

28 - METABOLIC SYNDROME AND DYSLIPIDEMIAS IN ADOLESCENTS PARTICIPANTS OF A MULTIPROFESSIONAL PROGRAM OF OBESITY TREATMENT

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INTRODUCTION

Excess of body fat, setting the overweight and obesity, has been observed in several researches conducted in developed countries and developing countries, pointing to a sharp increase in its prevalence during the recent decades and giving to this public health problem some epidemic proportions (FISBERG, 2005; LOBSTEIN, BAUR, and UAUY, 2004). Researchers now say that this may be the first generation whose children will die before their parents (IDF, 2007).

According to the Household Budget Survey (POF), conducted by the Brazilian Institute of Geography and Statistics (IBGE), years 2008-2009, among adolescents aged 10 to 19 years, the overweight between boys increased from an index of 3, 7% (1974-1975) to 21.7% (2008-2009), representing an increase of six times. For girls, the statistics tripled: from 7.6% to 19% between 1974-1975 and 2008-2009. Obesity is also shown to increase, going from 0.4% to 5.9% among boys and 0.7% to 4.0% in females in the same period (IBGE, 2010).

Obesity in children and adolescents is associated with the presence of metabolic abnormalities that indicate cardiovascular risk, such as increased insulin resistance, hypertriglyceridemia, low HDL cholesterol (HDL-C) and blood pressure (BP) changed, which are described as components of metabolic syndrome (MS), which increase in prevalence has been observed in adolescents (COOK et al., 2003, DE FERRANTI et al., 2004).

There are few studies evaluating the prevalence of metabolic syndrome in overweight children and adolescents, there is no consensus on criteria and cut points to be used for its classification, so the results vary from study to study (COOK et al. 2003; DE FERRANTI et al., 2004, WEISS et al., 2004). Despite the increasing number of studies using the criteria of the IDF for children and adolescents with different characteristics (obesity, asthma, Polycystic Ovarian Syndrome, others with chronic diseases, among other cases) (FORD et al. 2008; DEL-RIO -NAVARRO et al. 2010; VRBIKOVA et al., 2010) there is only one study in literature, to our knowledge, conducting a survey of MS prevalence among overweight brazilian adolescents (specifically in São Paulo), using as criterion for the diagnosis of MS proposed by the IDF in 2007 (CAVALI et al., 2010).

Considering this, the objective of the study were: 1- Evaluate the prevalence of metabolic syndrome and dyslipidemias in overweight adolescents, attendants of a Multidisciplinary Treatment of Obesity Program; 2- to compare the biochemical profile, BP, Body Mass Index (BMI) and waist circumference (wc) among gender of the adolescents in the sample, and 3- to compare the biochemical profile, blood pressure and BMI among adolescents with increased and not increased wc.

METHODOLOGY

The present study is characterized as a descriptive comparison. A total of 22 overweight adolescents were classified from the cut-offs points of Conde and Monteiro (2006), aged between 10 and 18, participants of the Program Multidisciplinary Treatment of Obesity (PMTO) offered at the Maringá State University (UEM). Among the teenagers, 11 were female and 13 were already participating in the Program to more than six months. All evaluations were conducted in August 2009, at the Multidisciplinary Center for the Study of Obesity (NEMO), located in the Physical Education Department of UEM.

Anthropometric data has been done, involving the measurement of weight, height and wc. These parameters were measured using a Welmy digital scale with a capacity of 300 kg and precision of 0.05 kg of a stadiometer attached to it, capable of measuring up to 2 m to the nearest 0.1 cm and a Wiso non-extensive tape (model T-87, China), capable of measuring up to 2 meters and an accuracy of 0.1 cm, respectively. For the weight measurement, the adolescents were asked to wear light clothing and to be barefoot. We considered that the wc is the smallest circumference between the iliac crest and last rib.

BP was measured 5-10 minutes of rest as the Brazilian Society of Hypertension recommended (ESTEVES, SANTOS and GORDAN, 2006). AEMAI noninvasive monitor, model RX-300A was used.

The lipid profile, characterized in this study from the total cholesterol (TC), triglycerides (TG), HDL cholesterol (HDL-C), LDL cholesterol (LDL-C) and VLDL cholesterol (VLDL-C), and glycemic control (glucose) were evaluated by laboratorial tests, with the help of a specialized company in the region of Maringá-PR. For these evaluations, the adolescents were asked to fast for 12 hours.

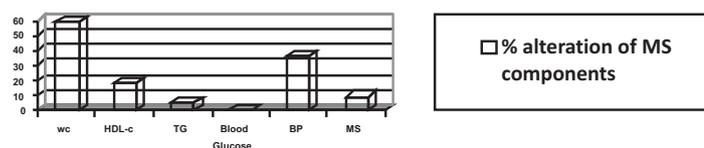
MS and dyslipidemias were classified according to the criteria proposed respectively by the International Diabetes Federation (IDF, 2007) and the Brazilian Society of Cardiology (GIULIANO et al., 2005). According to the IDF (2007), MS is present if diagnosed 3 or more of the following parameters changed: blood glucose, triglycerides, HDL-C, BP and WC. The dyslipidemic situation was diagnosed if altered at least one of the following parameters of lipid profile, TC, HDL-C, LDL-C and TG.

Data were subjected to descriptive analysis, involving measures of central tendency, dispersion and frequency. Numerical data were evaluated according to the normality by the Shapiro-Wilk. In the inferential analysis, for normal data was used test parametric (t test for independent samples), while for non-normal data was made using nonparametric test (Mann-Whitney). The teenagers were divided into two groups in two different situations: when comparing gender (11 girls and 11 boys) and when comparing those who had increased wc and those who did not (13 with increased wc and 9 with normal cc). The significance level was preset at 5%.

RESULTS

The evaluated sample (n=22) presented average age and weight values and BMI of 13.14±2,03 years, 81,30±20,04 Kg and 31,21±4,92 Kg/m², respectively.

Regarding the MS, the parameter which presented higher frequency of alteration was the wc (59,09%). In all the remaining parameters it was highlighted that the altered BP e HDL-c prevailed, 36,36% and 18,18%, respectively. It was found triglycerides alteration in 4,55% of the sample, while no adolescent presented blood glucose above values recognized as normal by IDF (graphic 01).



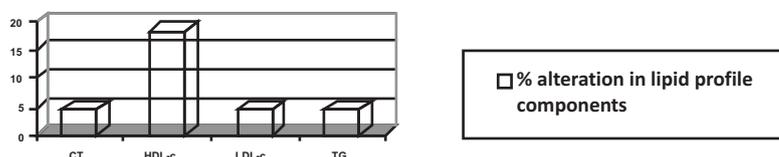
Graphic 01. Prevalence of MS and its components in adolescents with excess weight (n=22).

Regarding the altered parameters frequency that build the MS, 36,36% of the adolescents didn't present altered parameters, 31,83% presented two parameters with alteration and 22,73% of these young ones presented an altered parameter. The MS was diagnosed in 9,09% of the cases (2 adolescents), and both presented alteration in 3 parameters. None of the adolescents presented more than 3 components of the altered MS (Table 01).

Table 1. Altered MS parameters frequency in adolescents with excess weight (n=22).

Number of altered MS parameters	N	%
0	8	36,36
1	5	22,73
2	7	31,82
3	2	9,09
+3	0	0

Concerning the alterations diagnosis in the lipid profile, following the Brazilian Cardiology Society criteria, 18,18% of the evaluated adolescents presented at least one altered parameter, characterizing a dislipidemic chart. Only one adolescent presented all lipid profile parameters altered. The parameter that suffered alteration was HDL-c (graphic 02).



Graphic 02. Prevailing of the altered lipidic profile components in adolescents with excess weight (n=22).

The sample was divided from the gender to set a comparison of all the biochemical parameters, BP, BMI and wc. There was statistically significant difference in LDL-c and HDL-c, according to what was presented in table 2 ($p < 0,05$), and the boys presented the most critical values.

Table 2. Biochemical parameters comparison, BP, BMI and wc between boys and girls with excess weight.

	Boys	Girls	P
Age (years)	13 (2)	13 (2)	0,073
Blood Glucose (mg/dL)	91 (8)	86 (12)	0,078
TC (mg/dL)	150 (26)	145 (31)	0,056
HDL-c (mg/dL)	48 (17)	64 (18)	0,019*
LDL-c (mg/dL)	92,6 (30,8)	69,6 (19)	0,006*
VLDL-c (mg/dL) ¹	11,2 (14)	9,8 (5,4)	0,087
TG (mg/dL)	56 (70)	49 (29)	0,085
wc (cm) ¹	88 (15)	89,5 (9,5)	0,844
SBP (mmHg)	121 (17)	120 (14)	0,839
DBP (mmHg)	70 (14)	71 (6)	0,983
BMI (Kg/m ²)	28,35 (6,60)	32,31 (7,90)	0,247

Data presented in median and interquartile range. Test t for independent samples.

¹Mann-Whitney Test.

* $p < 0,05$.

SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure.

The sample was also divided among the ones that presented increased wc and the ones that presented the normal values, according to the IDF criteria which follow the cut-off points suggested in Fernandez et al (2004). In this comparison, significantly higher values were observed in SBP and BMI in the group with increased cc. (Table 3).

Table 3. Biochemical parameters comparison, BP and BMI according to wc measure in adolescents with excess weight.

	Increased wc	Normal WC	p
Age (years)	13 (2)	14 (4)	0,098
Blood Glucose (mg/dL) ¹	91 (6)	82 (11)	0,115
TC (mg/dL)	145 (20)	149 (24)	0,827
HDL-c (mg/dL)	53 (16)	64 (23)	0,065
LDL-c (mg/dL)	82,8 (21,8)	68,4 (30,5)	0,283
VLDL-c (mg/dL) ¹	10,4 (5,8)	9,8 (5,7)	0,300
TG (mg/dL) ¹	52 (29)	49 (35)	0,367
SBP (mmHg)	122 (12)	114 (21)	0,037*
DBP (mmHg)	71 (14)	70 (12)	0,465
BMI (Kg/m ²)	32,31 (8,80)	29,20 (8,09)	0,046*

Data presented in median and interquartile range. Test t for independent samples.

¹Mann-Whitney Test.

* $p < 0,05$.

DISCUSSION

The interest in studying the prevalence of MS in children and adolescents worldwide has been increasing along the years, with different characteristics. However, the criteria used for the disease diagnosis vary from one study to the other, which provides a problem in these data analysis. The accordance for MS classification and diagnosis in children and adolescents from

IDF was recently published, in 2007, and there is only one study using these criteria in pediatric overweight Brazilian population (CAVALI et al., 2010). Barbosa et al. (2010) states that in Brazil the prevalence of MS is known in few regions.

In our study it was found the prevalence of 9,09% of MS in 22 researched adolescents. The literature has shown values that may vary, in overweight adolescents, from 10,3% to 52,1%. The study made by Cavali et al (2010) found a MS prevalence of 13,75% in 80 obese adolescents. Weiss et al. (2004) and Fu et al. (2007) found in their studies with obese adolescents the abdominal obesity presenting the highest prevalence among the other components from MS, similar to what observed in the present study, although using different cut-off points. In general, our study found less frequency in MS components than in literature that points to obese adolescents (MORAES et al., 2009), in spite of 31,82% of the sample showed two parameters of altered SM. This can be related to the fact that our research is not population based, showing limitations in our results. Besides, adolescents that composed our sample are participants of a PMTO, that offers exercise, nutritional and psychological guidance. Studies that follow this model link to positive results in MS control in obese adolescents (LEITE et al., 2009; CARANTI et al., 2007).

In our study the girls presented a significantly favorable profile of LDL-c and of HDL-c when compared to the boys, besides presenting tendency to better results in other variables. This results are in accordance to the ones published by Caranti et al. (2007) and Kang et al. (2002), in which the obese girls presented a lipid profile significantly better than the boys. Coppens et al. (2008) found in their study a greater evolution in female gender, after a multiprofessional intervention, that include dietary and exercise prescription, in HDL-c and TG, compared to boys (-2,8mg/dL versus +0,5mg/dL; -2,9mg/dL versus -61,5mg/dL, respectively). Some subjects in our research was under intervention process for a period of until a year, what may mean improvements, mainly for female gender, in biochemical parameters studied. When compared adolescents that presented abdominal obesity, characterized by increased wc and adolescents that didn't, we found SBP and BMI values significantly higher in the group with abdominal obesity. There was also an tendency in the group with increased wc to present better values to the biochemical parameters. Studies have shown that obese adolescents have greater probability of developing the MS (MORAES et al., 2009) and abdominal obesity is associated to cardiovascular risk factors (PHILLIPS and PRINS, 2008). This way, individuals that present wc above the recommended standard have greater probability of also presenting higher values in the parameters that build the lipid profile and in BP (FREEDMAN et al., 2001).

In spite of the important results, this study have its limitations. Our sample was composed by both overweight and obese adolescents, which prejudice the conclusion to a specific population. Besides that, we evaluated only 22 adolescents that entered PMTO. This small number of people doesn't allow our research to be representative to adolescents with excess weight in the town of Maringá-PR.

CONCLUSION

Our study link to MS prevalence near to what was found in other studies. Added to this, our data suggest that girls present a greater biochemical profile than boys, besides both being classified as normal to the most of variables. The characterization of abdominal obesity implicated, in our sample, in significantly higher values of SBP and BMI.

We suggest studies with larger and representative samples of Brazilian population, using the IDF criteria, aimed to obtain more clarification about this thematic.

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METABOLIC SYNDROME AND DYSLIPIDEMIAS IN ADOLESCENTS PARTICIPANTS OF A MULTIPROFESSIONAL PROGRAM OF OBESITY TREATMENT

ABSTRACT

The aim of the study was to access the prevalence of MS and dyslipidemias in obese adolescents. For this, it was used the IDF criteria for adolescents and the one presented by I Diretriz de prevenção da aterosclerose na infância e na adolescência, respectively, in 22 adolescents participants of a MPOT. It was collected biochemical, anthropometrics and clinics data for analyses. Adolescents were divided into groups according to gender and to central obesity classification to comparing evaluated parameters. The prevalence of MS and dyslipidemias were, respectively, 09,09% and 18,18%. The results demonstrated that girls presented better lipid profile and adolescents classified with central obesity obtained values significantly lower in systolic blood pressure. We suggest more population representative studies that collaborate to the establishment of a standard criteria to diagnosis MS in adolescents.

KEY-WORDS: Metabolic Syndrome, Obesity and Adolescents.

SYNDROME METABOLIQUE ET LA DYSLIPIDEMIE CHEZ LES ADOLESCENTS PARTICIPANT A UN MULTIPROFESSIONNELLE TRAITEMENT DE L'OBESITE

RÉSUMÉ

L'objectif global de l'étude était d'évaluer la prévalence du syndrome métabolique et de la dyslipidémie chez les adolescents obèses. Pour cela, nous avons utilisé les critères de la FID pour les adolescents et ceux présentés dans I Directives pour la prévention de l'athérosclérose dans l'enfance et l'adolescence, respectivement, de 22 jeunes participants à partir d'un PMTO. Des données biochimiques, anthropométriques et cliniques ont été collectées de l'analyse des données. Les adolescents ont été divisés en groupes selon le sexe et la classification de l'obésité centrale par rapport aux paramètres évalués. La prévalence de la SM et de la dyslipidémie ont été respectivement de 09,09% et 18,18%. Les résultats ont montré que les filles ont un meilleur profil lipidique et les adolescents classés à l'obésité centrale avaient des valeurs significativement plus faible de la pression artérielle systolique. Nous vous proposons d'autres études de la base de la population à collaborer avec l'établissement d'un critère de référence pour le diagnostic de la SM chez les adolescents.

MOTS-CLES: syndrome métabolique, obésité, adolescents.

SÍNDROME METABÓLICO Y LA DISLIPIDEMIA EN LOS ADOLESCENTES QUE PARTICIPAN EN UN PROGRAMA MULTIPROFESIONAL DE TRATAMIENTO DE LA OBESIDAD

RESUMEN

El objetivo general del estudio fue evaluar la prevalencia de síndrome metabólico y las dislipidemias en los adolescentes obesos. Para ello, se utilizaron los criterios de la IDF para los adolescentes y los presentados en El documento I Directrices para la prevención de la arterosclerosis en la infancia y la adolescencia, respectivamente, en 22 jóvenes participantes de un PMTO. Los datos bioquímicos, antropométricos y clínicos han sido recogidos del análisis de datos. Los adolescentes fueron divididos en grupos según el género y la clasificación de la obesidad central en comparación con los parámetros evaluados. La prevalencia de la SM y la dislipidemia fueron, respectivamente, 09.09% y 18.18%. Los resultados mostraron que las niñas tenían un mejor perfil lipídico y que los adolescentes clasificados con obesidad central presentaron valores significativamente más bajos de presión arterial sistólica. Sería interesante realizar estudios de la base de la población que vengan a colaborar con el establecimiento de un criterio estándar para el diagnóstico de la SM en los adolescentes.

PALABRAS CLAVE: Síndrome metabólico, la obesidad, los adolescentes.

SÍNDROME METABÓLICA E DISLIPIDEMIAS EM ADOLESCENTES PARTICIPANTES DE UM PROGRAMA MULTIPROFISSIONAL DE TRATAMENTO DA OBESIDADE

RESUMO

O objetivo geral do estudo foi avaliar a prevalência de SM e dislipidemias em adolescentes obesos. Para isso, foram utilizados os critérios do IDF para adolescentes e os apresentados na I Diretriz de prevenção da aterosclerose na infância e na adolescência, respectivamente, em 22 adolescentes participantes de um PMTO. Foram coletados dados bioquímicos, antropométricos e clínicos para análise dos dados. Os adolescentes foram divididos em grupos de acordo com o gênero e com a classificação de obesidade central para comparação dos parâmetros avaliados. As prevalências de SM e de dislipidemias foram, respectivamente, 09,09% e 18,18%. Os resultados demonstraram que as meninas apresentaram um melhor perfil lipídico e os adolescentes classificados com obesidade central obtiveram valores significativamente mais baixos de pressão arterial sistólica. Sugerimos a realização de mais estudos de base populacional que colaborem com o estabelecimento de um critério padrão para diagnóstico da SM em adolescentes.

PALAVRAS-CHAVES: Síndrome Metabólica, obesidade, adolescentes.