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NUTRITIONAL STATUS, KNOWLEDGE ABOUT NUTRITION AND FEEDING PRACTICES OF ADOLESCENTS ENROLLED IN HIGH SCHOOLS OF THE TOWN OF FORMIGA/MG

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■ABSTRACT: This study assessed the nutritional status, feeding practices and knowledge of nutrition of school students enrolled at high schools of the public and private teaching schools of the town of Formiga/MG. To evaluate the nutritional status, percentile Body Mass Index was utilized, adopting the cutting scores proposed by the World Health Organization. The information about feeding practices and knowledge in nutrition was obtained by utilizing self-administered standardized questionnaires. The prevalence of overweight was 11.8% and was significantly higher in the public schools and in males. The low weight was found in only 1.9% of studied population. Little more than a half of the participants indicated correctly the foods rich in fibers and in proteins, lipids and carbohydrates. Most of the adolescents (65.5%) do not eat fruit and vegetables daily. The daily consumption of milk and dairy products was also low and was significantly higher in the private school network and in the male gender. Overall the results indicate poor eating habits that increase the risk of nutritional disorders.

■KEYWORDS: Overweight; obesity; adolescents; feeding; nutritional status.

INTRODUCTION

Adolescence is a period marked by important physical and psychosocial transformations which influence both the nutritional and feeding behavior of adolescents. Due to the intense and complex modifications, that is one of the most challenging periods of human development, both support and special attention to the transforming individual being necessary. [9,18]

The evaluation of the nutritional status intends to verify the body growth and proportions, aiming at the early diagnosis of nutritional alterations and the establishment of intervention measures. [20] Among of the nutritional alterations found in teenage, overweight has gained distinction owing to the increased prevalence in the latest decades and its association with metabolic alterations, dyslipidemias, hypertension, diabetes mellitus type 2 and cardiovascular diseases.[12] These disorders were more evident in grown-ups, but in the latest years, they already can be observed frequently in the youngest age range. [1,9,10] The earlier the overweight is diagnosed, the greater will be the chances of reverting the disease avoiding its consequences. [15]

Adolescence is a lifetime period in which the individual starts the process of searching his identity. In this context, a great deal of habits is formed and persists throughout the adult life. Presence of inadequate feeding habits among adolescents with a high consumption of high energy and low nutrient value foods and the frequent omission of meals, mainly breakfast. [8,12] The knowledge about a good feeding and its consequences can be a difference in the establishment of wholesome feeding habits among adolescents. [12,13]

The present study was designed to evaluate the nutritional status, knowledge on nutritional and feeding practices of adolescents enrolled in the public and private school networks of the town of Formiga, MG.

MATERIAL AND METHODS

A cross-sectional study with adolescents of 14 to 19 years, enrolled in the morning period at high schools of the public and private networks of the town of Formiga – MG. The study included all public (seven schools) and private (three schools) high schools in the urban zone of the town Formiga / MG. The sample calculation was performed according to the method described by Barbetta.[4] Was performed a calculation of sample size for public school students (N=1500) and another for private school students (N=230) considering a maximum tolerable sampling error of 5%. The samples obtained were 316 and 146 adolescents for the public and private high schools, respectively. In the whole, 517 students were screened (371 adolescents in

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public schools) and (146 adolescents in private schools), by proportional systematic random sampling. The teenagers selected for the study who were not present on the day of data collection or refused to participate in the study were replaced by other students using systematic random sampling. The data collection was performed at the schools by researchers duly trained in previously determined dates. The study was approved by the Committee of Ethics in Research of the College of Formiga - UNIFOR, MG. It is stressed that all the research steps were performed according to the ethical principles at the Resolution Nº 196/96 of the National Health Council. To take part in the research, the adolescents or the persons in charge signed the informed free term of consent.

Evaluation of the Nutritional Status

To evaluate the nutritional status was used the body mass index (BMI). The weight was measured on a digital scale, with a capacity for up to 150 kg and precision of 100 g. the height was obtained by using the wall estadiometer with a precision of 1mm. For the classification of the nutritional status were adopted the cut-off points of the percentile BMI proposed by the World Health Organization: [23] < percentile 5 = low weight, ≥ percentile 5 and < percentile 85 = adequate or euthrophic and ≥ percentile 85 = overweight.

Evaluation of the feeding practices and knowledge of nutrition

The information on the feeding practices and knowledge in nutrition were obtained by using a standardized self-administered questionnaire previously tested in this population. This questionnaire contained questions about feeding practices (consumption of fruits and vegetables, milk and dairies, refreshments, etc.), consumption of foods in the cafeterias of the schools, identification of foods considered good sources of vitamins, minerals, fibers, macronutrients and energy value of the foods. The subjects were given instructions as to the filling in of the questionnaire. This questionnaire was applied by the researchers in pre-determined day and time in association with the board of the schools and with the aid of the teachers responsible for the adolescents evaluated.

Data analysis

The data were analyzed by utilizing the statistical software Epi-info 2002. To analyze the categorical variables was applied the qui-square test (χ^2) with com Yates' correction. *Student's t test* was applied to compare the continuous variables with normal distribution. The significance level adopted was of 5%.

RESULTS

Characterization of the Population

517 adolescents of both genders, enrolled in high school, in public (371 adolescents) and private schools (146 adolescents) of the town of Formiga/MG took part in this study. Among the public school students, 42.6% were of the female gender and 57.4% of the male gender, while in the private schools, the male gender stood for 45.2% of the sample and the female 54.8. The adolescents evaluated in this study were aged between 14 and 19 years, the general mean being equal to 16.06 $\pm$ 1.02 years for the private schools and 16.07 ± 1.02 years. No significant difference of the means of age between the genders was found.

Nutritional Status

The anthropometric data of the population studied according to the school network and gender are presented in Table 1. There were no significant differences among the means of weight, height and BMI for boys and girls relative to the school network. Nevertheless, the height and average weight were significantly higher for the boys in both the school networks. As to the BMI, there was no significant difference between the genders and the school networks.

The prevalence of overweight in the population evaluated is presented in Table 2. The public school network students presented prevalence of overweight twice as high as the particular school network students. Taking into account all the population evaluated, it was found that 11.8% of the adolescents presented overweight. Both in the public and private network schools the prevalence of overweight was higher in the male gender (Table 2). In the total population, the prevalence of overweight was twice as high in the male gender (M=16.5% and F=8.2%, p=0.005). The most worrying situation was found in the group of adolescents

Table 1 – Mean and standard deviation of the anthropometric variables according to gender and school network of teenagers of Formiga, MG, 2007.

Variable	Public School				Private School			
	Male		Female		Male		Female	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Weight (kg)	65.32*	15.2	54.12	6.50	64.22*	10.11	54.30	5.70
Height (cm)	1.73*	0.07	1.60	0.06	1.72*	0.06	1.61	0.05
BMI (kg/m^2)	21.80	4.47	21.04	3.35	21.5	2.66	21.00	2.00

*p<0.01, Student's t test.

of the male gender of the public school network, in this contest, almost a fifth presented overweight. On the other hand, only 1.9% of the adolescents evaluated presented low weight, there being significant differences between the gender and school network.

Feeding Knowledge

The percent frequencies of hits in questions about the feeding knowledge are presented in Figure 1. A little more than the half of the adolescents indicated correctly which foods are fiber-rich (vegetables and fruits), there being no significant differences between the school networks. Nevertheless, more than a quarter of the adolescents (27.2%) indicated the pastas and meats as fiber-rich foods.

Adolescents showed a high percent of hits in the questions related to the sources and functions of micronutrients (calcium, iron, vitamin C and D), its being significantly higher in the private school network. A high percent of adolescents was mistaken as to the main sources of macronutrients, specially the public school adolescents. In relation to the carbohydrates, 37.9% and 18.1% of the adolescents of the public and private schools, respectively, pointed to the meats, milk and dairy products as foods rich in this nutrient. As for proteins, 48.8% of the public school adolescents and 32.9% of those of the private schools considers both fruits and greens as good sources of this nutrient. But in relation to lipids, 26.2% of the adolescents of public schools and 14.4% of the private schools included plants such as beetroots and lettuce as lipid-rich foods. Despite the majority of the adolescents having managed to identify correctly the high-energy foods, the inadequate knowledge about the main sources of macronutrients can favor the inadequate food intake.

Adolescents have appraised the *diet* and *light* foods, there not being significant differences in the percent of hits between the public and private network, but the percent of hits for *diet* foods was very poor, making it clear that the population studied has no adequate knowledge about the definition and purpose of *diet* products. The majority of the adolescents (81.2%) stated that *diet* foods are only those without sugar and 11.8% believe that any *diet* food is good to lose weight.

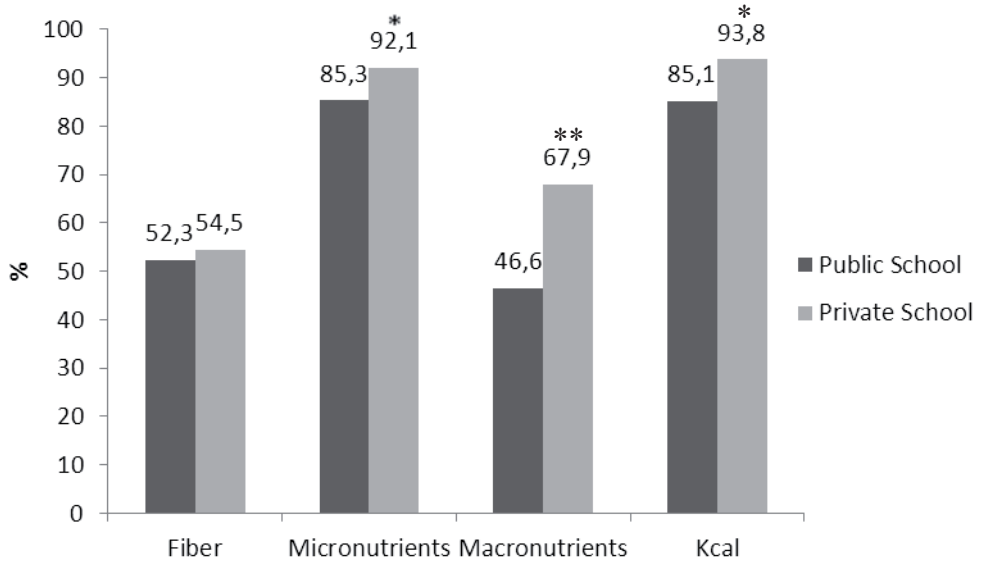
Feeding Practices

The results about food consumption of the adolescents evaluated in the present study are presented in Table 3. The data show a worrying situation, since the majority (65.5%) does not ingest either fruits or vegetables daily. The daily intake of milk and dairy products was also poor reaching only 48.2% of the adolescents, its being

Table 2 – Prevalence of overweight in teenagers according to the gender and school network of Formiga, MG, 2007.

Gender	Public	Private	OR (IC 95%)	Value-p*
Male	19.6	9.1	2.44 (0.91-6.91)	0.08
Female	9.4	5.0	1.97 (0.61-7.05)	0.32
Total	13.7	6.8	2.17 (1.03-4.70)	0.04

* Qui-square test at 5% of probability.



*p<0.05, **p<0,01, chi-square test.

FIGURE 1 – Frequency of the hits in questions about nutrients and energy according to the school network.

significantly higher in the private schools. The intake of milk and dairy products both in public and private schools was significantly higher in the male group: public schools (M= 54.1% and F=35.1%), private schools (M=75.8% and F=50.6%). For the other foods, there were no relevant differences relative to intake. The private school students presented a significantly higher daily consumption of sandwiches, meats and refreshments.

As to the consumption of meats, it is found that 89.0% of the adolescents of the private schools consume meats every day in contrast to the public schools, where only 37.8% of the adolescents consume meat every day.

The foods which showed greater frequency of consumption by the adolescents in the cafeterias of the schools evaluated are presented in Figure 2. Predominance of the consumption of high-energy and low nutrient value foods was found. With the exception of the cakes, the other foods presented consumption frequency significantly higher among the private school students.

DISCUSSION

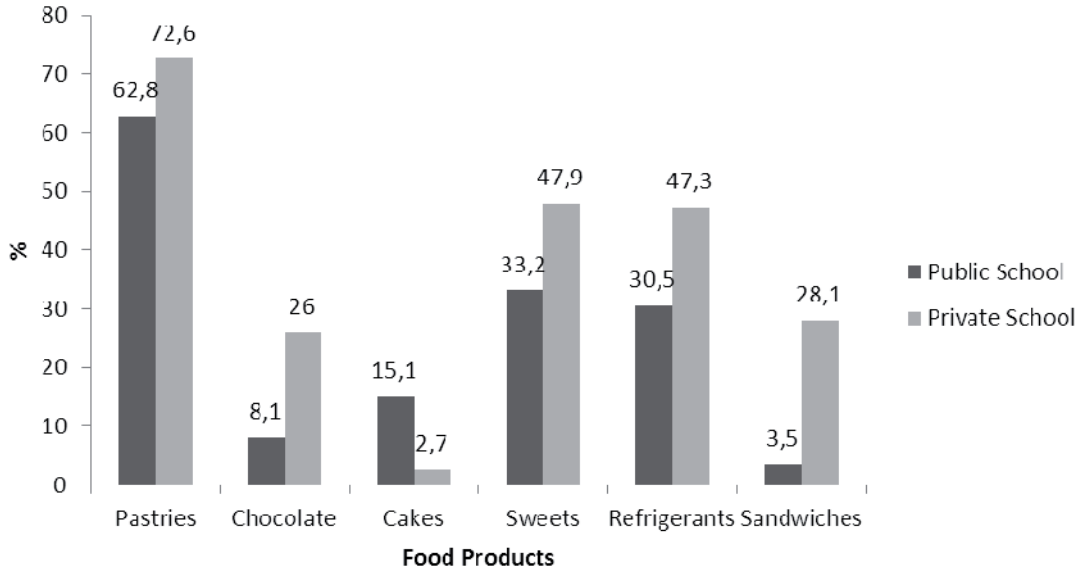
Several studies have shown greater prevalence of overweight among adolescents of male gender. Andrade et al.3 found prevalence of overweight in adolescents of the town of Rio de Janeiro equal to 29.3% and 15% for boys and girls, respectively. Farias Junior & Lopes[7] also found prevalence of overweight greater in adolescents of the male gender (14.8%) in relation to the female gender (8.0%). Costa et al.[6] evaluated the prevalence of overweight in adolescents of 14 to 19 years enrolled in the morning schedule of high school of the town of Toledo, PR. In spite of the authors finding prevalence of overweight (10.2%) similar to our study, there were no significant differences between the school networks (private = 12.6% and public = 9.7%, p=0.073). Other studies found no significant differences in the prevalence of overweight in relation to gender.[14,19,21]

These studies show that overweight among the adolescents occur in a different manner in the several towns and cities in Brazil, the conduction of nation-wide studies which encompass cities and towns situated in the interior

Table 3 – Percent frequency of teenagers according to the school network, Formiga, MG, 2007.

Variables	Public	Private
Fruits and Vegetables		
Every day	34.0	39.8
2 to 3 times/Week	42.3*	27.9
Once/week.	13.8	16.7
once/month or he does not **ingest**	9.9	15.6
Milk and dairy products		
Every day	43.2	62.1*
2 to 3 times/Week.	32.6	24.1
Once/week.	17.4	8.3
Once/month or he does not ingest	3.7	5.5
Sandwich		
Every day	1.6	5.5
2 to 3 times/Week.	13.4	15.9
Once/Week.	34.9	37.2
Once/month or he does not ingest	50,1	41,4
Meats		
Every day	37,8	89,0*
2 to 3 times/Week.	22,2*	10,3
Once/week.	7,6	0,7
Once/month or he does not ingest	2,2	0,0
Refreshments		
Every day	23.8	32.9*
2 to 3 times/Week.	40.4	40.4
Once/week.	27.1	19.2
Once/month or he does not ingest	8.7	7.5

*p<0.05, chi-square test.



*p<0.05 and **p<0.01.

FIGURE 2 – Percent frequency of the foods most consumed by the teenagers in the cafeterias of the Private and Public schools, Formiga, MG.

of the states to draw a more real picture of the problem in the country was performed. Despite of the variations realized in the prevalence of overweight found in several studies, we can state that the problem deserves special attention, the urgent implementation of strategies aiming at the prevention and control of the overweight among adolescents being necessary.

The major prevalence of overweight among the adolescents of the public schools may be associated with the poorer feeding knowledge demonstrated by them. But, the predominance of overweight among the male gender may be associated to increased worry by the girls with their body weight, since 90% of the girls reported to worry about their body weight. According to Vilela al.[22] the girls present a wish to lose weight with increasing age.

The poor percent of the hits in the questions concerning the sources of food fibers is worrying since the low intake of this nutrient is associated with the low consumption of fruits and vegetables which are important to a good nutrition and body weight control.

The subjects of study answered questions about the sources of carbohydrates, lipids and proteins that are more nutrients consumed daily in the human diet. High percentage of adolescents was wrong how the main sources of each macronutrient, especially adolescents from public favoring the intake of imbalanced diet. In the diet products, there is a total reduction of at least one nutrient of its composition. But the diet product not every time has energy value poorer than the average product. Rorato et al.[16] verified that among individuals which consumed light and diet products, the majority did not know for what purpose these products should be utilized.

The low frequency of consumption of fruits and vegetables can hinder the fulfillment of daily needs for fiber, vitamins and minerals of the adolescents. Mendes & Catão.[11] found low consumption of fruits (79.1%) and vegetables (75.6%) in adolescents aged 10 to 16 years. The poor consumption of milk and dairy products mainly among the public school adolescents, in general, one associates to an intake of calcium below the recommendations, this being able to harm the formation of the bony tissue so marked in this age range.2 A number of studies conducted on adolescents show the poor consumption of dairy products, fruits and vegetables. [6,10,17]

The school cafeterias are important sites to purchase food for the students. In general, in the private schools, they constitute the only place for the purchase of foods during the school period, which accounts for the increased consumption of foods purchased in the cafeterias in privates schools. These institutions contribute for the adolescents to exercise their autonomy for the choice of foods. A few studies show that, when they are given autonomy for purchasing foods, adolescents prefer the sugar and energy rich products as sweets, pastries, biscuits and refreshments. [16,18]

In general, the school cafeterias affect negatively the feeding practice, for often they commercialize low nutritional value food products which can lead to the strengthening of inadequate feeding habits.

CONCLUSION

The prevalence of overweight found is similar to other nationwide studies. The public school students presented practically the double of overweight. In the same manner, the adolescents of the male gender presented a twice higher prevalence of overweight than the girls. The problem of overweight in this population can be regarded as worrying and liable of particular intervention measures.

In general, the results indicate inadequate feeding habits, which favor the nutritional deviations. The consumption of foods in the school cafeterias was greater in the private schools. The most consumed foods are all of poor nutritional value and high energy density. As to the feeding knowledge, the public school students presented better knowledge than the private school students.

ABREU, W. C.; COELHO, T. M.; SOUZA, R. A.; GUIMARÃES, L. C. Estado nutricional, conhecimento sobre nutrição e práticas alimentares de adolescentes matriculados no ensino médio da cidade de Formiga/MG. **Alim. Nutr**., Araraquara, v. 23, n.4, p. 521-527, out./dez. 2012.

■RESUMO: Este estudo avaliou o estado nutricional, práticas alimentares e conhecimentos sobre nutrição de escolares matriculados no ensino médio das escolas da rede pública e particular da cidade de Formiga/MG. O estado nutricional foi avaliado utilizado o Índice de Massa Corporal percentilar, adotando-se os pontos de corte propostos pela Organização Mundial de Saúde (1995). As informações sobre práticas alimentares e conhecimentos em nutrição foram obtidas utilizando-se questionário padronizado auto-administrado. O sobrepeso atingiu 11,8% dos adolescentes, sendo significativamente maior nas escolas da rede pública e no sexo masculino. O baixo peso foi observado em apenas 1,9% da população estudada. Pouco mais da metade dos participantes indicou corretamente os alimentos ricos em fibras e em proteínas, lipídios e carboidratos. A maioria dos adolescentes (65,5%) não ingere frutas e hortaliças diariamente. O consumo diário de leite e derivados também foi baixo, sendo significativamente maior na rede particular e no sexo masculino. De modo geral os resultados indicam hábitos alimentares inadequados, que aumentam o risco de distúrbios nutricionais.

■PALAVRAS-CHAVE: Sobrepeso; obesidade; adolescentes; alimentação; estado nutricional.

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