CARDIORESPIRATORY FITNESS IN OBESE AND NON-OBESE CHILDREN.

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ABCTRACT

Childhood obesity is considered by the World Health Organization (WHO) as a pandemic. One of the ways to assess childhood obesity is by calculating the body mass index (BMI) and waist circumference (WC). It is known that with the advent of screen use and reduced physical activity, children tend to become obese and experience a decrease in their cardiorespiratory fitness (CRF). Therefore, the objective of this work is to associate abdominal fat with the cardiorespiratory fitness (CRF) of schoolchildren. This is a cross-sectional observational study. Obese and non-obese children aged 4-13 years were included, with parental/guardian consent for participation in the study. Children with factors that prevent the performance of the cardiorespiratory fitness test (amputations, osteomyoarticular problems) were excluded. The children underwent the collection of anthropometric measurements (mass, height, BMI, and waist circumference) followed by the assessment of cardiorespiratory fitness through the six-minute walk/run test. The study included 110 children, 57 (51.8%) boys and 53 (48.2%) girls. There was no association between the classification of obesity and ACR (p=0.284). Non-obese children covered a greater distance (735.84±102.0m) compared to (685.61±112.7m) in the obese group (p= 0.016). Due to the aforementioned facts, it was possible to analyze that ACR is reduced in obese schoolchildren, making the monitoring of these groups extremely relevant for the improvement of pediatric health.

Keywords: Childhood Obesity; Cardiorespiratory Fitness; Pediatrics.

INTRODUCTION

Childhood obesity is already considered a pandemic by the World Health Organization (WHO), estimating that by the year 2025 the planet will have 75 million obese children. The Brazilian Institute of Geography and Statistics (IBGE, 2010) announced that 33.5% of children suffer from obesity. When analyzing children aged 5 to 9, one in three children is overweight in Brazil. This situation is due to the excessive accumulation of fat in adipose tissue, which is a disease of a biopsychosocial context.

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For this reason, it is important to evaluate and monitor its development (KUMAR; 2017).

One of the ways to assess childhood obesity is the calculation of the body mass index (BMI), which is a widely used parameter and correlated with all gold standards, DEXA, Magnetic Resonance Imaging (ONIS et al., 2007). However, it is classified as a specific but not sensitive marker, thus, other markers are being used to evaluate obesity in children, among them waist circumference, which, in addition to being specific, is also sensitive as it detects adiposity present in the abdominal region (GAYA; GAYA, 2021).

It is known that with the advent of screen use, reduced physical activity, and poor dietary control, children tend to become obese (KUMAR; 2017) and experience a reduction in their cardiorespiratory fitness (CRF), which is the body's ability to supply energy to the muscles during exercise (DROZDZ et al., 2021). This underscores the importance of evaluating these children regarding the present obesity markers, focusing on greater specificity and assessing CRF, knowing that this can reduce the chances of these children becoming obese adults with cardiovascular disease risks through health promotion and prevention strategies. However, the objective of this work is to associate abdominal obesity with the ACR of children.

METHODOLOGY

This is an analytical cross-sectional study, approved by the Ethics and Research Committee of UniEVANGÉLICA under nº 5.971.901/2023. The evaluated children belonged to the municipal education network of Anápolis. Children aged between 4-13 years were included, with parental/guardian authorization for participation in the study. Children with factors that prevented them from performing the cardiorespiratory fitness test (amputations, osteomyoarticular problems) were excluded.

The children were recruited through systematic sampling with a fixed interval. All assessments were conducted in the school environment in a private room in the presence of parents/guardians (if deemed necessary) and on the school playground at previously scheduled times and according to the availability of the school and the children.

For the measurement of body mass, a portable digital scale (Welmy brand, LED 200 kg model, São Paulo, Brazil) was used, with a precision of up to 500 grams. The measurement of height was performed with a fiberglass anthropometric tape, with a resolution and length of 1.5 meters (Sanny®, São Paulo, Brazil). (GAYA; GAYA, 2021). The body mass index was calculated by dividing body mass by height squared. The waist circumference was measured at the midpoint between the iliac crest and the lower rib margin (12th rib) (ONIS et al., 2007). The reference values were used according to McCarthy et al. (2001).

Cardiorespiratory fitness was assessed and classified using the 6-minute test described in the battery of tests of the Brazil Sports Program (PROESP-BR) (Gaya; Gaya, 2021). It was conducted on the school courts with a marked perimeter of 30 meters using a stopwatch and a recording sheet. During the test, it was emphasized that the children should run for as long as possible with bursts of speed interspersed with long walks.

The results were described as mean, standard deviation, percentages, and represented by graphs. To verify the normality of the data, the Kolmogorov-Smirnov test was used. For comparison between groups, the t-Student test was used for independent samples with a normal distribution. The Chi-square test was also used for the association of categorical variables, specifically between the walking/running test and the obesity classification. The p-value considered was <0.05 and the data were analyzed using the Statistical Package for Social Science (SPSS) software.

RESULTS

The study included 110 children, with 57 (51.8%) boys and 53 (48.2%) girls. Table 1 characterizes the sample with a division between obese and non-obese according to waist circumference.

Table 1 – Sample characterization (n=110).

	Without Obesity (n=56)	With Obesity (n=54)	p
Variables	**Average±SD**	**Average±SD**	

Mass (Kg)	30,77±7,06	45,1±10,65	<0,001
Height (m)	1,38±0,11	1,45±0,09	0,002
Age (years)	9,79±1,76	9,98±1,40	0,54
Measures Anthropometric			
Body mass index	15,84±1,89	21,48±4,13	<0,001
Waist circumference (cm)	58,62±5,05	72,64±7,88	<0,001

Source: Authors (2023).

When comparing the differences in proportions of the subdivided groups in relation to the 6-minute walk/run test, no significant difference was found, p=0.284 (Table 2).

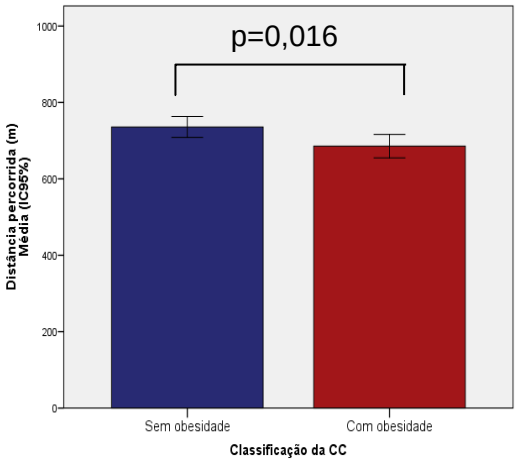
Table 2 – Cardiorespiratory fitness of obese and non-obese children (n=110).

Cardiorespiratory fitness	**Without Obesity (n=56)** **n (%)**	**With Obesity (n=54)** **n (%)**	**p**
Below expectations	47 (83,9%)	49 (90,7%)	0,284
Above expectations	9 (16,1%)	5 (9,3%)	

Source: Authors (2023).

There was a significant difference in meters walked/runned in the 6-minute walk/run test, the non-obese group had an average of (735.84±102.0m) and the obese group (685.61±112.7m), (p= 0.016) (Graph 1).

Graph 1 – Comparison of the distance traveled in the ACR test between obese and non-obese children.



Source: Authors (2023).

CONCLUSION

Due to the aforementioned facts, it was possible to analyze that ACR is reduced in obese school children, making the monitoring of these groups extremely relevant in order to improve pediatric health. It is important to highlight the significance of waist circumference as a more specific marker for this age group studied.

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