# 151 - EVALUATION OF NUTRIENTS INTAKE AND ABDOMINAL CIRCUMFERENCE IN PATIENTS WITH METABOLIC SYNDROME OF VALE DOS SINOS REGION, RS

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## INTRODUCTION

The increasing rate of metabolic syndrome (ms) in the several regions of the world is due to the greater number of obesity cases as well diabetics. The worldwide forecast for the year 2010 is around 50 to 75 million or more for the individuals with the metabolic syndrome manifestations (WHO 2004).

The MS is a manifold aspect of disorders, which is responsible for the premature sclerosis and for premature risks of cardiac vascular diseases. Yet, the suitable feeding and the physical activity gathering other changes in the life style help to control the sickness, prevailing its complications and longing life quality (ABREU et al., 1994; CASTRO et al., 2006; GOMES TUBINO, 2006).

Nowadays ordinary elements converge to a rich fat diet such as sugar, refined meals, reduced carbohydrate complexes and important micronutrients for the metabolism and sensitive to insulin. This steady diet and the progressive decreasing of the individuals' physical activity have brought concomitant changes in the body make up, specially the increasing of abdominal obesity (MONTEIRO, 1995).

The nutritional therapy for the MS subjects focuses not only on the glucose control, but also on a better intake of unsaturated fat whose origin is oil acid (mono unsaturated) and linolenic acid (HABER et al., 2001).

Recently experiments and observed studies have showed a close relation between MS and some micronutrients like magnesium, chromo, zinc, B complex vitamin, because they improved the sensibility to the insulin (KELLY GREGORY, 2000; he et al., 2006). Some measures are necessary for a suitable nutritional attitude that might increase the nutrients consume to help to diminish this syndrome statistics (HU, F. B et al., 2001).

Briefly, this study aims at the intake nutrient evaluation and the abdominal circumference in patients with the metabolic syndrome in the Vale dos Sinus Region in Rio Grande do Sulk.

## METHODOLOGY

The investigative, descriptive study of quantitative characteristic without interfering in the observed inquiry analyzed a sample comprised of 50 patients (n=37 female (f) and n=13 male (m) with metabolic syndrome (MS). The interviewer randomized the patients' selection and interviewed them separately. Their age was between 30 and 60, living in Vale dos Sinos Region, RS. They underwent to the instruments of the study.

The data collect took place from September 2005 to March 2007. Information on patients with MS were obtained considering aspects such as diet and the intake of macronutrients, lipids and micronutrients Magnesium (Mg), Chromo (Cr), Zinc (Zn) and B complex vitamins. The evaluator applied tools, previously tested: records of food (record of 24 hours) and implemented by them, which recorded all foods consumption and their quantities, from the first to the last meal (SALVO, e GIMENO, 2001). The main tool applied to analyze the inquiring was the food survey (MAJEN, BARBA, 1995).

Subsequently to the registration of the information on the intake of food and preparations, the measures converted into grams or milliliters, with the aid of a digital scale, and table used for this purpose .

To calculate the amount of daily intake of nutrients Mg/d, Zn (mg/d), vitamin B6 (mg/d), Calories, total carbohydrate (g/d), total lipids (g/d), fat mono unsaturated, one used the Brazilian Table of Food Composition (TACO) and software of nutrition through the Diet Win Clinical 3.0 were analyzed the consumption of Cr (ug/d), biotin (ug/d), folic acid (ug/d) and vitamin B12 (ug/d), because these nutrients were not in the TACO table.

The adequacy of the consumption of nutrients expressed the average daily intake and related to the dietary reference intake (DRI).

To analyze the adequacy of the consumption of micronutrients and fatty acids linoléic and linolêmic, the paradigms used were the ones recommended by DRI. The macronutrients of the diet (carbohydrate, lipid, protein), intake of cholesterol(mg/d), the percentage of saturated fat, and oléico acid, the paradigm used was the one recommended by the I DBSM (2005).

The measure of abdominal circumference used as a standard for measuring 80 cm for women and 94 cm for men, according to the (International Diabetes Federation (IDF), 2007. The abdominal circumference measured by means of a tape measure positioned in the greater breadth between the iliac crest and the back edge, with the patient standing without clothes, with the arms positioned along the body and the expiratory phase of breath. (CASTRO, MATO, GOMES, 2006).

The program SPSS (15.0) analyzed the results statistically through ANOVA tests to verify differences between the variables studied, and Correlation of Pearson.

## RESULTS

Having analyzed the intake of macronutrients (Table 1) in the investigated group one observed that the carbohydrate and lipid are on the reference average, however, the protein was 4,4% (P<0,05) above of the recommended.

**Table 1:** intake of macronutrients (n=50)

| Variables | values of daily/reference | Nutrients Intake $\bar{x} \pm dp$ |
|---|---|---|
| Carbohydrate (%) | 50 a 60 | 57,5 ± 8,9 |
| Protei (%) | 10 a15 | 19,4 ± 5,8 * |
| Lipid (%) | 25 a 35 | 23,2 ± 6,4 |

Difference related to the recommended values p<0.05.= average *dp*= pattern deviation

The consumption of lipids by the groups shows that the saturated fatty is within the forecast one. The fatty acids which promote the individual's health with metabolic syndrome were under the recommended one: -9, -6, -3 (p<0,01 respectively) (Table 2). The diabetic cholesterol kept on the average permitted, in the female group it was 49% inferior to the maxim limit (Table 2)

**Table 2**: Lipids Consumption

| | Male (n=13) x̄+ dp | | Female (n=37) x̄+ dp | |
|---|---|---|---|---|
| | Average Reference | Average Intake | Average Reference | Average Reference |
| Calories | | 2246,5 ± 89,4 | | 1469,0 ± 64,0 |
| Saturated % | <10 % VET | 7,3 | <10 % VET | 7,2 |
| ω-9 % | 20 % VET | 6,2 * | 20 % VET | 6,1 * |
| ω-6 (g) | 14,0 | 8,7 + 0,1 * | 11,0 | 6,2 + 0,1 * |
| ω-3 (g) | 1,6 | 1,3 ± 0,0 * | 1,1 | 0,7 ± 0,0 * |
| Cholesterol (mg) | < 300,0 | 293,7 ± 43,1 | < 300,0 | 153,6 ± 21,4 * |

%Percentage values. = average dp= pattern deviation

· RDA (daily suitable recommendation);

**I DBSM (Brazilian Management Diagnose and Treatment of Metabolic Syndrome) (2005).

The analyzes of micronutrients intake (Table 3), showed a consumption deficiency in the aging from 31 to 50 years (p<0,01) of B6, both male and female genders, B9 in the make and Mg in female, aging from 50 to 70 years, the deficit (p<0,01) was on Mg, B6, B9, for both groups.

| | Male (years) (n=13) | | | | Female (years) (n=37) | | | |
|---|---|---|---|---|---|---|---|---|
| | 31 a 50 | | 50 a 70 | | 31 a 50 | | 50 a 70 | |
| | DRI | Consumption | DRI | Consumption | DRI | Consumption | DRI | |
| Magnesium (mg)• | 420,0 | 487,9 | 420,0 | 334,9 * | 320,0 | 243,4 ** | 320,0 | 220,6 ** |
| Zinc (mg) • | 11,0 | 19,0 | 11,0 | 20,1 | 08,0 | 08,5 | 08,0 | 12,0 |
| Chromo (ig) •• | 35,0 | 101,5 | 30,0 | 199,9 | 25,0 | 62,6 | 20,0 | 109,4 |
| Biotina (ig) •• | 30,0 | 214,0 | 30,0 | 116,7 | 30,0 | 77,8 | 30,0 | 78,3 |
| Vitamin $B_6$ (mg) • | 1,3 | 0,5 ** | 01,7 | 01,4 * | 01,3 | 00,5 ** | 01,5 | 01,2 ** |
| Vitamin $B_9$ (i g) • | 400,0 | 231,3 ** | 400,0 | 421,5 | 400,0 | 205,9 ** | 400,0 | 233,7 ** |
| Vitamin $B_{12}$ (i g) • | 02,4 | 03,0 | 02,4 | 07,5 | 02,4 | 07,3 | 02,4 | 04,5 |

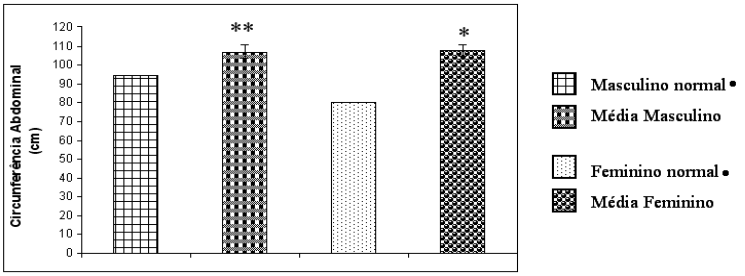
**Table 3.** Average consumption of micronutrients in distinct groups

*RDA (dialy suitable recommendation); ** AI (suitable intake).

*Difference related to recommendation p<0,05. **Difference related to recommendation p<0,01.

The abdominal circumference related to the recommended measures showed high in the male group, 14% (p<0,05), and in the female group it this result was 34% superior (p<0,01) (Fig. 1).

**Fig. 1**: Abdominal circumference average (cm) M= 13 F=37




. Reference value IDF (2007)

**Male difference when compared to recommendation (p<0,05)

*Difference F when compared to recommendation (p<0,01).

**Discussion**

Epistemological studies have revealed to be prone to a number of women who present the metabolic syndrome and this work confirms this trend. A great part of the adult population develops this syndrome, stemming from genetic, hormonal or the lack of physical exercises, the excess of certain nutrients intake, or the deficiency of other ones, which take part into the vary reactions leading to physiologic changes such as the obesity (Kelly, Gregory 2000). The suitable food is very important not only for the treatment, but also to prevent the Metabolic Syndrome (SANTOS et al., 2006).

Among the food causes, the excess of refined carbohydrate, the lipid quality and the high level of consumption of animal protein favor the lipid profile change, adipose abdominal, systemic artery hypertension, tolerance to impaired glucose, pro-thrombosis and pro-inflammatory condition characterize the Metabolic Syndrome (PEREIRA et al., 2002; SANTOS et al., 2006).

The effect of fatty acids on the insulin varies. FERNÁNDEZ-REAL et al. (2003) found a strong relation between the fatty acids rich in omega-6 and the inflammatory activity in patients with MS evaluated by the interleukin 6 and PCR. The omega-3 had a negative relation. The excess of omega-6 fatty acid might reduce the HDL-c and favor the oxidation of the biologic tissue. The omega-3 reduces the plaque adhesive marks so important for the cardio vascular disease (CVD). The oleic acid strengthens the LDL-c particles. So they become less prone to the oxidation (RIQUE et al., 2002).

VESSBY (2001) polyunsaturated fatty acid compared to the saturated fat. The dietary cholesterol has less effect on cholesterolemia than on the saturated fat and mainly the trans fat (RIQUE et al., 2002).

SUMMERS (2002) have observed a better sensitiveness to insulin with monounsaturated fatty acid. The results of this study have showed that the carbohydrate macronutrients intake and lipids are within the tolerance limit. The patients showing a high level of protein consumption stemming from the meat, saturated fat favor the metabolic syndrome. The ones who present a low intake of omega-3 and oleic acid are much better.

The evaluation of food intake in the study has observed a deficiency on certain micronutrients so important to the cardio vascular system and sensible to insulin. Among them one might point out the magnesium which is a mineral evolved in the insulin secretion and in the *lisp* muscle relax of the vase (SALES e PEDROSA, 2006). Another important analyzes is related to the Vitas which interact in the homocystein cicle such as acid folic, cobalamin, piridoxin. These ones showed deficiency favoring the DCV. The homociseinais a s*ulforado* amino acid made up from the metabolism of *metionina*, considered as a risk for the occlusive vascular diseases (JACQUES et al et al., 2001).

PALANIAPPAN et al (2004) has observed that the increasing of the abdominal perimeter was the most important variable to forecast the MS. DESPRES, LEMIEUX, PRUD'HOMME, 2001 have showed that the high amount of the abdominal adipose tissue related to the intolerance to the glucose and with hipersinsulinemia. They resist to insulin. The results of the study confirm the central adipose is a mark for the insulin resistance. Bad food habits or food deficiency lipid eating is so important for the

biochemical reactions and refined carbohydrates.

**Conclusion**

According to the result of this study, one has stressed the relation of the nutrition deficit with the CA, and, once it is a risk factor of Metabolic Syndrome, it is important to advise efficiently the young individuals concerning the dietary food habits. It is also important to emphasize the intake of rich micronutrients food, improving daily quality of lipids in the eating.

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**EVALUATION OF NUTRIENTS INTAKE AND ABDOMINAL CIRCUNFERENCE IN PATIENTS WITH METABOLIC SYNDROME IN THE REGION OF VALE DOS SINOS, RS**

**ABSTRACT**

Metabolic syndrome (MS) is a cardiovascular risk factor. Proper eating habits, associated to other alterations on life style has contributed to a better control of the disease, preventing its complications and increasing quality of life. The aim of this study is to assess nutrients intake and abdominal circunference in patients with metabolic syndrome in the region of vale dos Sinos, RS. In this descriptive study, 50 patients n=13 male (M) and n=37 female (F), aged between 30 and 60 years, randomly selected, undertook 24-hour food record and alimentary enquiry in order to have their eating habit and nutrient intake identified. Figures were caculated through the Brazilian food composition table (TACO) and the program Diet Win Professional. Abdominal circunference (CA) was measured through tape measure placed at the longest extension between iliac crest and the back. Data was analysed statistically through ANOVA and Pearson Correlation. Regardin to intake, results showed protein over recommendation (19.4% = p<0.05) (WHO); significative deficiency (p<0.01) in -9, -6, -3; micronutrients with more deficiency (p<0.01) were magnesium (Mg), vitamins $B_6$, $B_9$ e $B_{12..CAwas}$ superior in M 14% (p<0.05) and in F 34% (p<0.01) when related to parameters of IDF 2007. CA results with intake of -9, -6, -3, Mg, $B_6$, $B_9$ e $B_{12}$ showed strong correlation. Eating habits in patients with Metabolic Syndrome must be adequate in important micronutrients on metabolic table, an adequate intake in unsaturated fat acid in detrimento of saturated fat.

KEY-WORDS: Metabolic Syndrome, nutrients, insulin resistance, circumference abdominal.

**EVALUATION DE L'INGESTION DE NUTRIMENTS ET DE LA CIRCONFERENCE ABDOMINALE SUR DE PATIENTS PRESENTANT LE SYNDROME METABOLIQUE DANS LA REGION DE VALE DOS SINOS,RS**

**RESUME**

Le syndrome métabolique constitue un risque cardiovasculaire. L'alimentation convenable, en rapport avec d'autres changements dans le style de vie, a contribué pour un meilleur contrôle de la maladie, évitant les problèmes et d'accroître sa qualité de vie. De cette façon, l'objectif de cet article est d'évaluer l'ingestion de nutriments et de la circonférence abdominale sur des patients présentant un syndrome métabolique à Vale dos Sinos, RS Region. L'étude a profil descriptif, avec 50 patients, n=13 hommes et n= 37 femmes, âgés de 30 à 60 ans, choisis au hasard. Ils ont mangés à un record de 24 heures et la nourriture enquête est importante d'identifier les habitudes alimentaires et les nutriments ingéré, calculé par l'intermédiaire du Brésilien Composition de la Nourriture de Table (TACO) et de la Riete Win Professional Programme.

La circonférence abdominale (CA) a été calculé par mesure de bande placée dans la plus grande longueur entre la crête iliaque, l'un bord arrière. Les données ont été analysées statistiquement par l'intermédiaire du ANOVA et de la Corrélation de Pearson. Les résultats ont souligné l'ingestion concernant : au-dessus de la protéine recommandé (19,4%= p<0,05) (OMS), un important déficience (p<0,01) à -6, -3, les micronutriments avec un plus grande déficience (p<0,01) ont été magnésie (Mg), vitamines B6 et B9.

Le CA est supérieur à 14% de sexe masculin (p<0,05) et 34% des femmes (p<0,01) liés aux normes de IDF, 2007.Les résultats de AC avec l'ingestion de -9, -6, -3, Mg, B6, B9 e B12 ont montré une forte corrélation. Bref, le patient avec le syndrome métabolique doit manger les nourritures adaptées à son métabolisme.

L'ingestion adéquate d'acides gras insaturés au lieu de graisses saturées est aussi recommandée.

MOTS-CLEF: syndrome métabolique, nutriments, insaturé, nourriture.

**EVALUACIÓN DE LA INGESTIÓN DE NUTRIENTES Y LA CIRCUNFERÊNCIA ABDOMINAL EN PACIENTES CON SÍNDROME METABÓLICA DE LA REGIÓN DEL VALE DO SINOS**

**RESUMEN**

El síndrome metabólico (SM) constituye un factor de riesgo cardiovascular. La alimentación adecuada, asociada a otras modificaciones en el estilo de vida, tiene contribuido para un mejor control de la enfermedad, previniendo sus complicaciones y aumentando la cualidad de vida. Así, el objetivo de este artículo ha sido evaluar la ingestión de nutrientes y la circunferencia abdominal en pacientes con el síndrome metabolico en la región del Vale do Sinos, RS. En este estudio de caracteristica descriptiva, se estudió 50 individuos comprendidos entre 30 y 60 anos, n=13 del género masculino (M) y n=37 del femenino (F) seleccionados aleatoriamente. Como paso inicial se realizó una entrevista particular "interrogatorio alimentar de 24hs" (R24), y un "inquerito alimentar" donde se identificó los hábitos alimentarios y la ingestión de nutrientes. El consumo alimentario fue analizado mediante la aplicación del programa "*DietWin Profissional" y de la " Tabela de Composição Brasileira dos Alimentos (TACO)". S*e tomó la circunferencia abdominal (CA) con una cinta antropométrica posicionada en la mayor extensión entre la cresta ilíaca y el borde inferior de la costilla. Los datos, fueron tratados utilizándose el análisis ANOVA y el Coeficiente de Correlación de *Pearson.* Resultados: la ingestión de proteína se mostró arriba del recomendado (19,4% = p< 0,05) (OMS). Hubo un déficit significativo (p< 0,01) de -9, -6, -3. Los micronutrientes con mayor déficit (p< 0,01) fueron magnesio (Mg), vitaminas $B_6$, $B_9$ e $B_{12}$ La CA fue mayor en el M en 14% (p< 0,05) y en el F 34% (p< 0,01) cuando relacionados a los parámetros del IDF 2007. Los resultados de la CA con la ingestión de -9, -6, -3, Mg, $B_6$, $B_9$ e $B_{12}$ muestran una fuerte correlación. En síntesis, la alimentación de los pacientes con SM debe ser adecuada en micronutrientes, y tener una cantidad adecuada en ácidos grasos insaturados en detrimento de las grasas saturadas. PALABRAS CLAVE: síndrome metabólico, ingestión, nutrientes, circunferencia abdominal

**EVALUATION OF NUTRIENTS INTAKE AND ABDOMINAL CIRCUMFERENCE IN PATIENTS WITH METABOLIC SYNDROME OF VALE DOS SINOS REGION, RS**

**RESUMO**

A síndrome metabólica (SM) constitui um fator de risco cardiovascular. A alimentação adequada, associada a outras modificações no estilo de viver, tem contribuído para um melhor controle da doença, prevenindo suas complicações e aumentando a qualidade de vida. Desse modo, o objetivo deste artigo é avaliar a ingestão de nutrientes e circunferência abdominal em pacientes com diagnóstico de síndrome metabólica na região do Vale do Sinos, RS. Neste estudo, de característica descritiva, com 50 pacientes n=13 masculino (M) e n=37 feminino (F), idade de 30 a 60 anos, selecionados aleatoriamente, foram submetidos ao recordatório alimentar de 24 h e como coadjuvante o inquérito alimentar, para identificação do hábito alimentar e ingestão de nutrientes, calculados através da tabela de composição brasileira dos alimentos (TACO) e do programa Diet Win Profissional. Para avaliação da circunferência abdominal (CA) foi aferida por fita métrica posicionada na maior extensão entre a crista ilíaca e o rebordo costal. Os dados foram analisados estatisticamente através da ANOVA e Correlação de Pearson. Os resultados apontaram quanto à ingestão: proteína acima do recomendado (19,4% = p< 0,05) (OMS), uma deficiência significativa (p< 0,01) em -9, -6, -3, os micronutrientes com maior deficiência (p< 0,01) foram magnésio (Mg), vitaminas $B_6$, $B_9$ e $B_{12}$ A CA foi superior no M em 14% (p< 0,05) e no F 34% (p< 0,01) quando relacionados aos parâmetros do IDF 2007. Os resultados da CA com ingestão de -9, -6, -3, Mg, $B_6$, $B_9$ e $B_{12}$ mostraram uma forte correlação. Em síntese a alimentação do paciente com SM deve ser adequada em micronutrientes importantes no quadro metabólico, uma ingestão adequada em ácidos graxos insaturados em detrimento da