OVERWEIGHT AND OBESITY PREVALENCE IN STUDENTS FROM PUBLIC AND PRIVATE SYSTEM IN THE CITY OF FORTALEZA

Prevalência de sobrepeso e obesidade em escolares da rede pública e particular da cidade de Fortaleza

Prevalencia de sobrepeso y obesidad en escolares de la red pública y privada de la ciudad de Fortaleza

ABSTRACT

Objective: To verify the prevalence of overweight and obesity in students from the private and public system in the city of Fortaleza, CE. **Methods:** Observational cross-sectional research, developed in the period from August to November 2012, with sample consisting of 217 children, aged between 7 and 11 years. The anthropometric parameters of body weight, height, and body mass index (BMI) were assessed. Data analysis was performed with the assistance of Predictive Analytics Software. **Results:** The mean age of the children was 8.15 years. On body mass, it was found that children from private schools had higher average, being 36.0 ± 11.70 kg in male children and 33.59 ± 8.97 kg in females, whereas in public school, the average was 27.05 ± 05 kg for male children and 28.06 ± 7.73 kg for females (p <0.05). For the BMI, in public school, the eutrophic state was found in 66 (81.5%) male children and 65 (72.2%) females; on the other hand, there was a higher prevalence of overweight and obese children among students from private school, being 12 (50.0%) males and 10 (45.5%) females. **Conclusion:** The study found high prevalence of children affected by overweight and obesity in schools from both the private and the public educational system, indicating higher values for children from the private educational system.

Descriptors: Child; Overweight; Pediatric Obesity; Prevalence.

RESUMO

Objetivo: *Verificar a prevalência de sobrepeso e obesidade em escolares da rede pública e particular da cidade de Fortaleza-CE.* **Métodos:** *Pesquisa observacional, transversal, desenvolvida no período de agosto a novembro de 2012, com amostra composta por 217 crianças na faixa etária entre 7 e 11 anos. Avaliaram-se os parâmetros antropométricos de massa corporal, estatura e índice de massa corporal (IMC). Realizou-se a análise dos dados com o auxílio do Predictive Analytics SoftWare.* **Resultados:** *Encontrou-se a média da idade das crianças de 8,1 anos. Na massa corporal, verificou-se que as crianças da escola particular tiveram média superior, sendo no masculino de 36,0±11,70 kg e no feminino de 33,59±8,97 kg, enquanto na escola pública o masculino foi de 27,05±05 kg e o feminino, 28,06±7,73 kg (p<0,05). Para o IMC, constatou-se, no ensino público, estado de eutrofia em 66 (81,5%) crianças do sexo masculino e 65 (72,2%) do feminino; por outro lado, verificou-se maior prevalência de crianças com sobrepeso e obesidade em alunos da escola particular, sendo 12 (50,0%) do masculino e 10 (45,5%) do feminino.* **Conclusão:** *Encontrou-se alta prevalência de crianças acometidas com excesso de peso e obesidade tanto em escolas da rede de ensino particular como pública, apontando maiores valores para as crianças da rede particular de ensino.*

Descritores: *Criança; Sobrepeso; Obesidade Pediátrica; Prevalência.*

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RESUMEN

Objetivo: *Verificar la prevalencia de sobrepeso y obesidad en escolares de la red pública y privada de la ciudad de Fortaleza-CE.* **Métodos:** *Investigación observacional y transversal desarrollada entre agosto y noviembre de 2012 con una muestra de 217 niños con franja de edad entre 7 y 11 años. Se evaluaron los parámetros antropométricos de masa corporal, estatura e índice de masa corporal (IMC). Se realizó el análisis de los datos con el Predictive Analytics SoftWare.* **Resultados:** *Se encontró una media de edad de los niños de 8,1 años. Respecto la masa corporal se verifico que los niños de la escuela privada tuvieron media superior en el sexo masculino de 36,0±11,70 kg y en el sexo femenino de 33,59±8,97 kg, mientras que en la escuela pública el sexo masculino fue de 27,05±05 kg y el femenino de 28,06±7,73 kg (p<0,05). Se constató en el IMC de la enseñanza pública, el estado de eutrofia en 66 (81,5%) niños del sexo masculino y en 65 (72,2%) del sexo femenino; sin embargo se verificó mayor prevalencia de niños con sobrepeso y obesidad en alumnos de la escuela privada en 12 (50,0%) del sexo masculino y en 10 (45,5%) del femenino.* **Conclusión:** *Se encontró elevada prevalencia de niños con exceso de peso y obesidad en escuelas de la red de enseñanza pública y privada con mayores valores para los niños de la red privada.*

Descriptores: *Niño; Sobrepeso; Obesidad Pediátrica; Prevalencia.*

INTRODUCTION

The overweight and obesity concepts relate to the abnormal or excessive accumulation of body fat and can cause injury to health[1]. The statistics indicate that, over the last 25 years, obesity has become a public health problem worldwide. Following global trends, overweight and obesity currently represent an increasing nutritional disorder in the Latin continent. Specifically among the population under 20 years of age, overweight is assuming epidemic proportions[2].

Epidemiologic data evidence a significant increase in the overweight and obesity prevalence in Brazil, representing a variation from 43%, in 2006, to 49% of overweight individuals in 2011, and 11%, in 2006, to 16% of individuals classified as obese in 2011[3]. The city of Fortaleza is the second capital of Brazilian Northeast in overweight and the fourth in the country - 53.7% of the adult population are overweight and 18.5% are obese[4].

Such situation becomes more alarming when it comes to the health of children aged between five and nine years, since in every three of them, one is diagnosed with overweight. In Brazil, the prevalence of children in this age group presenting overweight was 33.5%, and among those classified as obese, 16.6% were relative to males, and 11.8% to females[5].

Among its causes, childhood obesity comprises 5% of endogenous cases (hormonal, metabolic, neuropsychological disorders), and 95% have exogenous origin (hypercaloric diets, absence or low level of physical activity)[6]. There is a direct relationship between environmental factors, reduced physical activity, time spent watching TV, high caloric intake, and obesity in childhood[7].

Obesity detection in children was unusual in the last decade in developing countries with precarious socioeconomic conditions. The prevalence of obesity, however, is increasing worldwide, in various age groups. This is a worrisome phenomenon because childhood obesity is strongly associated with increased risk factors for developing cardiovascular disease and metabolic disorders in adulthood[8].

Furthermore, other consequences of obesity in childhood may be noted in short and long term. In the short term, orthopedic and respiratory disorders can be observed, along with diabetes, hypertension, dyslipidemia, and psychosocial disorders as well, whereas in the long term, increased mortality due to several causes has been reported, especially for coronary heart disease in adults who were obese during childhood and adolescence[6].

In view of this global and local problematic issue, this study is aimed at verifying the prevalence of overweight and obesity in schoolchildren from public and private system of the city of Fortaleza, Ceará.

METHODS

This study was characterized as an observational, cross-sectional study[9], developed in the period from August to November 2012 in two schools, one of the public education system and the other of the private system of the city of Fortaleza, both located near the University of Fortaleza.

The sample consisted of 217 children, aged between 7 and 11 years, voluntarily selected through non-probability sampling.

The study included children who met the following inclusion criteria: those who were duly enrolled in school participated in all evaluations carried out, and whose parents and/or guardians authorized the participation by signing the Free Informed Consent Form.

Children who had any serious type of physical disability, with a diagnosis of metabolic disease, did not take part in the sample.

Como parâmetros antropométricos, avaliaram-se massa corporal, estatura e cálculo do índice de massa corporal (IMC)

Body weight, height and the body mass index (BMI)[10] were evaluated as anthropometric parameters.

The group of researchers and authors of the study conducted evaluations following previous training in the use of scales and measuring tape stadiometer.

Data was collected with children grouped and they were assorted by grade, class, and age. In order to avoid a selection bias due to non-uniformity in ages, mainly evidenced in public schools, the children were also registered by date of birth. The children were not removed from the classroom and data was collected during the period of school activity reserved for physical education, being recorded in an Excel spreadsheet, in the field, at the moment of collection.

To measure weight, a Plenna digital scale with capacity of 150 kg and accuracy of 100 grams was used. The children were placed standing and barefoot, with lateral separation of the feet and staring ahead. The result was recorded in kilograms to the nearest 0.1 kg. The scale was calibrated every 10 ratings (with 4 kg pre-set weights), being observed its levelling along the ground.

As for height, the study used a measuring tape fixed to the wall, graduated in centimeters and tenths of centimeters, and a cursor. The measurements were performed with the children barefoot, in the standing position, with feet together, back surfaces of the heel, pelvic waist, scapular waist, and occipital region touching the measuring instrument. Children were asked to enter respiratory apnea, with the head parallel to the ground and the cursor forming a 90° angle with the scale[10].

BMI was calculated from the ratio between the weight (in kg) and the height squared (in meters). For this variable, children were classified as underweight, normal weight, overweight, and obesity, according to the classification table of BMI values[10].

For data processing and analysis, the Predictive Analytics Software (PASW Statistics - former SPSS) was used. Exploratory statistics was initially applied to verify the type of data distribution (normality) and the homogeneity of variances, using Shapiro-Wilk test and Levene's test, respectively. The descriptive statistics was then performed (mean, standard deviation, 95% mean confidence interval, absolute and relative frequency of overweight and obesity indicators). For comparison among the groups, analysis of variance (One-way ANOVA) and the Bonferroni post hoc test were used. In all cases, the significance level was $p < 0.05$.

This study followed the ethical and scientific standards established by Resolution No. 466/12 of the National Health Council/Ministry of Health on research involving human subjects and was approved by the Ethics Committee of the University of Fortaleza, under opinion No. 252,988.

RESULTS

Based on these results, Table I shows the characteristics of the sample according to age, gender and type of school. The mean age was 8.1 years and there was no significant difference between the groups in this variable.

Table I - Age characteristics, in years, of children from private and public schools. Fortaleza-CE, 2012.

					CI 95% Limits			
Sex / Schools	n	Mean	SD	Inferior	Superior	Minimum	Maximum
Male							
Private	24	8.17	1.01	7.74	8.59	7.00	11.00
Public	81	8.31	1.17	8.05	8.57	7.00	11.00
Female							
Private	22	8.32	0.84	7.95	8.69	7.00	10.00
Public	90	7.97	0.97	7.76	8.17	7.00	11.00
Total	217	8.15	1.05	8.01	8.29	7.00	11.00

SD = Standard Deviation
F = Values calculated in One-way Analysis of Variance test
F = 1.755; p>0.05

Table II - Body weight and height of children of both sexes from private and public schools. Fortaleza-CE, 2012.

Sex	School	Body weight (kg)			Height (cm)	
		n	Mean	SD	Mean	SD
Male						
	Private	24	36.0*	11.7	133.1	9.0
	Public	81	27.0	5.9	130.2	7.8
Female						
	Private	22	33.6**	9.0	132.0	8.9
	Public	90	28.0	7.7	130.2	8.5
F			11.740		1.087	

SD = Standard Deviation
F = Values calculated in One-way Analysis of Variance test
*$p < 0,05$ males private school $\neq$ males and females public school
**$p < 0,05$ females private school $\neq$ males and females public school

Table III - Distribution of the BMI classification in children of both sexes from private and public schools (n=217). Fortaleza-CE, 2012.

Sex	Schools	BMI Classification (frequency)									
		Obesity		Overweight		Eutrophic		Underweight		Total	
		n	%	n	%	n	%	n	%	n	%
Male											
	Private	8	33.3	4	16.7	11	45.8	1	4.2	24	100.0
	Public	2	2.5	6	7.4	66	81.5	7	8.6	81	100.0
Female											
	Private	5	22.7	5	22.7	12	54.5	0	0.0	22	100.0
	Public	3	3.3	11	12.2	65	72.2	11	12.2	90	100.0

$\chi^2 = 41.62$; $p < 0.05$

With respect to Table II, it depicts information regarding body weight and height of the groups. The male children of private schools had average body mass (36.0 ± 11.7 kg) significantly higher than both genders from public schools (27.0 ± 5.9 kg for males; 28.0 ± 7.7 kg for females). The female children of private schools obtained results similar to males of the same school, with body mass statistically higher (33.6 ± 9.0 kg) than children of public school.

Table III shows the distribution of children from public and private schools according to the BMI classification in obesity, overweight, normal weight, and underweight. Higher percentage of eutrophic children was found in schools of the public education system. On the other hand, there was a higher prevalence of overweight and obesity in the private school system.

Figure 1 portrays additional information to Table III, built with the help of Prismgraphics, using the BMI means of the schoolchildren from private and public education system. Both genders in private school showed that variable with values significantly higher in relation to the public school students. As these students have an average age of 8
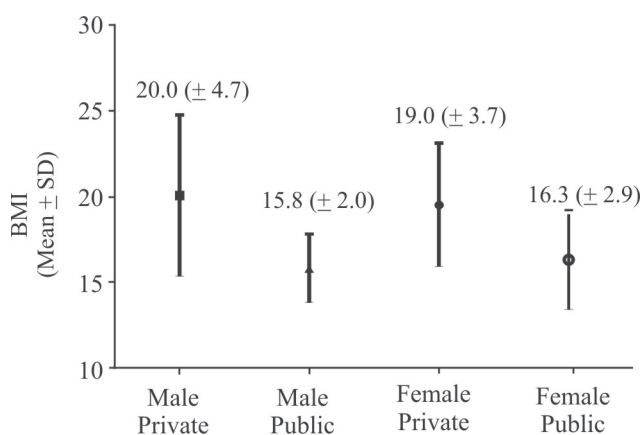

Figure 1 - Body mass index (kg/m²) in children of both sexes, from private and public schools (F=17.170; *p<0.05.; male and female different private school, and male and female from public school). Fortaleza-CE, 2012.

years, with BMI of 20.05 kg/m^2 for males and 19.05 kg/m^2 for females, this group is classified as overweight/obesity, according to the established cut-offs.

With regard to the prevalence of overweight/obesity in the studied groups, shown in Figure 2, also built with the help of Prismgraphics, high rates of this condition were verified in children enrolled in schools of the private education system.
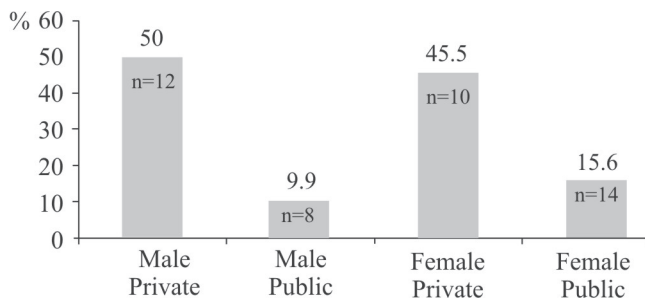

Figure 2 - Prevalence of overweight/obesity in children of both sexes, from private and public schools (n=217). Fortaleza-CE, 2012.

In this study, a high prevalence of overweight and obesity was observed among the school children; however, a higher number of children was found in private schools. Male and female children from private school showed prevalence of 50.0% and 45.5%, respectively, whereas in the public school, male children had a prevalence of 9.9%, and female children reached 15.6%.

DISCUSSION

Currently, obesity is considered a public health problem affecting developed and developing countries, reaching all age groups, genders and social classes, with an increasing prevalence. This aspect has also been observed among children, favouring the emergence of conditions such as orthopaedic disorders, respiratory disorders, hypertension, dyslipidemia, diabetes, and coronary heart disease, which can extend into adulthood[11].

Obesity has been perceived among students of the public and private systems all over Brazil. A study[12] conducted an analysis of the Brazil School project and indicated important and significant data on childhood obesity: there is overweight prevalence of 15.4% and obesity prevalence of 7.8% in Brazilian schoolchildren aged 7-9 years. Other studies[13,14] indicate that there is high prevalence of overweight and obesity among students of public schools, aged 6-10 years, in southern Brazil, data that corroborates the current study.

Other studies have also diagnosed high rates of this condition. In the city of Salvador, Bahia, the prevalence of obesity was 30% in students from private schools and 8% in public schools[15]. In Recife, children and adolescents from different socioeconomic status presented obesity rate of 8.3%[16]. A survey conducted in the city of Santos, São Paulo, assessed 10,822 children aged 7-10 years and found obesity prevalence of 18%. In the South, in the city of Londrina, Paraná[18], 14% were found obese, and in Pelotas, over a period of 11 years, the prevalence of obesity increased from 4% to 6.7% among the children population[19,20].

Excess weight in childhood raises the debate on the infants' nutritional status, an aspect that plays an important role in psychomotor and social development and, as regards children in the educational process, it can also promote a deficit in learning. In a research[21] held in São Paulo, it was found that changes in children's nutritional status can create potential risks of health problems and future problems in interpersonal and functional relationships within the community. The same study[21] also portrays the risk for overweight in children of the private educational system as a result of inadequate feeding outside the school.

Another study shows overweight and obesity data relative to students from municipal schools in Parnaíba, Piauí[22], showing that childhood obesity is a problem that affects children regardless of gender or social class, featuring alarming data in schoolchildren of the private and public systems. Such results corroborate the health status found among the schoolchildren of the city of Fortaleza, included in this research.

The prevalence overweight and obesity in children is often associated with the consumption of foods with excess carbohydrates and decreased physical activity practice, leisure, walking to school, among other things. In the present investigation, such variables have not been studied. Nevertheless, they are elements that need to be assessed and reviewed for building effective public policies, with a view to promoting health and preventing these events, given that not fighting obesity in childhood can lead to obesity in adulthood and contribute to the impairment of physical, mental and social health both in the child as in the future adult[23].

For this, starting from the primary health care, an effective and efficient model of operation is necessary, in which health professionals are provided for the implementation of counselling and education programs[24]. Furthermore, public policies should provide a supportive and encouraging environment for healthy eating habits, physical activities, standards for advertising and marketing of unhealthy food, and urban planning in order to encourage daily physical exercise practice[25]. The focus of these interventions must be based on the health status of the schoolchildren diagnosed in this study, for more significant

results in the fight against overweight and obesity in children.

On the findings, the limitations of the study itself should be taken into account; characterized as cross-sectional, it represents only a diagnosis and a picture of the health situation, and the selection was carried out voluntarily, by non-probability sampling. Moreover, other socioeconomic parameters of children have not been evaluated, and feeding and physical activity are directly related to the families' economic conditions.

The findings partially reflect the overweight/obesity situation faced by Brazilian children. Given this scenario, more rigorous government measures are needed, along with participation of all the authors involved in this issue (schools, parents, families and children), in the quest for social transformation. Additionally, an attentive look to the importance of inserting a healthcare model in which health promotion, prevention and treatment of childhood obesity are implemented.

CONCLUSION

The study found high prevalence of children affected by overweight and obesity, in schools of both the private and public education systems, pointing out the gravity of the health situation in schoolchildren of the city of Fortaleza, Ceará. There was significant difference in body weight and BMI between the groups, indicating higher values for children of private schools, representing prevalence of 50% in males, and 45.4% in females, with excess weight and obesity.

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