DOI: 10.1590/1980-549720180008.supl.1

ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Nutritional status of Brazilian schoolchildren: National Adolescent School-based Health Survey 2015

Estado nutricional de escolares adolescentes no Brasil: a Pesquisa Nacional de Saúde dos Escolares 2015

Wolney Lisbôa Conde[I], Camila Medeiros da Silva Mazzeti[I], Jéssica Cumpian Silva[I], Iolanda Karla Santana dos Santos[I,II], Aline Micaele dos Reis Santos[I]

ABSTRACT: ***Introduction:*** Obesity has increased in Brazil for all age groups. Overweight at the end of adolescence indicates a high probability of unhealthy weight in adulthood. ***Objective:*** To describe anthropometric data of the National Adolescent School-based Health Survey (PeNSE) 2015 and its distribution according to geographic and socioeconomic strata. ***Methods:*** Data from the PeNSE 2015 was used. The analysis sample consisted of adolescents aged 11 to 19 years old from public and private schools with available anthropometric data. Nutritional status was classified according to the body mass index, with reference values proposed by the International Obesity Task Force (IOTF). The prevalence estimates of underweight and overweight and their respective standard errors were presented. The association between anthropometric indicators and demographic or social characteristics of adolescents was estimated by odds ratio, and the respective 95% confidence intervals were presented. ***Results:*** The prevalence of underweight was less than 3%. Elevated prevalence of overweight was observed in adolescents from the South region, from the urban area, from the lowest fifths of income, and those who declared themselves to be black or indigenous. In general, the prevalence of overweight was higher among adolescents attending private schools. ***Conclusion:*** Overweight is more frequent among adolescents from low-income strata. Besides being an indicator of nutritional status, overweight may indicate social inequality in Brazil.

Keywords: Sanitary surveys. Nutritional assessment. Adolescents. Overweight. Brazil. BMI.

[I]School of Public Health, Universidade de São Paulo – São Paulo (SP), Brazil.
[II]Fundação Universidade Federal do ABC – Santo André (SP), Brazil.
Corresponding author: Wolney Lisbôa Conde. Avenida Doutor Arnaldo, 715, CEP: 01246-904, São Paulo, SP, Brasil. E-mail: wolney@usp.br
Conflict of interests: nothing to declare – **Financial support**: none.

RESUMO: ***Introdução:*** A obesidade é um problema crescente no Brasil em todos os grupos etários. Excesso de peso ao final da adolescência indica probabilidade elevada de peso não saudável na vida adulta. ***Objetivo:*** Descrever dados antropométricos da Pesquisa Nacional de Saúde dos Escolares (PeNSE) 2015 e sua distribuição segundo estratos geográficos e socioeconômicos. ***Métodos:*** Dados da PeNSE 2015 foram utilizados. A amostra desta análise compreende adolescentes com idade entre 11 e 19 anos de escolas públicas e privadas com dados antropométricos disponíveis. O estado nutricional foi classificado segundo valores de referência para o índice de massa corporal (IMC), propostos pela *International Obesity Task Force* (IOTF). As estimativas das prevalências de déficit de peso e de excesso de peso e seus respectivos erros padrão foram apresentados. A associação entre os indicadores antropométricos e as características demográficas ou sociais dos adolescentes foi estimada por *odds ratio* e os seus respectivos intervalos de confiança de 95% foram apresentados. ***Resultados:*** A prevalência de déficit de peso foi inferior a 3%. As maiores prevalências de excesso de peso foram observadas em adolescentes que se declararam negros ou indígenas, da região sul, da área urbana e dos quintos mais baixos de renda. Em geral, a prevalência de excesso de peso foi maior entre adolescentes que frequentavam escolas privadas. ***Conclusão:*** O excesso de peso é mais frequente entre adolescentes dos estratos de baixa renda. Além de indicador do estado nutricional, o excesso de peso pode indicar desigualdade social no Brasil.

Palavras-chave: Levantamentos sanitários. Avaliação nutricional. Adolescentes. Sobrepeso. Brasil. IMC.

INTRODUCTION

Obesity is a growing problem in Brazil, whether among adults or adolescents[1]. In parallel to the growth of overweight or obesity in virtually all age groups[2,3], obesity also begins to characterize itself as an inequality marker in the country[4]. The growth of obesity among the poorest countries occurs at faster pace than that observed among the richest.

Currently, the nutritional status of adolescents is pressured by two relevant and opposing vectors. The first is the rate of increase in mean height among children, which contributes to the reduction of height deficit[5] and to containing the expansion of obesity in adolescence[2]. The second is the expansion of obesity among adults[1,6], which generally anticipates the increased prevalence of the problem across the population and is associated with the overall level of exposure. The synthesis of these vectors' action has resulted in an increase in the mean values of the body mass index (BMI) in this age group among diverse regions of the planet[7].

In Latin America, the prevalence of overweight varies from 19 to 37% in the age group between 5 and 11 years, and from 17 to 36% in the age group between 12 and 19 years[8]. In Brazil, the last estimate with national coverage indicates overweight prevalences of approximately 32%, in the age group from 6 to 11 years, and another 32% of overweight and 18% of obesity among adolescents aged 12 to 19 years. This level was reached after expansion of the two conditions at the rate of 1.04 per year in the period between 1975 and 2009 for the two age groups[1].

BMI values above the healthy spectrum at the end of adolescence indicate a high probability of maintaining unhealthy weight in adult life[3] and at high risk for the early development of chronic noncommunicable diseases[9].

The first edition of the National Adolescent School-based Health Survey (PeNSE) in 2009 carried out the anthropometric evaluation of 9th grade students only, and the results showed that, among them, 23% were overweight and 7% were obese[10]. In its second edition, in 2011, PeNSE did not carry out the anthropometric evaluation of the students included in the research.

This study presents the descriptive analysis of the anthropometric data of the PeNSE survey performed in 2015 and its distribution according to geographic and socioeconomic strata.

METHODS

STUDY POPULATION

PeNSE was held in 2015 with students from public and private schools with national representation. The 2015 edition had two independent samples, defined by representativeness and target population criteria. In sample 1, students in the morning and afternoon classes of the 9th grade of elementary school were interviewed. This interview used the standard survey questionnaire and serves to maintain the standardization of the historical PeNSE data series.

In sample 2, students from the morning, afternoon and evening classes from the 6th to the 9th grade of elementary school (formerly 5th to 8th grades) and from the 1st to the 3rd year of high school. The anthropometric evaluation was also performed for the students aged between 11 and 19 years (n = 16,556). Sample 2 covered the urban and rural areas of the 5 macroregions (North, Northeast, Midwest, Southeast and South). The school units were selected from the records of the school census conducted in 2007 by the National Institute for Educational Studies and Research Anísio Teixeira (INEP).

In PeNSE 2015, 3,509 public or private schools were sampled in Brazil, of which 3,129 were included in sample 1 and 349 in sample 2. From the set, 31 schools composed sample 3, which is a combination of samples 1 and 2 within the same school by lottery and representativeness. More comprehensive information on PeNSE editions[11] or more detailed PeNSE 2015 sample design and data collection process data[12] are available in other publications. In this analysis, we used only data from the adolescents in sample 2 and those in sample 3 who had anthropometric data.

CLASSIFICATION OF NUTRITIONAL STATE

Body mass values were collected in kilograms, and height in centimeters. The measurement procedures were performed according to international standardization and are

described in more detail in the research report[12]. BMI was calculated by dividing weight by height in square meter.

The nutritional status of adolescents was classified according to the BMI reference values proposed by the International Obesity Task Force (IOTF)[13]. This analysis presents estimates of underweight and overweight. Individuals with BMI values below -2.31 standard deviations for age and gender — equivalent to BMI 17.5 kg/m^2 in adulthood — were considered underweight[14] and those with BMI above the reference value at their age and sex, equivalent to BMI 25 kg/m^2 in adulthood, were considered to be overweight.

The choice of the IOTF reference values instead of those officially proposed by the World Health Organization (WHO) is due to previously mentioned problems in the accuracy of this reference[15]. Replication of results according to WHO classification will be provided to interested readers upon request to authors. This analysis presents the estimates for overweight without decomposing the fraction of the obese, once this category generates imprecise classification in this age group[16].

Values below or above 5 standard deviations for age and gender, considered biologically implausible for the BMI index for age, were excluded from the analysis[17].

DATA ANALYSIS

Estimates of nutritional indicators were weighted by the expansion factor of sample 2 and, in all strata, the standard error was reported for each estimate. The association between the anthropometric indicators and the demographic or social characteristics of the adolescents was estimated by odds ratio (OR) and reported with their respective 95% confidence intervals (95%CI). The OR values were presented according to the crude calculation, as well as adjusted for age, according to the relevance of this variable for the analysis of the nutritional risk exposure in this stage of the life cycle. In both cases, OR values were calculated by logistic regression, taking into account the sample weighting structure.

The socioeconomic level was established by the Principal Component Analysis (PCA) based on material goods and services referred in the home, described in section B1, questions 12 to 26 of the PeNSE 2015 questionnaire[12]. The PCA is a multivariate technique that allows the reduction of the data set dimensionality with many interrelated variables. The reduction of dimensionality occurs with the maintenance, as much as possible, of the data variability in several latent variables (components) that represent different possible syntheses of this variability[18]. In the present analysis, the PCA was used to establish variance patterns, being the first component orthogonal to the others, from the set of selected variables. The first component explained 52% of the sample variability and, based on the factorial loads of each variable, the socioeconomic score that represents the household wealth was calculated. Subsequently, the score was divided into fifths for use in the stratification of the prevalence of anthropometric indicators.

In all estimates, the sample structure, with its respective weighting of the lottery probability of the individuals, was taken into account. The analyzes were conducted in Stata 14® software.

RESULTS

The median age of adolescents in sample 2 of PeNSE 2015 was 14 years, with an equivalence in the distribution between boys and girls. Of the adolescents interviewed, 36% declared to have white skin color, 13% had black skin color, and 3% were indigenous.

Underweight showed a national prevalence of less than 3% and very low prevalences in all strata. The points where the value exceeded 5% are most likely to be sample fluctuations attributable to the size of the category (Table 1).

Overweight was more prevalent among white adolescents, from private schools, from the Southern region, and from the poorer socioeconomic strata. Prevalences tend to be higher in females, especially after 15 years of age. At the national level, approximately one in four adolescents is over the considered healthy weight (Table 1).

The type of school represents a relevant factor for the description of overweight among adolescents in Brazil. If we group all schools with private, community, religious or philanthropic administration under the same "private" category, we will see that the prevalence of overweight is predominantly higher in private versus public schools in all the analytical selections presented here. This phenomenon is more pronounced in males (Table 2).

The socioeconomic level of students in public and private (all non-public) schools varies according to the macroregion and the socioeconomic level. At the regional level, students in public schools tend to have higher socioeconomic scores than in private schools, with the exception of the Midwest, where the figures are the same. In the fifth stratification of the socioeconomic score, students in public schools have lower values in the poorest fifth and highest in the richest fifth.

Figure 1 shows the prevalence of overweight of adolescents enrolled in public and private schools, analyzed according to macroregion and fifths of the socioeconomic score in males (Figure 1A) and females (Figure 1B), respectively. The prevalence of overweight among adolescents in private schools is vastly higher than the values observed among their peers in public schools. Among females from the Southern region, the picture is the opposite, with higher values in the adolescents in public schools; and in the Midwest region, the values alternate over the socioeconomic fifths.

Distribution by age, region and social status of the risk of overweight, expressed in adjusted OR for socioeconomic score or age, is described in Table 1. The distribution of risk, adjusted by the socioeconomic score between the ages, shows a U-shaped curve, indicating that the adjusted risk of being overweight is higher in the extreme ages of adolescence. Schoolchildren in the private school system show an adjusted risk of overweight equivalent to 1.3 times that observed in public schools. Students residing in rural areas present an adjusted risk equivalent to 0.9 times that observed among their urban-dwelling peers.

Table 1. Prevalence and odds ratio of underweight and overweight among adolescent students, according to gender, by sociodemographic strata, National Adolescent School-based Health Survey, 2015.

	Underweight				Overweight			
	Male % (se)	Female % (se)	Total % (se)	OR (95%CI)	Male % (se)	Female % (se)	Total % (se)	OR (95%CI)
Brazil	2.4 (0.01)	3.4 (0.01)	2.9 (0.01)	–	21.4 (0.01)	22.9 (0.01)	22.2 (0.01)	–
Age (years)								
11	1.0 (0.01)	3.5 (0.01)	2.3 (0.01)	1.00*	27.2 (0.02)	26.4 (0.02)	26.8 (0.01)	1.00*
12	2.0 (0.01)	2.7 (0.01)	2.4 (0.01)	0.92 (0.90 – 0.94)	22.8 (0.02)	24.2 (0.01)	23.6 (0.01)	0.84 (0.83 – 0.84)
13	2.3 (0.01)	2.4 (0.01)	2.3 (0.01)	0.97 (0.95 – 0.98)	23.3 (0.02)	24.5 (0.02)	23.9 (0.01)	0.84 (0.84 – 0.85)
14	2.2 (0.01)	3.4 (0.01)	2.8 (0.01)	1.29 (1.27 – 1.31)	20.5 (0.02)	21.4 (0.02)	21.0 (0.01)	0.72 (0.72 – 0.73)
15	2.1 (0.01)	2.5 (0.01)	2.3 (0.01)	0.88 (0.87 – 0.90)	21.0 (0.02)	19.4 (0.01)	20.2 (0.01)	0.66 (0.66 – 0.67)
16	2.4 (0.01)	3.4 (0.01)	2.9 (0.01)	1.27 (1.25 – 1.29)	18.4 (0.01)	20.3 (0.01)	19.4 (0.01)	0.60 (0.60 – 0.61)
17	2.5 (0.01)	4.4 (0.01)	3.5 (0.01)	1.28 (1.26 – 1.30)	19.3 (0.02)	22.7 (0.02)	21.0 (0.01)	0.71 (0.70 – 0.71)
18	4.3 (0.01)	6.3 (0.02)	5.1 (0.01)	2.01 (1.98 – 2.04)	22.0 (0.03)	24.0 (0.03)	22.8 (0.02)	0.85 (0.84 – 0.86)
19	2.5 (0.01)	4.2 (0.01)	3.2 (0.01)	1.26 (1.24 – 1.29)	23.1 (0.03)	34.1 (0.04)	27.7 (0.03)	1.16 (1.15 – 1.17)
Skin color								
White	2.6 (0.01)	3.5 (0.01)	3.1 (0.01)	1.00*	24.2 (0.01)	22.1 (0.01)	23.2 (0.01)	1.00*
Black	2.0 (0.01)	3.1 (0.01)	2.5 (0.01)	0.74 (0.73 – 0.75)	16.9 (0.01)	25.5 (0.02)	20.4 (0.01)	0.91 (0.90 – 0.91)
Yellow	4.6 (0.01)	3.6 (0.01)	4.1 (0.01)	1.31 (1.29 – 1.33)	20.1 (0.03)	20.3 (0.02)	20.2 (0.02)	0.88 (0.87 – 0.88)
Brown	2.1 (0.01)	3.2 (0.01)	2.7 (0.01)	0.80 (0.80 – 0.82)	20.8 (0.01)	23.0 (0.01)	22.0 (0.01)	0.99 (0.99 – 1.00)
Indigenous	2.0 (0.01)	4.3 (0.01)	3.0 (0.01)	1.00 (0.98 – 1.02)	19.1 (0.03)	26.6 (0.05)	22.5 (0.02)	1.02 (1.01 – 1.03)
School								
Public	2.4 (0.01)	3.4 (0.01)	2.9 (0.01)	1.00*	20.2 (0.01)	22.5 (0.01)	21.3 (0.01)	1.00*
Private	2.1 (0.01)	2.8 (0.01)	2.4 (0.01)	0.97 (0.95 – 0.95)	31.7 (0.01)	26.5 (0.02)	29.0 (0.01)	1.30 (1.30 – 1.31)

Continue...

Table 1. Continuation.

	Underweight				Overweight			
	Male % (se)	Female % (se)	Total % (se)	OR (95%CI)	Male % (se)	Female % (se)	Total % (se)	OR (95%CI)
Community	5.8 (0.01)	–	3.2 (0.01)	0.98 (0.89 – 1.07)	28.2 (0.01)	12.1 (0.01)	21.0 (0.01)	0.97 (0.93 – 1.01)
Religious	–	5.2 (0.01)	2.9 (0.01)	1.09 (1.04 – 1.13)	32.9 (0.01)	30.6 (0.01)	31.6 (0.01)	1.46 (1.44 – 1.48)
Philanthropic	1.4 (0.01)	4.2 (0.01)	2.9 (0.01)	1.09 (1.07 – 1.11)	23.5 (0.02)	21.3 (0.05)	22.3 (0.03)	0.92 (0.91 – 0.92)
Macroregion								
North	2.0 (0.01)	4.2 (0.01)	3.1 (0.01)	1.00*	18.9 (0.01)	22.4 (0.01)	20.7 (0.01)	1.00*
Northeast	3.6 (0.01)	3.1 (0.01)	3.4 (0.01)	1.14 (1.13 – 1.16)	18.0 (0.01)	20.3 (0.01)	19.1 (0.01)	0.92 (0.92 – 0.93)
Southeast	1.8 (0.01)	3.4 (0.01)	2.6 (0.01)	0.93 (0.93 – 0.94)	23.6 (0.01)	23.4 (0.01)	23.5 (0.01)	1.10 (1.09 – 1.11)
South	1.7 (0.01)	2.9 (0.01)	2.3 (0.01)	0.84 (0.83 – 0.86)	24.2 (0.01)	27.2 (0.01)	25.6 (0.01)	1.35 (1.34 – 1.35)
Midwest	1.8 (0.01)	3.8 (0.01)	2.8 (0.01)	1.00 (0.99 – 1.02)	21.6 (0.01)	24.0 (0.02)	22.8 (0.01)	1.09 (1.08 – 1.10)
Area								
Urban	2.3 (0.01)	3.4 (0.01)	2.8 (0.01)	1.00*	21.7 (0.01)	23.2 (0.01)	22.5 (0.01)	1.00*
Rural	2.8 (0.01)	3.1 (0.01)	2.9 (0.01)	1.21 (1.20 – 1.23)	17.1 (0.03)	18.6 (0.03)	17.8 (0.02)	0.89 (0.89 – 0.90)
Wealth fifths								
1	1.8 (0.01)	2.0 (0.01)	1.9 (0.01)	1.00*	23.3 (0.01)	25.4 (0.01)	24.3 (0.01)	1.00**
2	2.0 (0.01)	3.5 (0.01)	2.7 (0.01)	1.45 (1.44 – 1.47)	25.8 (0.01)	22.5 (0.02)	24.2 (0.01)	0.98 (0.98 – 0.99)
3	1.5 (0.01)	4.3 (0.01)	2.9 (0.01)	1.60 (1.59 – 1.62)	20.9 (0.02)	20.7 (0.02)	20.8 (0.01)	0.81 (0.81 – 0.82)
4	3.2 (0.01)	3.3 (0.01)	3.3 (0.01)	1.62 (1.61 – 1.64)	18.7 (0.02)	24.1 (0.01)	21.5 (0.01)	0.83 (0.83 – 0.84)
5	3.1 (0.01)	4.0 (0.01)	3.6 (0.01)	1.92 (1.90 – 1.93)	17.4 (0.01)	21.3 (0.02)	19.3 (0.01)	0.72 (0.72 – 0.73)

OR: odds ratio; 95%CI: 95% confidence interval; se: standard error; *adjusted by socioeconomic score; **adjusted by age.

The risk of age-adjusted overweight is inversely associated with socioeconomic stratification, with schoolchildren in the richest fifth having a risk equivalent to 0.7 times that observed among schoolchildren in the poorest fifth (Table 1).

Table 2. Prevalence and odds ratio of underweight and overweight among adolescent students, by gender and school type by social and regional strata, National Adolescent School-based Health Survey, 2015.

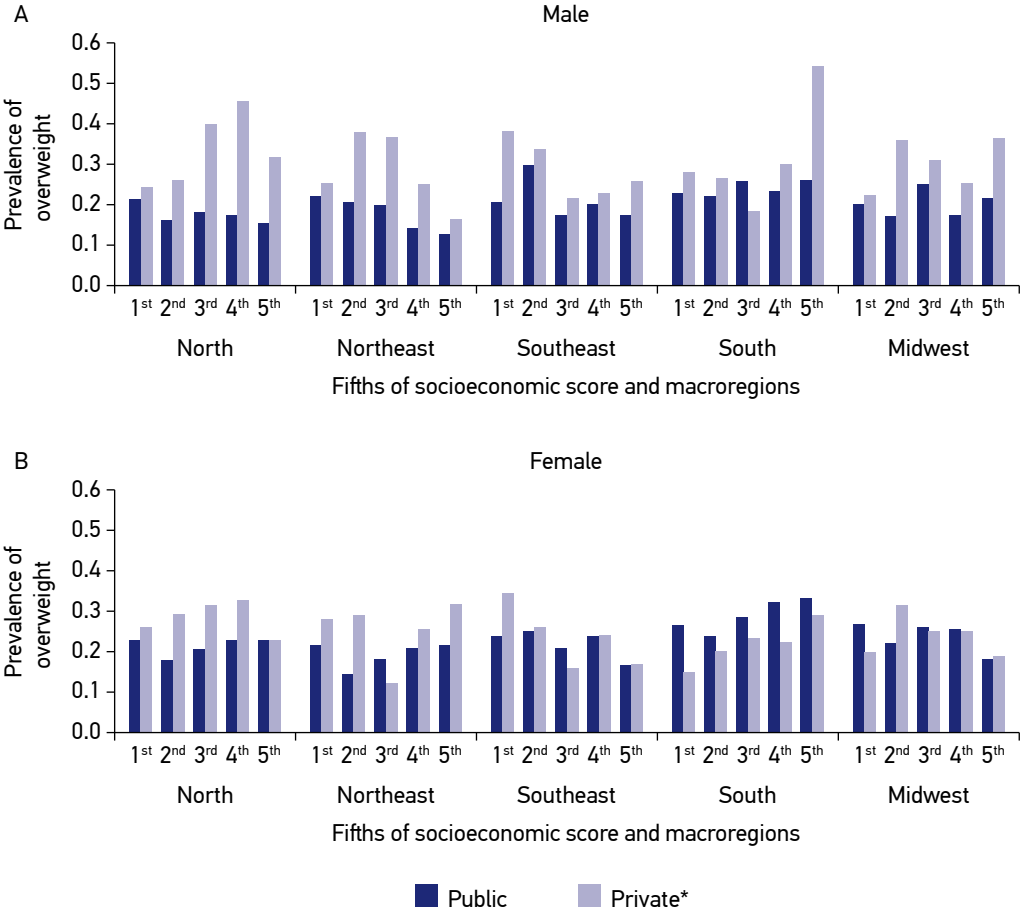
	Male			Female		
	Public % (se)	Private % (se)	OR* (95%CI)	Public % (se)	Private % (se)	OR* (95%CI)
Wealth fifths						
1	21.5 (0.01)	32.9 (0.03)	1.60 (1.59 – 1.61)	24.5 (0.01)	29.2 (0.05)	1.28 (1.27 – 1.29)
2	24.6 (0.01)	33.5 (0.03)	1.69 (1.67 – 1.70)	21.7 (0.02)	26.7 (0.03)	1.22 (1.21 – 1.23)
3	20.0 (0.02)	27.9 (0.03)	1.67 (1.65 – 1.69)	21.1 (0.02)	17.7 (0.02)	0.76 (0.75 – 0.76)
4	17.9 (0.02)	26.0 (0.03)	1.49 (1.48 – 1.51)	23.9 (0.01)	25.5 (0.04)	1.13 (1.12 – 1.15)
5	16.3 (0.01)	25.6 (0.03)	1.65 (1.63 – 1.67)	21.1 (0.02)	23.4 (0.04)	1.27 (1.26 – 1.29)
Macroregion						
North	17.6 (0.01)	32.3 (0.02)	2.30 (2.27 – 2.34)	21.7 (0.02)	28.4 (0.02)	1.64 (1.62 – 1.67)
Northeast	17.1 (0.02)	27.4 (0.03)	1.97 (1.96 – 1.99)	19.5 (0.01)	25.8 (0.03)	1.62 (1.61 – 1.64)
Southeast	22.2 (0.01)	31.0 (0.02)	1.50 (1.49 – 1.51)	22.8 (0.01)	26.1 (0.04)	1.12 (1.11 – 1.12)
South	23.7 (0.01)	29.0 (0.04)	1.28 (1.27 – 1.30)	28.1 (0.02)	19.6 (0.04)	0.64 (0.63 – 0.65)
Midwest	20.0 (0.01)	30.1 (0.03)	1.67 (1.65 – 1.69)	24.0 (0.02)	23.9 (0.03)	1.03 (1.02 – 1.05)
Area						
Urban	20.5 (0.01)	29.9 (0.01)	1.62 (1.61 – 1.63)	22.8 (0.01)	25.5 (0.02)	1.15 (1.15 – 1.16)
Rural	16.8 (0.03)	36.7 (0.01)	4.70 (4.50 – 4.91)	18.7 (0.03)	13.8 (0.01)	0.72 (0.67 – 0.76)

OR: odds ratio; 95%CI: 95% confidence interval; se: standard error; *adjusted by age.

DISCUSSION

The results obtained indicate that the nutritional status of adolescent students in Brazil is characterized by: low prevalence of underweight; high prevalence of overweight; as a contextual social space, private schools show a higher risk of overweight than their public counterparts; evidence that overweight presents an inverted social gradient, with adolescents from poorer families being more exposed than their peers in wealthier families.

Brazil has been presenting a consistent and wide reduction trend in the nutritional deficit indicator values in its infant[5], adolescent and adult[1,19] population. The prevalence of low weight observed in PeNSE 2015 is part of the path for reduction of nutritional deficits in



Source: National Adolescent School-based Health Survey, 2015.
*Including community, religious and philanthropic schools.

Figure 1. Prevalence of overweight among male (A) and female (B) adolescents from public and private schools according to macroregions and fifths of socioeconomic score. National Adolescent School-based Health Survey, 2015.

Brazil. The social and health determinants associated with this improvement show broader positive repercussions on the health status of vulnerable groups, such as children and mothers[20] and on the general health conditions in Brazil[21].

On the other side of the nutrition spectrum of Brazilian adolescents, an increase tendency in overweight or obesity is observed in a rhythm similar to that observed among adults in the same periods[1]. In PeNSE 2015, the level of adolescents with excess weight is 1.3 times higher than that observed in the Household Budget Survey in 2008-2009. The probability of overweight persistence from adolescence to adulthood is on average moderate[22], being higher among males, and has an inverse gradient associated with schooling for females[3]. The current level of overweight, its likelihood of persistence in adulthood, and the risks of morbidity and mortality associated with this trajectory[9,23] are added to other vectors observed in the Brazilian epidemiological transition, which suggest an increase in the burden of chronic noncommunicable diseases in adults over the coming decades.

The higher risk of overweight among adolescents in the private school system is a phenomenon that had already been detected in municipal surveys, but had not previously been reported in national samples. The higher risk of overweight observed among adolescents from the poorest families relative to those of the richer families is suggestive of a change in the distribution of overweight and obesity in Brazilian society. This profile is characteristic of societies marked by social or income inequality and is associated with worse health indicators for the whole society, less access to social and health services for the poorest, as well as greater exposure to violence[24]. Although outside of the scope of this analysis, one needs to highlight the undesirable association observed between the compared profile of the socioeconomic score of the public and private school students and the socioeconomic gradient.

In the period from 1975 to 2016, the mean BMI among children and adolescents increased globally[25]. Mean BMI values in children and adolescents in high-income countries are beginning to show a tendency for stability, albeit at high levels[25]. Considering the average BMI, Latin American and Caribbean countries are closer to high-income Western countries[25]. There are four vectors that act as mechanisms that help explain changes in physical activity and eating patterns and the association with increased weight gain: the widespread use of technology in various aspects of life, including leisure activities such as use of videogames, computers, tablets and cell phones, exacerbating sedentary behavior and, therefore, reducing energy expenditure[23,26]; the process of urbanization, which is associated to the increase in the availability of ultraprocessed foods that present higher energy density, fat and free sugar and lower fiber content[23,27]; the change in per capita income and the reduction of the cost of foods, mainly the processed and ultraprocessed types[23]; and greater access to technology and to the manufacturing process[23].

The results and analyzes in this study present some limitations that should be highlighted. Although not a limitation, it is relevant to discuss the possibility of extrapolating the results obtained in samples of adolescent students to the entire adolescent population

in the country. Data from the Brazilian Institute of Geography and Statistics (IBGE) presented in Brazil, in summary, indicate that in the period between 2007–2015, the enrollment rate of the population between 6 and 14 years old reached 98.6%. This data suggests that it is valid to extrapolate the conclusions of the analyzes presented for the universe of Brazilian adolescents, since only 1.4% of domiciled adolescents would not be represented by those observed in the educational system. The second limitation refers to the process of nutritional status classification in PeNSE 2015. The database published by the IBGE informs the age of the individuals in number of years with integers, while the reference values are available for monthly intervals at each age. Thus, individuals were classified against reference values of the median month at each year of age. This procedure is unlikely to affect the estimates of indicators and broader associations, but the effect of this procedure on more detailed analyzes and with multiple stratification cut-offs cannot be predicted.

CONCLUSION

Overweight among adolescents in Brazil is now a public health problem, given the high prevalences observed and the trend of growth of these values among the last available surveys for analysis. The repercussion, or even persistence in adult life, of various health problems acquired during adolescence emphasizes concern about the current nutritional picture and reinforces the need for early action to prevent the incidence of overweight in this life cycle and promote healthy practices that may be reflected in adulthood.

Overweight and obesity are multifactorial conditions and interact with other health problems or exposure to violence observed at this age. The evidence of the association between nutritional problems and the Brazilian inequality profile in this social group also explains the need to deepen and multiply public health and social policies, with a focus on equity, aimed at adolescents in Brazil.

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Received on: 11/14/2017
Final version presented on: 02/07/2018
Accepted on: 02/08/2018