parents need to be aware of this control, since the longest time spent on SB occurs in the family environment.

These results point to the need to intensify and expand health promotion actions aimed at young people. The current Brazilian context is conducive to this. In addition, the maintenance of the surveillance system for health risk factors directed at adolescents should be part of the list of future actions.

CONCLUSION

These findings suggest that inactive adolescents exhibit other unhealthy behaviors that may increase the risk of chronic non-communicable diseases in adulthood. Thus, interventions in the school environment should focus not only on increasing PA levels, but also prioritize approaches to healthy lifestyles.

Thus, through the knowledge of food consumption by adolescents, it is possible to plan actions that are capable of promoting positive changes in eating behavior and, thus, avoiding health problems resulting from inadequate nutrition.

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