

50 - CHARACTERIZATION OF DIET, PHYSICAL ACTIVITY LEVEL AND NUTRITIONAL STATUS OF ADOLESCENTS.

MARCIA VAL MIYAMOTO; ZIRLENE ADRIANA DOS SANTOS;
SANDRA MARIA LIMA RIBEIRO.
São Judas Tadeu University- São Paulo- SP- Brazil
smlribeiro@uol.com.br.

INTRODUCTION

Adolescence is the transition period between childhood and the adult life, being characterized by intense somatic, psychological and social changes. It is an anabolic period, with increase in stature, weight, and alterations in the body composition (Garcia et al, 2003). The appropriate nutrition is one of the key points to adequately express the genetic potential of growth and development. However, the adolescents diet generally is characterized by food preference of low nutritional value, low micronutrients density and high energy density. As a result, there a frightful increase in the obesity prevalence among adolescents is observed (Albano & Souza, 2001; Garcia et al, 2003; Monteiro et al, 2000; Urbano et al, 2002). Beyond the diet, another aspects of the lifestyle have collaborated for the drastic increase of obesity. Among these, the physical inactivity deserves prominence. The systematics practices of physical activity can contribute for a lesser accumulation of body fat and the circulating lipids, preventing development of chronic diseases (Garcia et al, 2003; CDC, 2004; Ekelund et al, 2004; Kuan-Zhang & Boozer, 2004). Considering the importance of the evaluation in different aspects, this work aims to correlate the level of physical activity and the food intake behavior (energy, macronutrients, iron and calcium) with some aspects of nutritional status in a adolescents group.

CASUISTIC AND METHODS

The present study was transversal and descriptive type. The data had been collected from May to June, 2004. 297 students had been evaluated, following the inclusion criteria: age from 10 to 14 years, males and females, from a private school of the city of São Paulo-SP. The adolescents whose parents had not authorized the accomplishment of the measures had been excluded. All responsables signed a consent term.

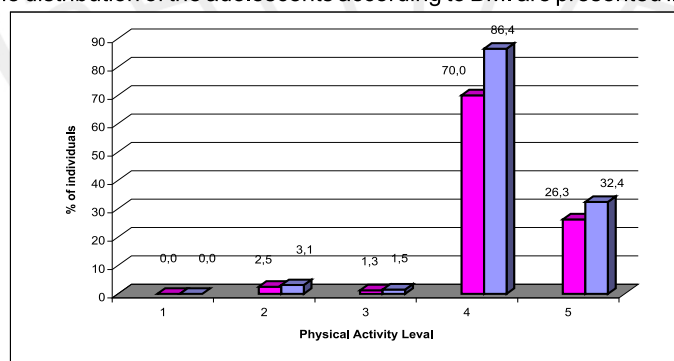
For the evaluation of the physical activity level, the International Physical Activity Questionary-IPAQ (short version) was applied (Craig et al, 2003).

The food consumption was evaluated by 24-hour food recall, analyzed quantitatively and semi-quantitatively. The quantitative analysis was made with the Nutri-UNIFESP software. Energy, macronutrients, iron and calcium werer calculated and the results compared with current DRIs (Trumbo et al, 2002; DRI, 2005). For the semiquantitative evaluation, the ingested portions were compared to Food Pyramid adapted the Brazilian population (Phillipi et al, 1999).

Weight and stature have been measured with a Filizola scale up to 150Kg, and with a stadiometer Seca, in carbon fiber. The body mass index (BMI) was calculated according to WHO (1995), considering the percentile. The systolic and diastolic blood pressure (SBP and DBP) were measured with a sfignomanometer (Sanny) with auscultatory method. The values of SBP have been classified in accordance with NHANES III (2000). Data have been presented by the average and standard desviation, or by the percentile distribution of individuals, and some parameters had been correlated using the Pearson coefficient, with SPSS for Windows software. The project was approved by the Ethics Committee of São Judas Tadeu University, under protocol number.

RESULTS

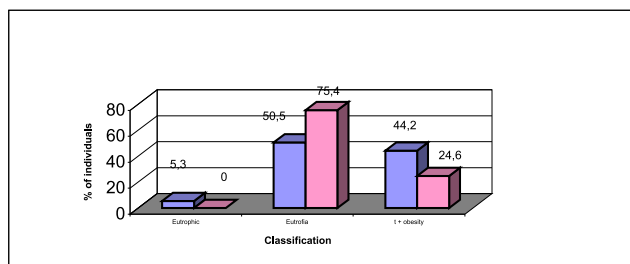
According to IPAQ, in both genders, most of the adolescents had been classified as active or very active (Graphic 1). The correlations between IPAQ and energy intake or IPAQ and blood pressure, had not observable significance. Table 1 presents the main results. The distribution of the adolescents according to BMI are presented in Graph 2.



Graphic 1: Adolescents distribution according physical activity level

Table 1: Main parameters evaluated (mean and standard desviation)

Parameter	Girls (n=145)	Boys (n=152)
Age (years)	12,04± 1,11	12,55± 1,31
BMI (Kg/m ²)	19,95± 3,35	21,72± 4,72
Systolic Blood Pressure (mmHg)	101,97± 10,96	106,67± 14,42
Diastolic Blood Pressure (mmHg)	66,80± 7,96	69,55± 12,87
Energy intake (Kcal)	1695,16± 597,82	1791,02± 681,39
Energy intake by body weight (Kcal/Kg body weight)	36,42± 14,71	35,57± 18,69
% carbohydrates (%)	51,66	53,91
% lipids (%)	31,85	29,33
% protein (%)	16,47	18,25
Iron Intake (mg/day)	10,22± 4,47	10,52± 4,65
Calcium intake (mg/day)	710,64± 411,75	703,72± 475,82
Calcium intake density (mg/1000Kcal)	430,66± 197,65	429,40± 394,05
Meals number/day	3,52	3,86
Portions number of cereals (guide = 5-9)	2,87	3,35
Portions number of vegetables (guide=4-5)	0,82	0,33
Portions number of fruits (guide= 3-5)	1,47	1,34
Portions number of beans (guide= 1)	0,66	1,11
Portions number of meats (guide= 1-2)	1,49	1,89
Portions number of milk and diary (guide= 3)	1,38	1,56
Portions number of fats (guide= 1-2)	2,22	2,58
Portions number of sweets and sugar (guide = 1-2)	2,65	4,04



The majority of the boys and girls could be classified as eutrophics. However, analyzing classifications of overweight and obesity, the number is high, mainly for the boys. Graph 3 presents the distribution of the adolescents in accordance with the classification of the systolic blood pressure. 17.3% of the girls were considered as bordering.

Graphic 3: Adolescents distribution according to systolic blood pressure

Additionally, the correlation between SBP and BMI revealed positive and significant, for both genders ($r=0,244$; $p=0,003$ for girls; $r=0,451$ and $p=0,000$ for boys). The correlation between BMI and DBP was also positive and significant ($r=0,183$ and $p=0,02$ for girls; $r=0,324$ and $p=0,00$ for boys). The correlation between SBP and the protein intake, was negative and significant, for all the group and both genders ($r = -0,368$ and $r=0,00$ for boys and $r = -0,368$ and $p=0,00$ for girls). In the analysis of the diet, the distribution of the macronutrients was found to be adequate, but the ingestion was little elevated by the girls. When evaluating the energy intake related to body weight, values are similar for boys and girls. The correlation between BMI and energy intake in Kcal/Kg of body weight presented significant and negative for both genders ($r = -0,507$ and $p=0,01$ for boys and $r=-0,416$ and $p=0,00$ for girls). The calcium and iron intake was found to be below those of recommendations (AI for calcium = 1300mg/day; RDA for iron = 15mg). Both genders had carried less than four meals/day, and ingested below the suggested intake of cereals, fruits, vegetables and dairy products.

DISCUSSION

A healthful lifestyle has been pointed out as basic element with respect to the concept of health promotion. The relation between sedentary lifestyle and obesity is object of a serie of studies. As example, Ekelund (2004), observed that adolescent that accumulated less than one daily hour of moderate physical activity had significantly higher adiposity than individuals that had more than two hours accumulated of the same type of activity. The data found for the IPAQ (most of adolescents classified as active or very active) justified the majority of the adolescents being classified as eutrophic in relation to the BMI.

A considerable percentage of the adolescents presented overweight or obesity, in accordance with studies carried through Brazil and several other countries. The increase in the obesity has suffered a secular trend, in all ages (Hunter et al, 2000). Studies of ENDEF, at 1975 and PNSN, at 1989, had disclosed an increase of overweight of 56,3% in men and 39.7% in women (Fonseca et al, 1998). The BMI values in the present study had been lower in girls when compared with boys. Fonseca et al (1998) had found similar results.

The positive and significant correlation between BMI and SBP and between BMI and DBP confirm a great number of studies pointing to the obesity as cause of some chronic diseases, including hypertension. The explanation of this correlation is not very clear, but it is known that adipose tissue express the angiotensinogen gene, molecule capable to provoke vasoconstriction and rise in blood pressure (Wajchenberg, 2000; WHO, 2004). Another fact, still related to the values of SBP and DBP, is the significant and negative correlation between these values and protein intake. Although some studies point to a positive association between blood pressure and protein intake, recent findings show a contrary trend. The reasons still have been investigated, and can follow ways as: - diuretic effect of the of the urea elimination, what could help in the reduction of blood pressure; - specifically arginine, amino acid present mainly in vegetal proteins, would diminish the arterial pressure and also would improve the endotelial function, by the nitric oxide pathway (NO) (Burke et al, 2001). The dietary proteins had also presented a negative and significant correlation with the values of BMI. Studies investigate the possible protein role in handling obesity. Much has been argued in respect to protein and obesity, from the high popularity reached with diets that restrict carbohydrates. The explanations also still deserve inquiries, but some can be cited: - increased thermogenesis, typical of protein ingestion; - appetite reduction, possibly for the role of leucine in brain signalling; - reduction of post prandial lipemia, pointed as initial step to lipoprotein synthesis, or re-lipogenesis (Kappagoda et al, 2004).

The calcium intake for the adolescents was very low despite the important role of calcium in the bone formation and in the mechanisms of muscular contraction. Many authors demonstrate a low consumption of this nutrient among young persons (Lerner et al, 2000).

The correlation analysis was significant and negative between BMI and energy intake. This fact seeming paradoxical can be justified: The low ingestion of fruits, vegetables, or dairy products reflects low micronutrient intake. Yet, the number of daily meals is still low. These facts, together, would be responsible for a slow metabolic rate, and thus a small energetic expenditure (Vitteri & Gonzalez, 2002).

Iron intake also was low. Viteri & Gonzalez (2002) described the risks to the health, in children and adolescents: alterations in the mielinization, in citocromic enzymes, and in the neurotransmitters metabolism; reduced learning capacity and also leading to low body temperature regulation.

In conclusion, some aspects of the feeding of this group of adolescents point to risks of development of chronic diseases. The main problems were identified as: - irregular standard of the schedules of the feeding; - low ingestion of micronutrients; - great consumption of sugars and fats.

REFERENCES

- Albano RD, Souza SB. Estado nutricional de adolescentes: "risco de sobrepeso" e "sobrepeso" em uma escola pública no município de São Paulo. *Cad Saúde Pública*. 2001; 17 (4): 941-947.
- Burke, Hodgson, JM; Beilin, LJ; Giangulioi, N; Rogers, P; Puddley, IB. Dietary protein and soluble fiber reduce ambulatory blood pressure in treated hypertensives. *Hypertension*. 2001; 38: 821,826-.
- CDC- Centres for disease control and prevention- National Center for chronic disease prevention and health promotion. CDC at a glance. Physical activity and good nutrition: essential elements to prevent chronic diseases and obesity. Disponível em www.cdc.gov/nccdphp/dnpa. Acesso em 21/9/2004
- Craig, CL; Marshall, AL; Sjostrom, M; Bauman, AE; Booth, ML; Ainsworth, BE; et al. International physical activity questionnaire: 12-country reability and validity. *Med. Sci. Sports Exerc*. 2003; 35(.8):1381-1395.
- DRI: Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride; Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Disponível em www.nap.edu. Acesso em 07/04/2005

- Ekelund, ULF; Sardinha, LB; Andersein, SA; Harro, M; Franks, PW; Cooper, AR; et al Associations between objectively assessed physical activity and indicators of body fatness in 9- to 10-old European children: a population-based study from 4 distinct regions in Europe (the European Youth Heart Study). **Am J. Clin. Nutr.** 2004; 80: 584-90.
- Fonseca, VM; Sichieri, R; Veiga, GV. Fatores associados à obesidade em adolescentes. **Rev. Saúde Pública**, 1998; 32(6): 541-9.
- Garcia GCB, Gambardella AMD, Frutuoso MFP. Estado nutricional e consumo alimentar de adolescentes de um centro de juventude da cidade de São Paulo. **Rev Nutr.** 2003; 16(1): 41-50.
- Kappagoda, CT; Hyson, DA; Amsterdam, EA. Low-carbohydrate-high protein diets: is there a place for them in clinical cardiology? **J Am. Coll Cardiol.** 2004; 43: 725-30.
- Kuan-Zhang, FXP; Boozer, CN. Improving energy expenditure for physical activity. **Med. Sci Sports Exerc** 2004; 36(5): 883-889.
- Lerner, BR; Lei, DLM; Chaves, SP; Freire, RD. O cálcio consumido por adolescentes de escolas públicas de Osasco, São Paulo. **Rev. Nutr.**, 2000; 13(1): 57-63.
- Monteiro, CA; Benicio, MHD; Condi, WL; Popkins, BM. Shifting obesity trends in Brazil. **Eur. J. Clin. Nutr.** 2000; 54: 342-346.
- NHANES III. PHYSICAL EXAMINATION PROCEDURES MANUAL. In: **National Health and Nutrition Examination Survey (NHANES III)**. Original Junary 1999 (Revised August, 2000).
- Philippi, ST; Latterza, AR; Cruz, ATR; Ribeiro, LC. Pirâmide alimentar adaptada: guia para escolha de alimentos. **Rev Nutr.** 1999; 12(1): 65-80.
- Trumbo P, Schlicker S, Yates AA, Poos M. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acids. **J Am Diet Assoc** 2002; 102(11): 1621-1630.
- Urbano MRD, Vitale MSS, Juliano Y, Amancio OMS. Ferro cobre e zinco em adolescentes no estirão pubertário. **J Ped.** 2002; 78(4): 327-333.
- Viteri, FE; Gonzalez, HG. Adverse outcomes of poor micronutrient status in childhood and adolescence. **Nutr Rev** 2002; 60(5): S77-S83.
- WAJCHENBERG, BL. Subcutaneous and visceral adipose tissue: relation to the metabolic syndrome. **End Rev.** 2000; 21: 697-738.
- WORD HEALTH ORGANIZATION (WHO): Global strategy on diet, physical activity and health. Disponível em www.WHO.org. Acesso em dezembro/2004
- WORD HEALTH ORGANIZATION. **Physical status: The use and interpretation of antropometry**. Geneva, 1995.

SANDRAMARIA LIMA RIBEIRO

Universidade São Judas Tadeu- Coordenadoria De Pós Graduação.

Rua Taquari, 546- Mooca- São Paulo- Brasil

smlribeiro@uol.com.br

CHARACTERIZATION OF DIET, PHYSICAL ACTIVITY LEVEL AND NUTRITIONAL STATUS OF ADOLESCENTS.

Objectives: to identify factors of nutritional status, physical activity and food related behavior in adolescents.

Methods: 297 adolescents of both genders, have been evaluated considering: - physical activity level, using IPAQ; - weight and height, from which BMI were calculated and classified in accordance with WHO; - systolic and diastolic blood pressure, compared with NHANES III; -24-hour food-recall calculated from energy, macronutrients, iron and calcium. Food also had been evaluated from semi-quantitative and qualitative parameters, in comparison with the Food Pyramid applied the Brazilian population. **Results:** although the adolescents, in the average, had been considered at normality for the BMI and the blood pressure, an expressive percentual of overweight and obesity was observed. Some significant correlations point out to risk factors with respect to development of obesity and chronic diseases: irregular meals schedules, low micronutrients consumption, and great consumption of sugars and fats. **Conclusions:** didactic strategies related with nutritional and physical education are recommended.

Key-words: adolescents; diet; obesity.

CARACTÉRISATION DU MODÈLE DE RÉGIME, NIVEAU D'ACTIVITÉ PHYSIQUE ET ÉTAT NUTRITIONNEL DES ADOLESCENTS

RÉSUMÉ

Objectifs: Identifier des aspects de l'état nutritionnel, du niveau d'activité physique et étalon alimentaire dans des adolescents d'une école d'enseignement privé de la ville de São Paulo (Brésil). **Méthodes:** étude transversale et descriptive. 297 adolescents des tous les deux les sexes ont été évalués, dans une école particulier d'enseignement de la ville de São Paulo. Les paramètres évalués ont été: niveau d'activité physique, à partir de IPAQ; poids, hauteur et pour calcul de l'IMC conformément à l'OMS; pression artérielle systolique et diastolique, comparée avec les valeurs de NHANES III; évaluation du régime, au moyen de souvenir de 24 heures et de postérieur calcul dans énergie, macronutricions, de fer et de calcium. Les aliments consommés aussi ont été évalués qualitative et demi pour quantité, et comparés avec la pyramide alimentaire appliquée à la population brésilienne. **Résultats:** bien que les adolescents, dans la moyenne, aient été considérés éuthrofique pour l'IMC et pour la pression artérielle, il y a eu un pourcentage expressif des catégories sur poids et obésité. Quelques corrélations significatives indiquent des facteurs de risque pour le développement d'obésité et de maladies chroniques: horaires irréguliers des repas; basse consommation de micronutricions, et grande consommation de sucres et graisses. **Conclusions:** Des stratégies pédagogiques qui valorisent la pratique d'activité physique et l'alimentation saine sont recommandées pour ces personnes.

Mots clés: adolescents; régime; obésité.

CARACTERIZACIÓN DE LA DIETA, NÍVEL DE ACTIVIDAD FÍSICA Y DEL ESTADO ALIMENTICIO DE ADOLESCENTES.

Objetivos: identificar los aspectos del estado alimenticio, nivel de actividad física y padrón/comportamiento alimentar en jóvenes adolescentes de un colegio de enseñanza privada de la ciudad de São Paulo SP.

Metodología: estudio transversal y descriptivo. Fueron evaluados 297 adolescentes de ambos géneros. Los parámetros evaluados fueron: nivel de actividad física, utilizando IPAQ; peso y altura, cuyos IMC fueron calculados y clasificados de acuerdo con OMS (Organización Mundial de la Salud); presión arterial sistólica y diastólica, comparados con los valores de NHANES III; memoria de 24 horas de la alimentación para calculo de consumo de energía, macro nutrientes, hierro y calcio. La alimentación también fue evaluada por parámetros semi cuantitativos y cualitativos, en comparación con la Pirâmide Alimentar aplicada a la población brasileña.

Resultados: aunque los adolescentes, en el promedio, sean considerados en la normalidad para el IMC y presión arterial, fue observado un gran y expresivo porcentual de las categorías sobrepeso y obesidad. Algunas correlaciones significativas precisan / apuntan factores de riesgo para el desarrollo de obesidad y enfermedades crónicas: horarios irregulares de las comidas, bajo consumo de los micro nutrientes, y gran consumo de azúcares y de grasas.

Conclusión: se recomienda estrategias pedagógicas que valoricen la práctica de actividad física y alimentación saludable para estos individuos.

Palabras claves: adolescentes; dieta; obesidad.

CARACTERIZAÇÃO DO PADRÃO DA DIETA, NÍVEL DE ATIVIDADE FÍSICA E ESTADO NUTRICIONAL DE ADOLESCENTES.

Objetivos: Identificar aspectos do estado nutricional, nível de atividade física e padrão alimentar em adolescentes de uma escola de ensino privado da cidade de São Paulo-SP. **Métodos:** estudo transversal e descritivo. Foram avaliados 297 adolescentes de ambos os sexos, em uma escola da rede particular de ensino do município de São Paulo-SP. Os parâmetros avaliados foram: -nível de atividade física, a partir do IPAQ; -peso, altura e para cálculo do IMC de acordo com a OMS; -pressão arterial sistólica e diastólica, comparadas com os valores do NHANES III; -avaliação da dieta, por meio de recordatório de 24 horas e posterior cálculo em energia, macronutrientes, ferro e cálcio. Os alimentos consumidos também foram avaliados qualitativa e semi-quantitativamente, e comparados com a Pirâmide Alimentar aplicada à população brasileira. **Resultados:** embora os adolescentes, na média, tenham sido considerados eutrofos para o IMC e para a pressão arterial, houve um percentual expressivo das categorias sobrepeso e obesidade. Algumas correlações significativas apontam fatores de risco para desenvolvimento de obesidade e doenças crônicas: horários irregulares das refeições; baixo consumo de micronutrientes, e grande consumo de açúcares e gorduras. **Conclusões:** estratégias pedagógicas que valorizem a prática de atividade física e alimentação saudável são recomendadas para esses indivíduos.

PALAVRAS CHAVE: adolescentes; dieta; obesidade.