35 - ANTHROPOMETRIC STUDY AND FEEDING QUALITY OF ROWERS IN THE BRAZILIAN MARINE CORPS

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INTRODUCTION

Competitive rowing is a sport modality of high intensity and short duration, which demands great body energy consumption. Studies with elite rowers have evidenced exceptional aerobic and anaerobic capacity and high levels of muscular power, involving a combination of strength and endurance, mainly at the training stage (SECHER, 1983).

Owing to the fact that competitive rowing is one of the sports that demands great physiological overload, nutrition plays an important role in the optimization of the athlete's performance, as a function of the total daily caloric consumption, the energetic density of the macronutrients, the bodily mass, hydration, among other factors that participate in the whole process (SANTINONI & SOARES, 2006).

According to the literature, it is estimated that in a competition of 2000 meters, with an average duration from 6 to 8 minutes there is an energetic consumption between 200 to 250 kcal. However, in a daily training routine of 1 to 2 hours, it is estimated that there is a total caloric consumption between 1000 to 2000 calories (HAGERMAN & HAGERMAN, 1990).

In a professional training session or in a competition, the average caloric consumption may be 3000 kcal, demanding from the athlete the caloric ingestion, both of nutrients and water sufficient to satisfy the metabolic needs involved in the accomplishment of this sport (SANTINONI & SOARES, 2006).

The variation of an athlete's bodily composition influences his performance and is directly related to the inherited characteristics, training programs and diet. Nutritional strategies can improve not only the performance, but also the athlete's recovery and make him better prepared for the training (MACDONALD & ROCHE, 2006).

In Brazil there are few publications that describe the bodily composition and the quality of feeding for rowing athletes. This fact suggests that more studies be developed so that the science of sports nutrition can increase its volume of information and can improve the nutritional guidance of these athletes, and consequently, contribute to improve their physical performance.

For the above described reasons, the Confederação Brasileira de Remo (CBR Brazilian Rowing Confederation) has become the training site of a group of privates in the Brazilian Marine Corps since March 2006. The plan is to make up a rowing team. Although this group had strict training routine, it did not have a nutritional follow up, which could risk the physical performance.

The aim of this study was to assess the anthropometric profile and the quality of feeding among the rowers that integrate the Brazilian Marine Corps and are affiliated to the CBR.

SUBJECTS AND METHODS

This was a cross-cut, descriptive, quantitative survey accomplished with 11 voluntary male athletes between the ages of 20 and 24 years olds, members of the Brazilian Marine Corps and affiliated to the Brazilian Rowers' Confederation. The athletes were evaluated and had a nutritional follow up at the Laboratory of Anthropometric Assessment and Diet Therapy at UNISUAM in November 2006. The participation of athletes in this study was made with their informed consent. The work was carried out in compliance with the norms of resolution 196/96 issued by the Conselho Nacional de Saúde (Health National Council), which describes the “Diretrizes e normas regulamentadoras da pesquisa envolvendo seres humanos” (“Guidelines and regulating procedures for research involving human beings” - document issued by the Health Ministry - MS, FIOCRUZ, 1998).

The social-demographic data analyzed in this study (family average income, school level and marital status) and the athlete's feeding quality were obtained from the nutritional anamnesis file developed for the study and applied to the athlete during the nutritional consultation.

The anthropometric measures made were the total bodily mass (kg), the height (m), evaluated as the subject was in apnea after maximum air intake; the skinfolds were measured at the non-domineering side of the body, in orthostatic position with the relaxed set of muscles, three times, with the register of the average value. The body measures were made according to the protocol issued by the International Society for the Advancement of Kineanthropometry (ISAK, 2000).

For the measurement of the total bodily mass and height, an electronic scale trademark *Filizola* was used, with capacity for the weight of 150Kg, graduations of 100g, provided with a stadiometer (2.00m altimeter) The thickness of the skinfolds was measured with a scientific adipometer model Sanny (0.1mm precision), according to standards by Heyward e Stolarczyk (2000).

The percentage of bodily fat was calculated through the sum of skinfolds with the application of the equation proposed by Jackson & Polock 3 folds (FERNANDES FILHO, 2003).

The data were entered and consolidated in *Excel for Windows* program. Aiming at describing the studied group, the exploration of the data was initially made from the absolute and relative frequency of the selected variables, measures of the central trend and deviation, with the application of the statistical package SPPS version 10.0.

RESULTS AND DISCUSSION

The social demographic data of the rowing athletes' analyses in this study are described in table 1. It was observed that 45.3% of the athletes had income amount between 2 and 4 minimum wages, suggesting that they are able to follow nutritional guidelines because they can afford buying the food recommended by the nutritional prescription.

At the moment the study was accomplished, it was detected that the 63.6% of the athletes had schooling level corresponding to incomplete secondary school and 91% of them were single. In the study of the nutritional anamnesis the quality of feeding referred by the athletes was as follows: 54.5% qualified their feeding as good, 27.3% as regular, and 18.2%, as poor. These data demonstrate how aware the athletes are of the used feeding standards and how interested they are in a nutritional follow-up, mainly in order to improve their physical performance.

Table 1. Socio-demographic data about the rowing athletes in the members of the Brazilian Marine Corps affiliated to the Brazilian Rowers' Confederation

Socio-demographic data	n	%
Average family income		
1 – 2 minimum wages	3	27.3
3 – 4 minimum wages	5	45.4
≥ 5 minimum wages	3	27.3
Schooling Level		
Incomplete Secondary School	7	63.6
Incomplete Secondary School	2	18.2
Incomplete College Education	2	18.2
Marital Status		
Single	10	90.9
Married	1	9.1
Feeding Quality (self reported)		
Good	6	54.5
Regular	3	27.3
Poor	2	18.2

n – Number of athletes

The consumption of fruits featured high percentage among the athletes (72.7%), as well as green vegetables (63.6%) and vegetables (63.6%). All the athletes reported they had breakfast, lunch and dinner. Only one of the athletes (9.1%) stated that he never had any afternoon snack, and all the athletes stated that they never had any morning snack and never had supper (table 2).

Table 2. Feeding quality regarding the consumption of fruits, green vegetables and vegetables and daily meals of the rowing athletes, members of the Brazilian Marine Corps affiliated to the Brazilian Rowers' Confederation

Daily food consumption	Yes n	%	No N	%
Fruits	8	72.7	3	27.3
Green Vegetables	7	63.6	4	36.4
Vegetables	7	63.6	4	36.4
Meal				
Breakfast	11	100	0	0
Morning snack	0	0	11	100
Lunch	11	100	0	0
Afternoon snack	10	90.9	1	9.1
Dinner	11	100	0	0
Supper	0	0	11	100

Fruits, vegetables and green vegetables are source of vitamins, mineral salts and water, indispensable to the athlete's feeding. Thus, the high frequency of consumption of these foods by the athletes has enabled the suggestion for preparations that could replace the micronutrients necessary for the organism's metabolic regulation.

The dietary prescription of an athlete who needs to consume a high energetic value (HEV) must be fractioned in at least six daily meals, for a high caloric concentration in the meals can interfere in the digestibility of the food and consequently, in the athlete's training. Large meals (lunch and dinner) must be eaten at least 3 to 4 hours before training because large part of the blood flow is deviated to the digestive process, decreasing the blood irrigation to the muscles (MAHAN & ESCOTT-STUMP, 2005).

The use of energetic replacements during the training period is also important to renew the stocks of ATP and muscular glycogen (BIESEK; ALVES; GUERRA, 2005).

Table 3 below brings the average values, standard deviation, minimum and maximum values for the age, total bodily mass (kg), height (cm) and the fat percentage.

Table 3. Average values, standard deviation, minimum and maximum values of the variables: weight, height, fat percentage of the rowing athletes, members of the Brazilian Marine Corps affiliated to the Brazilian Rowers' Confederation

Variables	Average	Standard Deviation	Minimum	Maximum
Age (years)	21.73	1.27	20	24
Total Bodily Mass (kg)	81.74	7.50	74.2	94.3
Height (cm)	186.91	4.30	180	196
% Fat (Faulkner)	10.21	3.87	4.98	17.12

The average age was 21.73 years±1.27, demonstrating that it as a homogeneous sample. The average value of the bodily mass registered for this study was lower than the values found by Silva *et a.l* (1984) and Silveira-Júnior *et al.* (1996), and higher than the values found by Meirelles *et al*. (1994), quoted by Marins & Giannichi (2003). However, the average height value (186.8cm) was similar to the value observed in the study by Silveira-Júnior *et al.* (1996) (Chart 1).

For the average fat percentage, the value detected was close to the figure registered by Meirelles *et al*. (1994) for high level teams. But the protocol applied was the one by Jackson e Pollock (1978), quoted by Marins & Giannichi (2003) who analyzed seven folds (Chart 1), and this study applied Faulkner's protocol. This fact may cause influences in the result of the analyzed value. MCARDLE, KACTH & KATCH (2001) report that the announced value of relative subcutaneous fat is between 10 and 15%. **Chart 1.** Average value and standard deviation of the bodily composition on national teams, and on high level male athletes' teams.

Modality	Age (years)	Weight (Kg)	Height (cm)	Body Fat (%)	Average Bodily Mass (Kg)	Technique	Ref.
Rowing[1]	x	88.8±11.3	187.8±9.5	7±3.1	82.3±8.2	X	Silva *et al.* (2000)
Rowing[1]	x	92.5	186.8	6.2	X	Jackson e Pollock (1978)	Silveira Júnior *et al.* (1996)
Rowing[2]	21.9±3.7	72.2±2.1	175±0.8	9.8±0.8	X	Faulkner	Meirelle *et al.* (1994)

Source: Marins & Giannichi (2003) / (1) National Teams; (2) High Level Teams x – no indication; Ref.- Reference.

According to Williams (2002), some of the effects of the *endurance* or aerobic training on the skeleton muscle are the increase of glycogen and triglycerides, which provide larger energy storage. This fact explains the need of a greater percentage of bodily fat for the rowing athletes when compared to other sports modalities, such as for example, sprinters and swimmers, whose average percentage of bodily fat varies from 5 to 10% (MCARDLE, KACTH & KATCH, 2001).

Therefore, for the assessed team there must be intervention of nutrition associated with the training so that the reduction of adipose tissue in some athletes on the team can be reduced and the increment of that percentual can be provided in others.

CONCLUSION

The rowing athletes stated they ingested food rich in micronutrients daily, such as fruits, green vegetables and vegetables, important for the physical performance and adequacy to the nutritional status. Nevertheless, they should increase the meals fractioning so that the caloric density could be distributed in a balanced way. They featured the average percentage of bodily fat within the expected standard, although some athletes need to decrease the volume of adipose tissue. It is expected that the data presented in this survey can contribute to adequate these athletes' diets and to encourage new investigations about the rowers.

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ANTHROPOMETRIC STUDY AND FEEDING QUALITY OF ROWERS IN THE BRAZILIAN MARINE CORPS

ABSTRACT

The bodily composition assessed by anthropometry, and food consumption have been widely used to diagnose athletes' nutritional status. These methods allow the detection of nutritional disturbances that can hinder physical performance. The aim was to assess the anthropometric profile and the quality of feeding among the rowers that integrate the Brazilian Marine Corps and are affiliated to the Brazilian Rowers' Confederation. A descriptive, quantitative study was accomplished with 11 male voluntary athletes between the ages of 20 and 24 years. A feeding anamnesis was developed, the anthropometric measures were taken, and each athlete's Bodily Mass Index and fat percentage were calculated. It was registered that 45.3% of the athletes had as income an amount between 3 and 4 minimum wages, 63.6% had incomplete secondary school background and 91% of them were single. The average age was 21.7±1.27 years. The average weight was 81.7±7.5Kg and the average height was 186.9±4.3cm. The average fat percentile was 10.2±3.87. For the referred feeding quality, 54.5% stated their feeding was good, 27.3%, regular and 18.2%, poor. The consumption of fruits featured a high percentage (72.7%), and so did the consumption of green vegetables (63.6%) and vegetables (63.6%). The anthropometric standard of most athletes showed figures consistent with the figures described in the literature, although some featured high fat percentages. The consumption of food considered healthy is part of the athletes' daily routine, but their feeding is still not adequate.

KEY WORDS: Rowing, Bodily Compositions, Food Consumption.

ÉTUDE ANTHROPOMETRIQUE ET QUALITÉ DE L'ALIMENTATION DE LES RAMEURS DE LA CONFÉDÉRATION BRÉSILIENNE DE L´AVIRON.

RÉSUMÉ

La composition corporelle, évaluée par l'anthropométrie, et la consommation alimentaire largement a été utilisée à la diagnose l'état nutritionnel de l'athlètes. Ces méthodes permettent de détecter les vacarmes nutritifs qui peuvent compromettre l'exercice physique de les rameurs. L'objectif a été d'évaluer le profil antropométrico et la qualité l'alimentation de l'athlètes, les

membres du corps de nourrissons de marine et filiados de la Confédération Brésilienne d'Aviron. On a fait une étude descriptive, quantitative, avec 11 athlètes hommes, volontaires, entre 20 et 24 années d'âge. A été appliquée une enquête de l'alimentation, prise les mesures anthropométriques et calculé l'indice de masse corporelle et le pourcentage de la matière grasse de chaque athlète. On a observé que 45,3% des athlètes possédaient revenu entre 3 et 4 salaires minimaux, 63,6% avaient baccalauréat incomplet et 91% étaient célibataires. La moyenne de l'âge a été de 21,7±1,27 des années. La moyenne de masse corporelle totale a été de 81,7±7,5Kg et la stature de 186,9±4,3cm. Le pourcentage moyen de la matière grasse a été de 10,2±3,87. Combien à la qualité de l'alimentation mentionnée, 54.5% mentionneraient avoir une bonne alimentation, 27,3% régler et 18,2% mauvaise. Le pourcentage moyen de la matière grasse a été de 10,2±3,87. Combien à la qualité de l'alimentation mentionnée, 54,5% mentionneraient avoir une bonne alimentation, 27,3% régler et 18,2% mauvaise. La consommation de fruits a présenté un pourcentage levé entre les athlètes (72,7%), ainsi que celui de légumes (63,6%) et de légumes (63,6%). Le standard antropométrico de la grande majorité des athlètes a été révélé compatible avec celui décrit dans la littérature, toutefois certains présentaient haut pourcentage de la matière grasse. La consommation d'aliments considérée saine fait partie de la routine quotidienne des athlètes, mais l'alimentation de d'eux-mêmes n'est pas encore adéquate.

MÓTS-CLES: Aviron, Composition Corporelle, Consommation Alimentaire.

ESTUDIO ANTROPOMÉTRICO Y CALIDAD DE LA ALIMENTACIÓN DE LOS REMADORES DE LA CONFEDERACIÓN BRASILEÑA DE REMO.

RESUMEN

La composición corporal, evaluada por la antropometría, y la consumición alimenticia ha sido ampliamente utilizadas a la diagnosis el estado nutricional del atleta. Estos métodos permiten detectar los alborotos nutritivos que pueden comprometer el desempeño físico del atleta. El objetivo fue evaluar el perfil antropométrico y la calidad de la alimentación de los remadores, integrantes del cuerpo de infantes de marina y filiados de la Confederación Brasileña de Remo. Se ha hecho un estudio descriptivo, cuantitativo, con 11 atletas varones, voluntarios, entre 20 y 24 años de edad. Fue aplicado una averiguación de la alimentación, tomada las medidas antropométricas y calculado el índice de masa corporal y el porcentaje de la grasa de cada atleta. Se ha observado que 45.3% de los atletas poseían renta entre 3 y 4 salarios mínimos, 63,6% tenían bachillerato incompleto y 91% eran solteros. El promedio de la edad fue de 21,7±1,27 años. El promedio de masa corporal total fue de 81,7±7,5Kg y la estatura de 186,9±4,3cm. El porcentaje medio de la grasa fue de 10,2±3,87. Cuánto a la calidad de la alimentación referida, 54.5% mencionaran tener una buena alimentación, 27,3% regular y 18,2% mala. La consumición de frutas presentó un porcentaje levantado entre los atletas (72,7%), así como el de verduras (63,6%) y de legumbres (63,6%). El estándar antropométrico de la gran mayoría de los atletas se reveló compatible con el descrito en la literatura, sin embargo algunos presentaban alto porcentaje de la grasa. La consumición de alimentos considerada saludable es parte de la rutina diaria de los atletas, pero la alimentación de ellos mismos todavía no está adecuada.

PALABRAS-CLAVE: Remo, Composición Corporal, Consumo Alimentario.

ESTUDO ANTROPOMÉTRICO E QUALIDADE DA ALIMENTAÇÃO DE REMADORES DO CORPO DE FUZILEIROS NAVAIS

RESUMO

A composição corporal, avaliada pela antropometria, e o consumo alimentar têm sido amplamente utilizados para diagnosticar o estado nutricional de atletas. Estes métodos permitem detectar distúrbios nutricionais que possam comprometer o desempenho físico. Objetivou-se avaliar perfil antropométrico e a qualidade da alimentação de remadores, integrantes do corpo de fuzileiros navais e filiados a Confederação Brasileira de Remo. Realizou-se um estudo descritivo, quantitativo, com 11 atletas homens, voluntários, com idade entre 20 e 24 anos. Aplicou-se uma anamnese alimentar, foram tomadas as medidas antropométricas e calculados o Índice de Massa Corporal e o percentual de gordura de cada atleta. Observou-se que 45,3% dos atletas possuem renda entre 3 e 4 salários mínimos, 63,6% tinham segundo grau incompleto e 91% eram solteiros. A média de idade foi de 21,7±1,27 anos. A média de peso foi de 81,7±7,5Kg e de estatura de 186,9±4,3cm. O percentual médio de gordura foi de 10,2±3,87. Quanto à qualidade da alimentação referida, 54,5% referiram apresentar uma alimentação boa, 27,3% regular e 18,2% ruim. O consumo de frutas apresentou um percentual elevado (72,7%), bem como o de verduras (63,6%) e legumes (63,6%). O padrão antropométrico da grande maioria dos atletas mostrou-se compatível ao descrito na literatura, embora alguns apresentassem o percentual de gordura elevado. O consumo de alimentos considerados saudáveis faz parte da rotina diária dos atletas, mas a alimentação dos mesmos ainda não está adequada.

PALAVRAS-CHAVE: Remo, Composição Corporal, Consumo Alimentar.