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How important is focalizing on a healthier lunch at school?

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Abstract

The aim is to assess the differences in frequency of school lunches, the adherence to the Mediterranean diet, sport practice and the parents' educational level in school-age children according to their weight status. 352 school-age children recruited from schools in Catalonia participated (11.99 ± 1.5 years). Body weight status groups were grouped as follows: overweight and obese (OW/OB; n=175) versus normal weight (NW; n=177). The percentage of NW children who had school lunches on weekdays was significantly ($p < 0.001$) higher than the percentage of peer children with OW/OB. The percentage of OW/OB children who reported to practice structured sport was significantly lower ($p < 0.05$) than in the NW children group and the mean time spent on it as well (2.05 ± 2.36 vs. 2.99 ± 3.03 hours/week; $p < 0.001$, respectively). No differences were found in the parental studies or the Mediterranean diet variable between groups. The results support the role of the educator at school and it is suggested that a healthy and regulated food supply could favor lower adiposity in children. Promoting physical exercise at school could also help with the degree of obesity.

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BMI-SD: Body Mass Index Standard deviation; OW/OB: Overweight and Obese; NW: Normal Weight; SS: Structured Sport

1. Introduction

Obesity is a chronic disease associated with negative effects on health. It is considered a risk factor

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for many diseases such as hypertension, type II diabetes, locomotor disorders, and it increases the risk of cardiovascular events considerably. In addition, obese children also have to face social problems (Salas-Salvadó et al., 2007) that can be important, especially at school age.

Moreover, childhood obesity seems to be refractory to treatment, subsequently obese children are more likely to be obese in their adult life than non-obese ones (WHO, 2014). Obesity is mainly attributed to an energy imbalance thus the acquisition of good eating habits and physical activity, together with healthy habits are central for the prevention and treatment of obesity. Childhood is the best time to acquire these behaviors/habits, which might persist during adulthood. The school setting is a suitable place to acquire them by means of specific curricular content, as well as offering children and their families the opportunity to be engaged in healthy eating and in structured physical activities. In this regard, it is essential to know the habits of children, to create specific programs for the management of obesity in school-age children.

In that sense, the aim of the present research is to assess the differences in frequency of eating at school, adherence to the Mediterranean diet, participation in structured sport programs and the parental level of education in school-age children according to their adiposity status.

2. Method

This is a cross-sectional study that took place in several schools of Lleida, Catalonia. Eligible participants were children aged between 8 and 13 years old who attended regular schooling. Before proceeding with the measures, informed parental and children consent and authorization from their schools were obtained. All procedures were conducted in accordance with the Declaration of Helsinki and its subsequent revisions.

Body weight and height were collected to determine their body mass index (BMI), which was calculated as weight (kg) divided by height squared (m^2). The children were divided into two groups: overweight or obese (OW/OB) versus normal weight (NW) based on BMI-SD following the LMS method (Pan & Cole, 2007). Waist circumference and waist-to-height ratio were also measured as adiposity variables. Frequency of eating at school, adherence to the Mediterranean diet (Serra-Majem, Aranceta-Bartrina & Rodríguez-Santos, 2003), participation in structured sport (SS) practice and the parental education level (classified as low, medium and high level) were all assessed by self-reported questionnaires. All measures were taken at school during physical education classes.

2.1. Data analysis

All statistical analyses were conducted with SPSS version 15.0 (SPSS Inc., Chicago, IL, 2007). Descriptive data are reported as mean \pm standard deviations (SD).

Student t-test was used to compare independent samples (NW versus OW/OB and girls versus boys). Frequency differences were evaluated using corresponding χ^2 -techniques. To analyze the influence between the variables and the different adiposity parameter, a Pearson correlation was conducted. Statistical significance was set at $p < 0.05$.

3. Results

In the study, 352 voluntary school-age children participated (11.99 ± 1.5 years) distributed in 184 boys and 168 girls. The OW/OB group consisted of 175 children and 177 children in the NW one. As table 1 shows, all adiposity parameters were superior ($p < 0.001$) in the OW/OB group. No differences in adiposity parameters were observed between boys and girls.

Table 1. Anthropometric data

	All (n=352) Mean±SD	Non-Obese (n=175) Mean±SD	Overweight/obese (n=177) Mean±SD
Age (years)	11.95±1.47	12.10±1.33	11.82±1.58
Weight (kg)	49.48±12.64	41.80±7.60	57.08±12.03*
Height (cm)	1.52±0.10	1.51±0.09	1.53±0.11
BMI (kg/m²)	21.23±4.112	18.12±1.63	24.31±3.47*
BMI SD (units)	1.02±1.05	0.16±0.56	1.88±0.64*
Waist circumference (cm)	76.17±11.43	68±5.53	84.25±9.92*
Waist-to-Height ratio (cm/m)	50.17±7.15	44.98±2.73	55.30±6.43*

BMI: body mass index. * p<0.001

During weekdays, the percentage of NW children (76.4%) who had lunch at school was significantly ($p<0.001$) higher than in their OW/OB peer group (55.7%). Eating at school also differed between genders, where 58.3% of boys had lunch in school, meanwhile this percentage raised to 75.6% for the girls ($p<0.01$). However, results from the adherence to Mediterranean diet indicate that 43.4% of NW and 41.8% of OW/OB children had poor adherence and no differences were observed between adiposity groups or between genders.

The percentage of OW/OB children (53.7%) who reported to participate in SS programs was significantly lower ($p<0.05$) than in NW children (65.1%). Moreover, the weekly time devoted to them was also lower in OW/OB children (2.99±3.03 vs. 2.05±2.36 hours/week; $p<0.001$, respectively). As Figure 1 shows, children who practice more sport are less fat than children who devote less time to sport practice. Parental studies did not differ between groups in any of the 3 classified categories.

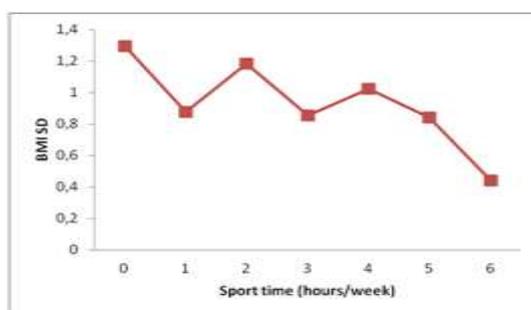


Figure 1. Relationship between BMI-SD and weekly time devoted to sport

Correlation analysis shows modest but significant correlations between adiposity parameters and having lunch at school, SS and parental education. Having lunch at school was the most significant correlated variable with the BMI-SD ($r=0.277$; $p<0.001$). However, it was higher in relation to Waist-to-Height Ratio ($r=0.336$; $p<0.001$). Adherence to the Mediterranean diet did not correlate with adiposity parameters.

Table 2. Correlations between the analyzed variables and different adiposity parameters

	BMI SD	Waist Circumference	Waist-to-Height Ratio
Eating at school	-.277*	-.223*	-.336*
Sport practice	-.220*	-.271*	-.270*
Sport time (hour/week)	-.259*	-.321*	-.297*
Father Education level	-.205*	-.304*	-.232*
Mother Education level	-.203*	-.275*	-.204*
Mediterranean Diet	-0.02	-0.062	0.01

*p<0.001

4. Discussion

The increasing prevalence of childhood obesity is attributed to a behavior modification during the last few years due, mainly, to a shift to more caloric intake, associated also with a decrease in the time spent on physical activity (Andersen & Mechelen, 2005). The present results reported that OW/OB children practice less SS than NW children and they are in accordance with the results found by other authors (Eisenmann, DuBose & Donnelly, 2007). However, no differences between genders or obesity degree groups were found in the Mediterranean diet. This could be due because they do not exist or despite the questionnaire being specific for assessing the adherence to the Mediterranean diet in Spanish children, but it could not be detailed enough to evaluate the caloric intake.

Data from that study puts forward the idea that having lunch at school is associated with a lesser degree of adiposity. Due to design limitations, it is not possible to infer a cause-effect relationship, however it could be suggested that eating at school might play a beneficial role on eating behavior. It remarks the importance of following healthier habits at school and the important role that schools have in the prevention and treatment of childhood obesity. Not only with regards to the diet intake, but also offering physical activity opportunities and helping children to take healthier options. These results are in accordance with the main focus of most of the guidelines for the prevention of childhood obesity. These guides are principally based on strategies for improving diet intake, reducing sedentary behavior and offering opportunities for increasing activity levels and the majority of these strategies focus on the prevention or/and intervention at schools (Grupo de trabajo, 2009).

Several studies report that the lower the socio-economical level of the parent, the higher the level of obesity. However, in the present results these differences were not appreciated, nonetheless it was correlated with the anthropometric parameters. These results are partially in accordance with data from the AVENA study (Moreno et al., 2004). They did not find any difference in socio-economical status and obesity prevalence in girls, however differences were found in boys. The lowest obesity prevalence was observed in both extreme socio-economic groups. Their results remark that obesity prevalence increases as the socio-economic status decreases.

The data were self-reported by the children, which could be a limitation. However, the tests were specific for children and to be self-administered. In addition, the data was collected with their teachers' help and with experimented and formed collaborators.

5. Conclusion

Although it is a cross-sectional study, the results support the role of the educator at school and it is

suggested that a healthy and regulated food supply could favor lower adiposity in school-age children. Promoting or/and offering physical exercise at school could also help manage the degree of obesity.

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