FEEDING IN SCHOOL AND NUTRITIONAL STATUS OF ELEMENTARY SCHOOL STUDENTS

Alimentação na escola e estado nutricional de estudantes do ensino fundamental

Alimentación en la escuela y el estado nutricional de estudiantes de la enseñanza fundamental

Original Article

Jeani Tedeschi Ferreira[1]
Joana Lemos[1]
Simone Morelo Dal Bosco[1]
Fernanda Scherer Adami[1]

1) Univates University Center (*Centro Universitário - Univates*) - Lajeado (RS) - Brazil

ABSTRACT

Objective: To relate the nutritional status and sex of elementary students with the intake of free school meals, meals bought at canteens and meals brought from home. **Methods**: Cross-sectional observational study performed in 2013 with 120 students from 5th to 9th grade of two elementary and public school of a municipality in Rio Grande do Sul. A structured questionnaire was applied to investigate free school meals, meals purchased at school or brought from home. Weight, height and waist circumference (WC) were measured. The distribution of percentiles of Body Mass Index (BMI) was analyzed and the nutritional status was ranked, using the Fisher's Exact Test for analysis. **Results**: Female students (n=36; 46.8%) reported not consuming the free school meals because they dislike it, and male students (n=22; 51.2%) because they do not feel hungry (p=0.028). Regarding the food purchased at school, females' preference (n=12; 27.9%) was for candies and males' (n=21; 48.8%) was for hot dog (p=<0.001). The majority of the students classified as eutrophic (n=28; 33.3%) consumed the food because they were hungry, and those classified as overweight/obese (n=24; 70.6%), because they considered it healthy and nutritious (p=0.028). **Conclusion**: Most eutrophic, overweight and obese students in both genders consume 2-3 free meals offered at school per week and they give preference to bringing from home some biscuits, snacks and sandwiches made with white bread. Females prefer soft drinks, goodies, candies, and cakes, while males prefer the hot dog.

Descriptors: School Feeding; Nutritional Status; Students.

RESUMO

Objetivo: *Relacionar o estado nutricional e o sexo de estudantes do ensino fundamental ao consumo da alimentação escolar gratuita, comprada nas cantinas e trazida de casa.* **Métodos:** *Estudo observacional, transversal, realizado em 2013 com 120 estudantes do 5° ao 9° ano de duas escolas municipais de ensino fundamental de um município gaúcho. Aplicou-se questionário estruturado para investigação acerca da alimentação escolar gratuita, comprada na escola ou trazida de casa. Foram aferidos peso, altura e circunferência da cintura (CC). Analisou-se a distribuição dos percentis do índice de massa corporal (IMC) e classificou-se o estado nutricional utilizando-se o Teste Exato de Fisher para análise.* **Resultados:** *Estudantes do sexo feminino (n=36; 46,8%) referiram não consumir a alimentação escolar gratuita porque não gostam, e os estudantes do sexo masculino (n=22; 51,2%), porque não sentem fome (p=0,028). Com relação à alimentação comprada na escola, a preferência feminina (n=12; 27,9%) foi por guloseimas, e a masculina (n=21; 48,8%), por cachorro quente (p=<0,001). A maioria dos estudantes classificados como eutróficos (n=28; 33,3%) consumia a alimentação porque sentia fome, e os com sobrepeso/obesidade (n=24; 70,6%), porque a considerava saudável e nutritiva (p=0,028).* **Conclusão:** *Os estudantes eutróficos, com sobrepeso e obesidade de ambos os sexos consomem de 2 a 3 refeições gratuitas oferecidas na escola por semana e demonstram preferência por trazer de casa bolachas, salgadinhos e sanduíches com pão branco. O sexo feminino prefere refrigerantes, guloseimas, doces e bolos, enquanto o sexo masculino, cachorro quente.*

Descritores: *Alimentação Escolar; Estado Nutricional; Estudantes.*

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RESUMEN

Objetivo: *Relacionar el estado nutricional y el sexo de estudiantes de la enseñanza fundamental con el consumo de la alimentación gratuita de la escuela, la de las cafeterías de la escuela y las que se trae de casa.* **Métodos:** *Estudio observacional y transversal realizado en 2013 con 120 estudiantes del 5° al 9° año de dos escuelas municipales de enseñanza fundamental de un municipio del Sur de Brasil. Se aplicó un cuestionario estructurado para investigar sobre la alimentación gratuita de la escuela, aquella comprada en la cafetería o la que se trae de casa. Fueron verificados el peso, la altura y circunferencia de la cintura (CC). Se analizó la distribución de los percentiles del índice de masa corporal (IMC) y se clasificó el estado nutricional utilizándose la prueba Exacto de Fisher.* **Resultados:** *Estudiantes del sexo femenino (n=36; 46,8%) refirieron que no consumían la alimentación gratuita de la escuela porque no les gustan y los estudiantes del sexo masculino (n=22; 51,2%) porque no tienen hambre (p=0,028). Respecto la alimentación adquirida en la escuela la preferencia femenina (n=12; 27,9%) fue por golosinas y la masculina (n=21; 48,8%) por perrito caliente (p=<0,001). La mayoría de los estudiantes clasificados como eutróficos (n=28; 33,3%) consumían la alimentación porque tenían hambre y aquellos con sobrepeso/obesidad (n=24; 70,6%) porque la consideraba saludable y nutritiva (p=0,028).* **Conclusión:** *Los estudiantes eutróficos de ambos sexos con sobrepeso y obesidad consumen entre 2 y 3 comidas gratuitas ofrecidas en la escuela cada semana y demuestran la preferencia de traer de casa galletas, ganchitos y emparedados de pan blanco. El sexo femenino prefiere refrescos, golosinas, dulces y pasteles mientras el sexo masculino prefiere el perrito caliente.*

Descriptores: *Alimentación Escolar; Estado Nutricional; Estudiantes.*

INTRODUCTION

School meals are provided free of charge to students of philanthropic and public schools through the *Programa Nacional de Alimentação Escolar – PNAE* (National School Feeding Program), which covers the whole basic education (early childhood education, primary education, secondary education, and youth and adult education). It aims to meet nutritional needs of students during their stay in classroom, contributing to students' growth, development, learning and performance besides promoting the adoption of healthy eating habits[1]. Hence the importance of knowing whether the program works properly and the food provided is adequately consumed or well accepted by students[2]. The manager should ensure universal, equal, regular and continuous access to healthy food; support sustainable development and social control; promote the rescue of regional eating habits; plan and monitor actions of food provision and actions of food and nutrition education[3].

Therefore, an improvement in school feeding is of great importance, and nutritional follow-up should be a fundamental tool for monitoring the health state of a population[4] which is living a moment of nutrition transition highlighted by the increase in overweight and obesity rates and the decrease in child malnutrition, influenced by social, environmental, economic and, especially, healthy factors[5,6]. Malnutrition, which was a risk factor in the past, is now reduced, and overweight and obesity have now become the public health problem. The rates rapidly increase every day and are difficult to stop as half of the total population and one third of children aged five to ten years are overweight or obese[7,8].

The school feeding public policy is one of the strategies developed by the State to minimize educational and social problems. In a country like Brazil, it is possible to observe social inequality, and, therefore, providing children with quality public schools is not enough. It is also necessary that these children be well fed in order to avoid an increase in school dropouts and improve their performance at school[9].

Thus, identifying the reasons why students do not eat at home or school are of great importance to ensure the maintenance of quality of life as a poor or inadequate nutrition results in child development problems and consequent decreased school performance[10]. Most of the time, students' food preferences consist of non-nutrient-dense foods and energy-dense foods that are frequently consumed at school[11].There is a big challenge in terms of changing the reality of school canteens through food and nutrition education actions in combination with the reduction in the marketing of unhealthy foods[10].

Given that, the aim of the present study was to relate the nutritional status and sex of elementary school students to the consumption of school food provided free of charge, food purchased from the canteens and food brought from home.

METHODS

This is an observational cross-sectional study conducted between August and October 2013 with 290 5th-9th graders aged 11-16 years attending two municipal elementary schools covered by the *Programa Nacional de Alimentação Escolar – PNAE* (National School Feeding Program) of the municipality of Lajeado, RS. Of the 290 students, 120 returned the Free Informed Consent form (FICF) signed by their parents or legal representatives and were included in the study. Variables age and sex were obtained from school records.

Data were collected using a structured questionnaire specifically tailored to the present research containing fourteen objective questions about: the type of food

provided by the school; the food students brought from home; the importance of nutrition to the students; how many times they ate the food provided free of charge by the school; the reasons for not eating it; what they used to drink during school meals; and the level of acceptance of these meals. Students answered the printed questionnaire in a room intended for this research. They were given circa thirty minutes to answer it.

The nutritional status was assessed by checking weight, height and waist circumference (WC) of students[12]. The body mass index (BMI) percentiles were analyzed based on the records of anthropometric measures and classified according to the Z-score into the curves of the World Health Organization (WHO) [13].

Weight was measured using Plenna® portable digital scale for adults (up to 150 kg and accuracy of 100 g) with students wearing light clothes and standing barefoot on the center of scale. A Wiso® portable stadiometer was used to measure the height of students who stood up straight with heels together and barefoot and relaxed arms by sides. WC was measured by a single evaluator who asked students to stand up right with arms relaxed by sides and used a flexible inelastic measurement tape with accuracy of one decimal place, and classified according to WC (cm) assessment percentiles for children and adolescents[12].

Data were presented as absolute numbers and percentages. The association between consumption variables (free school food, food purchased from canteens, food brought from home and liquids consumed), the nutritional status and sex of students was assessed using Fisher's Exact Test with maximum significance level set at 5% ($p<0.05$) through the Statistical Package for the Social Sciences (SPSS) software, version 13.0.

The study was approved by the Research Ethics Committee of the Health Sciences Center of the *Centro Universitário Univates* (Univates University Center) under No. 335.696, in accordance with Resolution 466/12 of the National Health Council.

RESULTS

Of the 120 students assessed, 77 (64.2%) were women with a mean age of 12.77 years (±1.49). According to the classification of BMI, 84 (70%) were eutrophic; 20 (16.7%) were overweight; and 14 (11.7%) were obese. A total of 118 (98.3%) students presented adequate WC (Table I).

Forty six (n=46; 59.7%) female students and 23 (53.5%) male students considered school feeding important, especially for being healthy and nutritious. When they do not eat it, it is because they do not like it – 33 (39.3%) female students – and 32 (47.1%) male students do not feel hungry. A total of 71.4% (n=55) of female students and 69.8% (n=30) of male students said the food provided by the school is "excellent or good", indicating a good acceptance.

Regarding adherence, the results were also positive because most of female students (n=44; 57.1%) and male students (n=19; 44.2%) eat school meals from two to three times a week (Table II).

Most female students (n=55; 71.4%) and male students (n=24; 55.8%) admitted to bringing biscuits, snack foods and white bread sandwich from home. Concerning what they purchase from school, girls prefer soft drinks, sweets

Table I - Description of students in relation to nutritional status by body mass index (BMI) and waist circumference (WC) according to sex. Lajeado, RS, 2013.

Variable	Category	Sex				*p**
		Female		Male		
		n	%	n	%	
Classification BMI#	Low weight	2	2.6	-	-	0.469
	Eutrophy	56	72.7	28	65.1	
	Overweight	12	15.6	8	18.6	
	Obese	7	9.1	7	16.3	
Classification WC#	Ideal	75	97.4	43	100.0	0.536
	Above Ideal	2	2.6	-	-	

#, BMI: Body Mass Index; WC: Waist Circumference.*Fisher's Exact Test.

and treats (n=50; 64>9%) while boys prefer hot dogs (n=21; 48.8%). Both girls (n=49; 63.7%) and boys (n=30; 69.8%) generally drink liquids during meals (Table III).

Both eutrophic students (n=82; 97.6%) and overweight/obese students (n=34; 100%) considered school feeding important. Eutrophic students (n=44; 52.4%) and overweight/obese students (n=17; 50%) ate it from 2-3 times a week. Eutrophic students (n=33; 39.3%) who did not eat it said it was because they did not like the food provided, whereas overweight/obese students (n=16; 47.1%) who did not eat it said it was because they had no appetite or hunger. Most eutrophic students (n=57; 67.8%) and overweight/obese students (n=26; 76.5%) considered the food provided by the school good or excellent (Table IV).

Eutrophic students – 57 (67.9%) and 53 (63.1%) – and overweight/obese students – 21 (61.8%) and 25 (73.5%) – generally bring biscuits, snack foods or white bread sandwich from home and drink liquids during meals. Regardless of their nutritional status, most eutrophic students (n=44; 52.4%) and overweight/obese students (n=16; 47.1%) purchase soft drinks, sweets and treats, cookies or cakes from school (Table V).

Table II - Description of students in relation to school feeding according to sex. Lajeado, RS, 2013.

Variable	Category	Sex				*p**
		Female		Male		
		n	%	n	%	
Do you think free school feeding is important?	Yes	77	100.0	41	95.3	0.126
	No	-	-	2	4.7	
Why do you think it is important?	Healthy/Nutritious	46	59.7	23	53.5	0.539
	Tasty/Good Taste	7	9.1	8	18.6	
	Feels hungry at school	21	27.3	11	25.6	
	Other	3	3.9	1	2.3	
Why is it that you do not eat free school food sometimes?	No appetite	26	33.8	22	51.2	0.028
	Brings snack from home	10	13.0	4	9.3	
	Purchases food from school	5	6.5	7	16.3	
	Does not like the food from school	36	46.8	10	23.3	
How many times do you eat free school food per week?	5 - 4 times	20	26.0	12	27.9	0.263
	3 - 2 times	44	57.1	19	44.2	
	1 - 0 times	13	16.9	12	27.9	
What do you think about the free school food prepared at school?	Excellent	14	18.2	16	37.2	0.063
	Good	41	53.2	14	32.6	
	Reasonable	18	23.4	12	27.9	
	Bad	4	5.2	1	2.3	

*Fisher's Exact Test.

Table III - Description of students in relation to food purchased from school canteens, food brought from home and liquids during meals according to sex. Lajeado, RS, 2013.

Variable	Category	Sex				*p**
		Female		Male		
		n	%	n	%	
What do you purchase from the school canteen?	Nothing/Never buy	10	13.0	12	27.9	<0.001
	Soft drinks, sweets, treats, cookies, cakes	50	64.9	10	23.3	
	Hot dogs	17	22.1	21	48.8	
What do you often bring from home to eat at school?	Biscuits, snack foods, White bread sandwich (carbohydrates)	55	71.4	24	55.8	0.180
	Fruit	7	9.1	8	18.6	
	Never bring food from home	15	19.5	11	25.6	
Do you drink liquids during school meals?	Yes	13	16.9	16	37.2	0.047
	No	28	36.4	13	30.2	
	Sometimes	36	46.8	14	32.6	
What do you usually drink at school?	Water	54	70.1	31	72.1	0.827
	Juice	10	13.0	3	7.0	
	Milk and chocolate	4	5.2	3	7.0	
	Soft drink	8	10.4	6	14.0	
	Tea	1	1.3	-	-	

*Fisher's Exact Time.

Table IV - Description of students in relation to school feeding according to nutritional status. Lajeado, RS, 2013.

Variable	Category	BMI Classification				*p**
		Eutrophy		Overweight/ Obesity		
		n	%	n	%	
Do you think free school feeding is important?	Yes	82	97.6	34	100.0	1.000
	No	2	2.4	0	0.0	
Why do you think it is important?	Healthy/Nutritious	44	52.4	24	70.6	0.028
	Tasty/Good Taste	9	10.7	6	17.6	
	Feels hungry at school	28	33.3	3	8.8	
	Other	3	3.6	1	2.9	
Why is it that you do not eat free school food sometimes?	No appetite	32	38.1	16	47.1	0.386
	Brings snack from home	12	14.3	2	5.9	
	Purchases food from school	7	8.3	5	14.7	
	Does not like the food from school	33	39.3	11	32.4	
How many times do you eat free school food per week?	5 - 4 times	23	27.4	9	26.5	0.928
	3 - 2 times	44	52.4	17	50.0	
	1 - 0 times	17	20.2	8	23.5	
What do you think about the free school food prepared at school?	Excellent	20	23.8	10	29.4	0.569
	Good	37	44.0	16	47.1	
	Reasonable	22	26.2	8	23.5	
	Bad	5	6.0	0	0.0	

BMI=Body Mass Index; *Teste Exato de Fisher.

Table V - Description of students in relation to food purchased from school canteens, food brought from home and liquids during meals, according to nutritional status. Lajeado, RS, 2013.

Variable	Category	BMI Classification				p*
		Eutrophy		Overweight/ Obesity		
		n	%	n	%	
What do you purchase from the school canteen?	Nothing/Never buy	15	17.9	6	17.6	0.860
	Soft drinks, sweets, treats, cookies, cakes	44	52.4	16	47.1	
	Hot dogs	25	29.8	12	35.3	
What do you often bring from home to eat at school?	Biscuits, snack foods, white bread sandwich (carbohydrates)	57	67.9	21	61.8	0.679
	Fruit	11	13.1	4	11.8	
	Never bring food from home	16	19.0	9	26.5	
Do you drink liquids during school meals?	Yes	22	26.2	7	20.6	0.296
	No	31	36.9	9	26.5	
	Sometimes	31	36.9	18	52.9	
What do you usually drink at school?	Water	64	76.2	20	58.8	0.113
	Juice	8	9.5	4	11.8	
	Milk and chocolate	5	6.0	2	5.9	
	Soft drink	6	7.1	8	23.5	
	Tea	1	1.2	0	0.0	

BMI=Body Mass Index; *Fisher's Exact Test.

DISCUSSION

The present study showed there is a good acceptance of the food provided free of charge by schools and a high intake of energy-dense foods when students bring food from home or purchase it from the school canteen.

Regarding nutritional status, it was observed that 15.6% and 18.6% of female and male students, respectively, were overweight. These results are higher than those of a study[4] which revealed that 11.4% of students were overweight. Another research[14] found a rate of 9.5% of overweight students and another inquiry [15] found a rate of 13.1%.

Most of the students in the present study had adequate WC measures, a result that points to a lower risk for the development of cardiovascular diseases and metabolic syndrome in children. WC relates to excess abdominal fat and risk factors for cardiovascular diseases such as high total cholesterol and LDL cholesterol and low HDL cholesterol[16]. WC is an indicator of visceral fat widely assessed in the adult population and recently identified as risk factor in children and adolescents[17].

Although most students assessed in the present research were eutrophic, excess weight rates were relevant. Most eutrophic students said it was important to eat school food because they feel hungry while overweight/obese students ate it because it was healthy and nutritious. These results differ from the findings of a study[18] in which excess weight students felt hungrier than eutrophic students and therefore ate more times a day and had the habit to eat between meals.

It was also observed that in canteens girls purchase more sweets and soft drinks and boys purchase more hot dogs (p=<0.001). These results on food purchasing habits at schools are worrying because the burden of chronic diseases is reaching worrying levels for public health; therefore, diseases like obesity and hypertension are also affecting children and adolescents just like the adult population[19].

In the present study, 10.4% of girls and 14% of boys reported drinking soft drinks during school meals, a result that is lower than that of another research[20] in which 29% of students (mostly girls) drank soft drinks during meals

as another study[21] observed a higher intake of soft drinks during lunch and snacks (55%).

Most of the students assessed in the present study said they eat free school food from 2-3 times a week. This result is similar to the result of a study[22] that revealed that 58% of students sometimes ate the school food. At the same time, the present study showed that 16.9% of girls and 27.9% of boys said they ate school food once a week. These rates are higher than those of another research[23] which observed that 7.7% of the students never ate school food. In another study[8], 61.1% of the students said they eat the food provided by the school from 4-5 times a week, a rate that is higher than the one found in the present study. In other studies[7,23], most of the students say they eat the school food every day.

In the present study, students' answers regarding the acceptance of school feeding were mostly "good" and "excellent", a result that is similar to those of other studies[21,22] that found rates of 74% and 70.8%, respectively, of good acceptance of school feeding. However, these percentages are lower than those recommended by the *Programa Nacional de Alimentação Escolar* (National School Feeding Program) for the acceptance of school feeding, which should be at least 85% for the hedonic scale[1].

The present research showed a significant difference between sexes in relation to the reason why they did not eat the food provided by the school. Female students said that they do not eat when they do not like it what is offered and male students said they do not eat it because they do not feel hungry, corroborating another study[24] in which interviewees said they did not like the food provided by the school (50%) or brought food from home (25%).

Most of students who do not eat the food provided free of charge by the school said they bring biscuits, snack foods or white bread sandwich from home, showing that preferences are similar between sexes and classifications of nutritional status. This result is similar to that of a study[24] in which 52.2% of students brought chips, filled cookies, juice and soft drinks from home and another research[25] in which 50.2% of students brought popcorn or biscuits from home, revealing worrying results since they show a preference for foods with poor nutritional quality.

Some of the limitations of the present study are the utilization of a structured questionnaire for the assessment of school feeding in students and the non-authorization of legal representatives, which affected the sample size.

Finally, the study suggests health promotion measures with strategies for nutrition education about the quality of food for students in general.

CONCLUSION

It is concluded that eutrophic, overweight and obese students of both sexes ate 2-3 meals provided free of charge by the school per week and presented preferences for biscuits, snack foods and white bread sandwiches brought from home. When purchasing food from school, eutrophic, overweight and obese students preferred soft drinks, sweets and treats, and cakes. With regard to sex, female students preferred soft drinks, sweets and treats, and cakes while male students preferred hot dogs.

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First author's address:
Jeani Tedeschi Ferreira
Centro Universitário Univates
Rua Avelino Tallini, 171
Bairro: Universitário
CEP: 95900-000 - Lajeado - RS - Brasil
E-mail: jeanitf@ibest.com.br

Mailing address:
Fernanda Scherer Adami
Centro Universitário Univates
Rua Avelino Tallini, 171
Bairro: Universitário
CEP: 95900-000 - Lajeado - RS - Brasil
E-mail: fernandascherer@univates.br