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Evolution of unhealthy eating practices among adolescents: National School Health Survey 2009-2015

Evolução de práticas alimentares não saudáveis entre adolescentes: Pesquisa Nacional de Saúde do Escolar 2009-2015

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ABSTRACT
The evolution of unhealthy eating practices among adolescents in the last three versions of the National School Health Survey is analyzed. Current ecological study comprises issues with regard to the consumption of soft drinks, candies, ultra-processed food, eating while watching television and having meals within the family. There was a decrease in the consumption of sweets (9.1%), soft drinks (8.2%) and ultra-processed foods (9%). The consumption of ultra-processed food had the largest reduction rate reported in the Northeast region of Brazil. Students whose mothers had higher education revealed a 3.5% reduction in the consumption of ultra-processed food, whilst there was a 12.2% decrease among students whose mother had full primary education. Although a reduction in the consumption of unhealthy foods has been observed, the intake of these foods was still significantly high in 2015. Since there is an association between unhealthy eating and the development of chronic diseases, it is essential that healthy eating practices strategies should be developed in the school context.

Keywords: Adolescent health. Demography. Food consumption.

RESUMO
Descrever a evolução das práticas alimentares não saudáveis entre adolescentes nas três últimas versões da Pesquisa Nacional de Saúde do Escolar. Estudo ecológico, no qual foram estudadas questões referentes ao consumo de refrigerante, guloseimas, ultraprocessados, hábito de comer enquanto assiste televisão e hábito de realizar refeições acompanhado do responsável. Houve redução do consumo de guloseimas (9,1%), refrigerante (8,2%) e de ultraprocessados (9%), sendo este último com maior redução observada na região Nordeste. Alunos com mães de ensino superior completo apresentaram redução de 3,5% no consumo de ultraprocessados, e de 12,2% entre os alunos com mães de ensino fundamental completo. Embora tenha sido observada redução no consumo de alimentos não saudáveis, a ingestão destes alimentos ainda foi significativamente alta em 2015. Considerando a associação entre alimentação não saudável com o desenvolvimento de doenças crônicas, é fundamental que sejam desenvolvidas estratégias de práticas alimentares saudáveis no contexto escolar.

Palavras-chave: Consumo alimentar. Demografia. Saúde do adolescente.

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INTRODUCTION

According to the World Health Organization (WHO), adolescence is a period in a person´s life between the age of 10 and 19 years old, with deep physical, emotional, behavioral and social transformations. Throughout adolescence, young people demand greater autonomy with regard to their family and a greater exposure to health risk factors, such as the use of alcoholic beverages, drugs, unhealthy food and sedentary lifestyle. These habits may endure throughout adulthood and influence life quality.[1-2]

Chronic non-transmissible diseases (CNTDs) account for 74% of death causes in Brazil, highly associated with overweight and the risk factors mentioned above.[3] Data retrieved from the National School Health Survey (PeNSE) showed that 23.7% of adolescents between 13 and 17 years of age, or rather, approximately three million Brazilian schoolchildren, are overweight.[4] Prevalence of obesity in the same population reaches 7.8%. Studies have shown that the eating habits of adolescents is worse than that of adults and the elderly. Although young people intake healthy foods, such as rice and beans, the consumption of ultra-processed foods (UPF) is characteristic of their diet. [5-6]

Since health or health risk behaviors acquired during adolescence may be passed over to adulthood, with an impact on health conditions and life quality, WHO recommends that governments maintain a sort of surveillance systems on young people´s risk factors. Investigations and monitoring of schoolchildren´s lifestyle are an important item for the development of public policies that may impact the health conditions of this age group.[2]

Consequently, the PeNSE survey has been undertaken in Brazil since 2009, every three years, and constitutes an important tool for the development of strategies for health promotion and combating NTCDs. [6] Current analysis describes the evolution of unhealthy eating practices among adolescents within the last three PeNSE surveys.

METHODOLOGY

STUDY PLAN

Current observational, descriptive and ecological study is based on PeNSE data.[4-6] PeNSE is a national epidemiological survey applied in school and has been undertaken in 2009, 2012 and 2015 by the Brazilian Institute of Geography and Statistics (IBGE) as a joint venture with the Ministry of Health and the Ministry of Education. Research data may be accessed at the IBGE electronic site.

Nine-Year school children in government-run and private schools of 26 capital cities of Brazilian states and of the Federal District were the population included in PeNSE. Research consisted of filling in a questionnaire by schoolchildren by a movable collection devise. Filling the

questionnaire was done simultaneously by all students of each class after being instructed on the issue. PeNSE 2009 was restricted to the states´ capital city and the Federal District. Schools were defined as Sampling Primary Units (UPA), whilst children groups were called Sampling Secondary Units (USA).[5] Schools were initially stratified according to geographical sites and administrative dependence. Sample in each geography stratification was retrieved in two stages, where initially the schools were selected through the selection method with proportional probability of size, and the groups were selected.

The 2012 and 2015 editions comprised an expansion of the research sample to include municipalities in the interior of the country and schoolchildren from other school grades. So that a comparison with the 2009 edition could be established, data in current study were retrieved from the sample fraction referring to the states´ capital cities and to the Federal District of the 2012 and 2015 editions. Data in current study refer to the complete sample of the 2009 edition (Nine-Year students from the capital cities and from the Federal District), a section of the sample of the 2012 and 2015 editions referring to Year-Nine students of the states´ capital cities and Federal District so that numbers for each edition may be compared[4]. Figure 1 gives the methodological organization chart of the study.

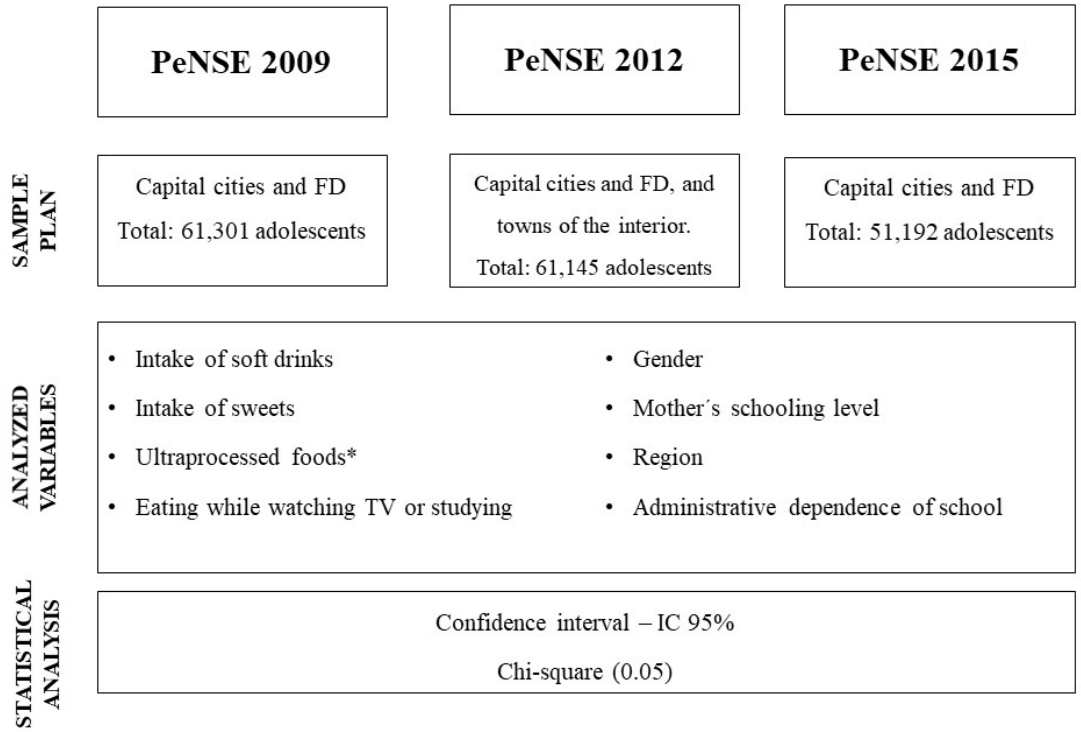

Figure 1. Methodological flowchart.
Source: Authors.

SELECTED VARIABLES

Issues on food consumption, specifically types of unhealthy food, by school children during the three research years were assessed. Variables such as soft drinks, sweets and ultra-processed foods were selected. In the 2009 edition, the ultra-processed food group is the sum of two variables, or rather, canned food and salt biscuits. In 2012, the variable comprised the sum of three variables, or rather, canned food, salt biscuits and snacks, whilst in 2015, the three variables were aggregated into a single question (intake of ultra-processed food), which also included instant noodles. Students were asked on the frequency of food consumption in the reference week (the week prior to the current).

Within the context of food consumption variables, the question in the three editions was the following: "During the last seven days, how many days have you consumed …?" For each food item the school children had 8 options, ranging between 1 to 7 days of the week. Within the variable on consumption while watching TV, the question was: "Do you consume food while watching TV or studying?". There were six options: No; Yes, everyday; Yes, five to six days a week; Yes, three to four days a week; Yes, one to two days a week; Yes, but rarely. The variable on consuming food with parents, the question was: "Do you take meals with your father, mother or tutors?" Options were the same as the previous variable.

STATISTICAL ANALYSIS

Frequencies with confidence interval at 95% (IC95%) of the selected variables were estimated. Prevalence was compared by the presence or absence of the intersection at IC95% to verify differences between the periods analyzed. The Chi-square test at 0.05 significance level was employed for categoric variables to verify whether there is an association between each pair of variables. Since research is based on complex sample, data analysis was performed by specific software, namely, R[8], taking into account the weights of each sample, following Oliveira et al.[7]

ETHICAL ASPECTS

Current study is based on public domain data for population surveys.[4-6] Further, the original Project for each survey was approved by the Brazilian Committee of Ethics in Research (CONEP: n. 11.537 - PeNSE 2009; n. 16.805 - PeNSE 2012; e n. 1.006.467 - PeNSE 2015).

RESULTS

When unhealthy food consumption data retrieved from 2009, 2012 and 2015 PeNSE are compared, one perceives a 9.1% reduction in sweets, with highest rate decrease by females (Table 1). There was an 8.2% decrease in the consumption of soft drinks (Table 2), with a higher rate in females. In the case of administration

dependence between 2009 and 2015, there was a greater reduction in the frequency of soft drinks among students from private schools (12.2%) than among those from government-run ones (7.0%). One should underscore that in the first PeNSE edition the consumption of soft drinks was higher in private schools, almost matching tally in the 2012 edition. However, the 2015 edition showed that students in private schools had lower soft drinks rates than those reported by students from Brazilian government-run schools.

Table 1. Percentage distribution of sweets intake among Brazilian adolescents according to social and demographic characteristics. National Schoolchildren School Survey (PeNSE): 2009, 2012 and 2015

Variables	2009		2012		2015		2009 → 2015
	%	**IC(95%)**	**%**	**IC(95%)**	**%**	**IC(95%)**	
Total	**50.9**	**50 - 51.7**	**42.7**	**41.7 - 43.7**	**41.8**	**40.9 - 42.7**	**-9.1%**
Gender							
Male	42.6	41.5 - 43.7	36.3	35.0 - 37.7	36.0	34.7 - 37.2	**-6.6%**
Female	58.3	57.3 - 59.4	48.8	47.7 - 50.0	47.5	46.3 - 48.6	**-10.8%**
Difference	-15.7		-12.5		-11.5		
Ratio	0.73		0.74		0.76		
Chi square test (rate-p)	< 0.01		< 0.01		< 0.01		
Region							
North	44.6	43.2 - 46	38.3	37.1 - 39.6	37.3	35.9 - 38.7	**-7.3%**
Northeast	47.7	46.6 - 48.8	39.1	38.1 - 40.2	38.0	37 - 39	**-9.7%**
Southeast	53.2	51.5 - 54.8	45.0	43.1 - 47.0	44.0	42.3 - 45.8	**-9.2%**
South	50.5	48.8 - 52.2	41.0	38.9 - 43.0	40.4	38.2 - 42.7	**-10.1%**
Midwest	54.4	52.7 - 56	46.3	44.5 - 48.0	45.8	43.9 - 47.7	**-8.6%**
Difference	9.8		8		8.5		
Ratio	1.2		1.2		1.2		
Chi-square test (rate-p)	< 0.01		< 0.01		< 0.01		
Adm dependence of school							
Private	49.9	48.5 - 51.3	39.8	38.2 - 41.3	40.9	39.4 - 42.3	**-9.00%**
Public	51.1	50.1 - 52.1	43.7	42.5 - 44.9	42.1	41.1 - 43.3	**-9.00%**
Difference	-1.2		-3.9		-1.2		
Ratio	0.98		0.91		0.97		
Chi-square test (rate-p)	**0.16**		< 0.01		**0.16**		
Mother´s schooling level							
No studies	45.4	41.5 - 49.5	35.7	32.4 - 39.2	43.5	39.1 - 48	**-1.90%**
Incomplete basic	50.7	49.1 - 52.3	44.3	42.7 - 45.9	41.4	39.2 - 43.6	**-9.3%**
Complete basic	50.9	48.6 - 53.2	43.5	41.8 - 45.1	41.5	39.4 - 43.7	**-9.4%**
Complete high school	52.7	51.4 - 54	42.7	41.2 - 44.3	42.7	41.1 - 44.4	**-10.0%**
Complete tertiary	49.5	47.8 - 51.2	40.1	38.3 - 41.8	40.7	38.9 - 42.6	**-8.8%**
Difference	-4.1		-4.4		2.8		
Ratio	0.92		0.89		1.07		
Chi-square test (rate-p)	< 0.01		< 0.01		**0.58**		

Table 2. Percentage distribution of soft drinks intake among Brazilian adolescents according to social and demographic characteristics. National Schoolchildren School Survey (PeNSE): 2009, 2012 and 2015

Variables	2009		2012		2015		2009 → 2015
	%	**IC(95%)**	**%**	**IC(95%)**	**%**	**IC(95%)**	
Total	**37.2**	**36.3 - 38.2**	**35.5**	**34.7 – 36.3**	**29.0**	**27.9 - 30**	**-8.2%**
Gender							
Male	37.9	36.6 - 39.2	36.5	35.5 - 37.6	30.5	29.2 - 31.8	**-7.4%**
Female	36.6	35.5 - 37.8	34.5	33.4 - 35.6	27.5	26.3 - 28.7	**-9.1%**
Difference	1.3		2		3		
Ratio	1.04		1.06		1.11		
Chi square test (rate-p)	**0.09**		< 0.01		< 0.01		
Region							
North	36.0	34.2 - 37.8	35.2	33.6 - 36.8	28.6	27.3 - 30	**-7.4%**
Northeast	32.0	30.8 - 33.2	30.3	29.3 - 31.3	24.8	23.7 - 26	**-7.2%**
Southeast	40.3	38.4 - 42.1	38.2	36.6 - 39.8	30.8	28.7 - 32.9	**-9.5%**
South	38.0	36.3 - 39.6	35.5	34.0 - 37.2	29.8	28 - 31.7	**-8.2%**
Midwest	36.3	34.7 - 37.8	36.0	34.5 - 36.8	30.2	28.5 - 31.9	**-6.1%**
Difference	8.3		7.9		6		
Ratio	1.26		1.26		1.24		
Chi-square test (rate-p)	< 0.01		< 0.01		< 0.01		
Adm dependence of school							
Private	39.1	36.6 - 41.6	35.3	33.9 - 36.8	26.9	25 - 28.9	**-12.2%**
Public	36.7	35.7 - 37.7	35.6	34.6 - 36.6	29.7	28.5 - 31	**-7.0%**
Difference	2.4		-0.3		-2.8		
Ratio	1.07		0.99		0.91		
Chi-square test (rate-p)	**0.08**		**0.80**		0.02		
Mother´s schooling level							
No studies	32.0	28.3 - 36	31.5	28.2 - 35.0	30.0	26.1 - 34.2	**-2.0%**
Incomplete basic	34.9	33.4 - 36.4	34.4	32.8 - 36.0	28.0	26.4 - 29.7	**-6.9%**
Complete basic	37.5	35.6 - 39.4	36.2	34.3 - 38.1	31.6	29.6 - 33.6	**-5.9%**
Complete high school	38.7	36.8 - 40.5	36.3	34.8 - 37.8	29.8	28.4 - 31.3	**-8.9%**
Complete tertiary	38.0	36 - 40.1	34.8	32.8 - 36.7	26.5	24.1 - 29.1	**-11.5%**
Difference	-6		-3.3		3.5		
Ratio	0.84		0.91		1.13		
Chi-square test (rate-p)	< 0.01		**0.06**		< 0.01		

Mothers´ schooling level revealed a similar behavior with regard to soft drinks intake. In 2009, children of mothers with a university education fitted within the second greatest intake percentage, evolving towards a lower percentage in the 2015 edition, or rather, the highest difference rate during the period analyzed. Intake of UPFs had a 9% decrease among the PeNSE editions (Table 3). In the case of this food group, the Southern region of Brazil had a mere 0.8% intake decrease,

whereas other regions reported reductions ranging between 6.9 and 9.9%. The Northeastern region had the highest reduction rate in UPFs intake, featuring 11.1%.

Table 3. Percentage distribution of ultraprocessed food* intake among Brazilian adolescents according to social and demographic characteristics. National Schoolchildren School Survey (PeNSE): 2009, 2012 and 2015

Variables	2009		2012		2015		2009 → 2015*
	%	**IC(95%)**	**%**	**IC(95%)**	**%**	**IC(95%)**	
Total	**43.8**	**42.9 - 44.6**	**42.5**	**41.6 - 43.4**	**33.9**	**33 - 34.8**	**-9.9%**
Gender	41.9	40.8 – 43	40.6	39.3 - 41.9	31.9	30.8 - 33.1	**-10.0%**
Male	45.4	44.3 - 46.5	44.3	43.3 - 45.4	35.8	34.7 - 37	**-9.6%**
Female	-3.5		-3.7		-3.9		
Difference	0.92		0.92		0.89		
Ratio	< 0.01		< 0.01		< 0.01		
Chi square test (rate-p)	37.1	35.8 - 38.3	35.9	34.7 - 37.2	28.2	27 - 29.4	**-8.9%**
Region	47.1	45.9 - 48.2	44.5	43.5 - 45.5	36.0	35 - 37.1	**-11.1%**
North	45.0	43.4 - 46.7	44.0	42.2 - 45.8	34.3	32.7 - 36.1	**-10.7%**
Northeast	38.1	36.3 - 39.9	37.5	35.8 - 39.3	35.5	33.7 - 37.3	**-2.6%**
Southeast	41.4	40.2 - 42.7	42.1	40.8 - 43.4	33.3	31.5 - 35.1	**-8.1%**
South	10		8.6		7.8		
Midwest	1.27		1.24		1.28		
Difference	< 0.01		< 0.01		< 0.01		
Ratio	40.8	39.1 - 42.4	39.0	37.2 - 40.8	40.1	38.4 - 41.8	**-0.7%**
Chi-square test (rate-p)	44.6	43.6 - 45.5	43.7	42.7 - 44.6	31.6	30.6 - 32.6	**-13.0%**
Adm dependence of school	-3.8		-4.7		8.5		
Private	0.91		0.89		1.27		
Public	< 0.01		< 0.01		< 0.01		
Difference	41.4	37.7 - 45.2	41.2	38 - 44.5	30.1	26.4 - 34.2	**-11.3%**
Ratio	44.1	42.6 - 45.7	43.5	42.2 - 44.9	32.5	30.6 - 34.5	**-11.6%**
Chi-square test (rate-p)	44.2	42.4 - 46	44.2	42.3- 46.2	32.0	28.8 - 35.4	**-12.2%**
Mother´s schooling level	46.1	44.4 - 47.8	43.2	41.8 - 44.5	35.5	34.1 - 37	**-10.6%**
No studies	40.8	38.8 - 42.8	39.5	37.6 - 41.4	37.3	35.2 - 39.4	**-3.5%**
Incomplete basic	0.6		1.7		-7.2		
Complete basic	1.01		1.04		0.81		
	< 0.01		< 0.01		< 0.01		

*Questions on ultraprocessed foods were more comprehensive in 2015, whilst in 2012 they were more comprehensive than in 2009. Data for 2009 are underestimated when compared to 2012 ones, which are underestimated with regard to those of 2015. Numerical difference is rendered difficult since potentially reduction is underestimated. Therefore, negative difference in UPF intake based on the three PeNSE versions, suggests a greater decrease than evidenced even under the same limitation.

When the three editions are compared on the same theme, the students of private schools have a mere 0.7% decrease in UPFs, whilst there was a 12% reduction among children from government-run schools. When mothers´

schooling is taken into account, there are different data than those reported on the intake of soft drinks. In fact, students with mothers with tertiary education had a lower reduction rate (1.5%) in UPFs intake, whereas students with mothers featuring complete or incomplete basic education had a 10.1 and 10.6% decrease, respectively.

The habit of eating while watching TV or studying was reduced by 2.3% (Table 4). Reduction among male students was higher than double the number of females. The South had the lowest reduction in the percentage of students with the habit. Highest reduction rate occurred among students in the North (6.7%), followed by the Northeastern region with a 3.6% decrease. The southeastern and midwestern regions had a reduction of 0.9% and 1.0%, respectively. On the other hand, school children of government-run schools increased by 1.6% with regard to this issue. Percentage increase of students who admitted eating while watching TV occurred between the 2009 and 2012 editions. In 2015, a reduction in percentage occurred, whereas a decrease among students in private schools occurred between all the PeNSE editions.

Table 4. Percentage distribution of assisting TV or studying during meals among Brazilian adolescents according to social and demographic characteristics. National Schoolchildren School Survey (PeNSE): 2009, 2012 and 2015

Variables	2009		2012		2015		2009 → 2015
	%	IC(95%)	%	IC(95%)	%	IC(95%)	
Total	**62.8**	**62 - 63.7**	**64.5**	**63.7 - 65.4**	**60.5**	**59.6 - 61.4**	**-2.3%**
Gender							
Male	65.4	64.4 - 66.5	66.8	65.7 - 68	62.1	60.8 - 63.3	**-3.3%**
Female	60.5	59.4 - 61.6	62.3	61.2 - 63.5	59	57.8 - 60.2	**-1.5%**
Difference	4.9		4.5		3.1		
Ratio	1.08		1.07		1.05		
Chi-square test (rate-p)	< 0.01		< 0.01		< 0.01		
Region							
North	56.4	54.7 - 58	56.2	55.1 - 57.4	49.7	48.1 - 51.3	**-6.7%**
Northeast	63.9	62.8 - 64.9	65.5	64.6 - 66.4	60.3	59.2 - 61.3	**-3.6%**
Southeast	64.5	62.9 - 66.1	67.0	65.3 - 68.7	63.6	61.8 - 65.3	**-0.9%**
South	57.3	55.5 - 59.1	58.8	57 - 60.6	56.9	55.3 - 58.5	**-0.4%**
Midwest	63.4	62 - 64.7	64.8	63.2 - 66.3	62.4	60.2 - 64.6	**-1.0%**
Difference	8.1		10.8		13.9		
Ratio	1.14		1.19		1.28		
Chi-square test (rate-p)	< 0.01		< 0.01		< 0.01		
Adm. Dependence of school							
Private	63.9	62.9 - 64.8	61.8	60.2 - 63.5	60.3	58.5 - 62	**-3.6%**
Public	59	57.1 - 60.9	65.5	64.5 - 66.4	60.6	59.6 - 61.6	**1.6%**
Difference	4.9		-3.7		-0.3		

Ratio	1.08		0.94		1.00		
Chi-square test (rate-p)	< 0.01		< 0.01		**0.74**		
Did not study	59.4	55.6 - 63	65.3	62.2 - 68.3	60.1	55.8 - 64.2	**0.7%**
Mother´s schooling level							
Incomplete basic	65.4	64 - 66.7	66.1	64.6 - 67.5	62.2	59.7 - 64.6	**-3.2%**
Complete basic	61.8	59.6 - 64.0	64.2	62.5 - 65.8	62.9	60.8 - 64.9	**1.1%**
Complete high school	63.9	62.5 - 65.3	65.9	64.6 - 67.2	61.8	60.3 - 63.3	**-2.1%**
Complete tertiary education	58.3	56.3 - 60.3	59.1	57.1 - 61.1	58.2	56.3 - 60.1	**-0.1%**
Difference	1.1		6.2		1.9		
Ratio	1.02		1.10		1.03		
Chi-square test (rate-p)	< 0.01		< 0.01		< 0.01		

DISCUSSION

Current study describes the Evolution of unhealthy food practices among young people in the three PeNSE versions. Although results show a decrease in ultra-processed food consumption throughout the years, intake rate of this type of food is still very high.

Since the first PeNSE edition, the epidemiological survey of Brazilian schoolchildren served as a health subsidy for the population concerned due to providing important data on the Vigilance System of Risk Factors for non-transmissible chronic diseases and the follow-up of factors related to physical development, social and economic aspects, family milieu, sexual and reproduction health, usage of health service and safety of the target population.[4]

The school is a unique place for monitoring risk factors, protecting students and a space with significant influence for the formation of individuals.[9] The enhancement of healthy food habits is one of the aims of the National Program (PNAE) which underscores healthy meals and the development of food and nutrition education within the school environment.[10] In fact, PNAE is the most significant school meal program and contributes towards food and nutrition safety in school children.

Several research works have evaluated the relationship between school food milieu, environment close to the school and young people´s food intake through data provided by PeNSE. In the case of private schools, an association between the sale of natural fruit juice and a lower consumption of salted snacks (OR = 0.86; CI95% = 0.77-0.96) and soft drinks (OR = 0.85; IC95% = 0.76-0.94) has been pointed out.[14] On the other hand, in the case of government-run schools, the regular consumption of school meals seems to be positively associated with moderate (3-4 days/week) and regular (≥5 days/week) consumption of beans, raw or cooked vegetables and fruits, and

negatively to the regular consumption of snacks, sweet biscuits and sweets. [11.12]

Aguirre et al. evaluated the relationship between young people´s nutritional conditions and healthy and unhealthy food consumption markers and reported that among adolescents who consume fried snacks there is a 1.19 more chance of being obese than among those who refrain from doing so.[13] In the case of the consumption of UPFs and sweets, chances for obesity were respectively 1.22 and 1.33 higher. Adolescents whose mothers had a higher education revealed a greater chance (60%) to develop obesity when compared to young people whose mother did not have any schooling. Results corroborate our study underscoring that a lower reduction in the consumption of UPFs among young people whose mothers have a university diploma throughout the three PeNSE editions. However, the same behavior failed to be detected with regard to the intake of soft drinks and sweets.

Rossi et al. evaluated the association between the origin of meals consumed in schools, their nutritional value and weight excess among school children.[14] Weight excess has been associated with food consumed in school canteens in private schools. Home-made lunches have been associated with higher consumption of low nutritional food value in private and government-run schools. School meals have been negatively affected by the consumption of extra-institutional food and positively influenced by food and nutritional educational practices.[15]

Current study compares the consumption of unhealthy food between the three PeNSE editions and concludes on a general decrease in its consumption. However, one should underscore that unhealthy food consumption among school children is still high, featuring food high in sugar and saturated fatty acids for the total energetic intake.[16-17] Current analysis identified four out of ten school children consuming sweets and three in ten consuming UPFs during five or more days of the week.

Frequent intake of soft drinks (29%) has been linked to a greater risk in the development of the metabolic syndrome, diabetes Type 2, decrease in the intake of milk, calcium and other nutrients.[18,19] Boys evidenced a higher consumption rate of soft drinks when compared to adolescents, according to the three PeNSE editions. The highest difference among genders has been reported in the 2015 edition, with the intake of soft drinks by boys at 3% higher than among adolescents.

Report by the Health Behavior in School-Age Children (HBSC) has shown that prevalence of the daily consumption of soft drinks increases between people aged 11 to 15 years, especially among males.[20] Difference between the genders has been reported in most countries and regions under analysis and in all age groups evaluated. In some places, it was up to 10%. In the case of regions in Brazil, the

midwestern region had the lowest percentage decrease of soft drinks throughout the three PeNSE editions.

A study by Alves et al. showed that, as a rule, Brazilian male adolescents has a healthier food standard, with a greater adhesion to the consumption of rice, beans, meat, and a lower adhesion to the consumption of soft drinks, snacks, cakes, biscuits and sweets when compared to female adolescents.[21] The authors failed to detect food standards characterized by the consumption of fruits and vegetables in Brazil, with the exception of the northern region. Further, Oliveira-Campos et al. reported a reduction in the regular consumption of beans and a mild increase in the regular intake of fruits among Brazilian young people.[22]

In the case of the habit of eating while watching TV or studying, one observes an increase of such behavior among students of government-run schools, with a greater percentage rate in the 2012 edition and a reduced percentage rate in the 2015 edition. There was a decrease of the habit among students of private schools between the three editions. Taking meals while watching TV is associated with increase of energetic consumption and the reduction of the amount of consumed food. Such association may be related to advertisements on food with low nutrition value and to the reduction of the perception of satiety in the midst of distractions, leading towards weight gain risks[23,24] Greater time per day in a sedentary lifestyle, such as watching TV and in front of the computer may reduce time for activities with a greater expenditure of energy and consequently risk of weight excess.[24]

Time of sedentary lifestyle is associated with a greater prevalence of UPF consumption.[25] A study from southern Brazil has pinpointed a combination of decreasing levels physical activities and low fruit ingestion among adolescents, with a still lower fruit percentages for boys.[26] Current study revealed high intake of sweets and UPFs among adolescents. Although total percentage in female adolescents who have the habit of assisting TV while eating is lower than that in boys, decrease in habit overtime was higher among boys than that observed in girls.

It should be underscored that while simultaneously there was a percentage decrease of government-run school children with the habit of taking meals with their parents, there was also a percentage increase in people with the habit of taking meals while watching TV or while studying. Maia et al. reported a positive association between the habit of eating while watching TV and not partaking meals with parents / tutors with the adhesion of unhealthy meal standard.[27] Consequently, results reveal that the presence of parents during meals may be a potentially positive factor which contributes towards healthier food and an improvement in the adolescents´ diet quality.[28-29]

Results of the Project Eating and Activity in Teens - III, indicate that the habit of taking meals within the family decreases the risk of adolescents develop overweight and obesity in adulthood when compared to adolescents who fail to do so. The authors suggest that adolescents should be urged to take one or two meals per week with the family as a protection factor against weight excess.[30]

Limitations of current study comprises the fact that the sample studied represents Nine-Year school children from Brazil and may not be representative of all Brazilian adolescents. Since the design of the three PeNSE edition was transversal, it forwards a time trend in different groups and fails to do so at individual level. Further, the methodology employed did not take into account absent adolescents or those who did not go to school. The above item may be minimized since Brazilian school system covers 97% of children between 10 and 14 years old, and 82% of adolescents between 15 and 17 years old.

Current study may also be limited in its evaluation of UPF consumption trend since questions were not standardized throughout the years, with an increase of items in the category. No identification of increase in a particular type of food is possible. Limitation was however minimized due to the fact that there was a reduction of consumption in UPFs. There was a decrease in UPF consumption which makes the author infer that, even if more types of food are included in the questionnaire, a reduction occurred over time. One should also highlight that PeNSE is a survey that assesses the frequency of consumption and does not provide data for the evaluation of the amount of food consumed by adolescents.

Current study´s potentialities comprises an analysis of the evolution of unhealthy food consumption among adolescents and a subsidy for the development of policies and programs for the promotion of adequate and healthy food practices during this stage in the life cycle.

FINAL CONSIDERATIONS

In spite of evidence on a reduction trend in unhealthy food consumption among Brazilian adolescents over the period, consumption is still very high. Such a trait, coupled to other factors, such as the frequency of the habit in taking meals while watching TV, physical inactivity rates and decrease in the consumption of healthy food underlined in other research works, are risk factors for the development of NTCDs and, therefore, they should be a priority in schools and among families of Brazilian adolescents.

Further, the prevalence of weight excess among children and adolescents in Brazil and the multiple factors and social determinants of obesity should trigger public policies for the prevention and control of obesity to broaden strategies for the food system as a whole. In fact, they should take into account healthy environments that comprise healthy food,

an objective informative nutritional tag for children and adolescents.

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