152 - DIETETIC EVALUATION IN ATHLETES OF DIFFERENT SPORTS MODALITIES

GILBERTI HELENA HÜBSCHER; MARIA HELENA WEBER.
Centro Universitário Feevale, Novo Hamburgo, RS, Brazil
helenaweber@feevale.br

INTRODUCTION

Studies have showed that athletes' performance and health can be enhanced through dietetic modifications. There is little opposition to researches that prove the beneficial effects to health, favorable changes in body composition and better performance (SBME,2003). Nutritional necessity is influenced by a number of individual factors. Frequency, intensity and duration of training must be taken into consideration (Maughan & Burke, 2004). The athlete must adequate energy intake from 37 to 41 kcals/kg of body weight a day, and depending on their objectives, caloric rate can vary between 30 and 50kcal/kg/day (SBME,2003; GONZÁLEZ-GROSS et. al. 2001)

Adequate carbohydrate availability is fundamental to physical activity development. Carbohydrates are the most efficient fuel and require less quantity of oxigen for their oxidation than fat and protein. Therefore, the recommended intake of carbohydrate must be enough to maintain glycogen reserves (MELVIN, W. H. 2002).

A daily intake between 60 and 70% of carbohydrate calories is believed to be necessary to supply the exercises demmands as well as to replace losses caused by daily training (BURKE,2001; MAUGHAN & BURKE, 2004). According to Burke (2001), in order to maintain and/or even increase glycogen reserves during training periods, an intake of 6 to 10g of carbohydrates per kg of body weight is recommended, whereas SBME (2003) suggests that between 5 and 8g/kg/day should be ingested and for long duration activities and/or intense physical efforts it would be necessary an increase up to 10g/kg of body weight/day. The recommendation (RDA, 2000) of proteins to sedentary people varies between 0.8 and 1.2g/kg body weight(BW)/day, but for athletes healing injuries inducted by exercising in muscular fibers, small quantity use of protein as energy source and increase on the muscular mass, the quantity must be increased (ACSM, 2004)

According to Tarnopolsky (1999), the resistance athletes should ingest from 1.2 to 1.6/kg BW/day and strength athletes from 1.2 to 1.7g/kgBW/day, whereas SBME (2003) reccomends intake of 1.2 to 1.6 and 1.4 to 1.8g/kgBW/day respectively. Fat is a concentrated source of energy that helps satisfy energy necessities of training. It also plays an important structural role in biological membranes and is used in hormone synthesis as well as carriers of liposoluble vitamins. To people who do physical activities regularly it is recommended that fat represents 25% and not more than 30% of the total calories (SBME,2003).

Despite athlete's concern about performance, lack of knowledge, wrong eating habits and the influence of advertising are the main factors that lead them to using nutritional supplementation and to adopting eating habits that may not guarantee the best results in competition (PAMPLONA; KAZAPI, 2004). According to González-Gross et al (2001) both professional and amateur sportspeople frequently forget to include a diet plan and optimal hydration guidelines within the global strategy of preparation for sports practice. Studies have showed that low caloric intake doesn't cover necessities of energy and aditional nutrients which are imposed by training (RIBEIRO et al. 1999).

This study aimed to assess athletes' dietetic profile in different sports modalities, to assess calories and macronutrients consumption (carbohydrates, protein and fat).

METHODOLOGY

A nutritional evaluation was done to verify stature, weight and eating habits of 40 athletes, 10 footballers, 15 swimmers (7 men, 8 women) and 15 handballers, participants in the project “Nutrição Desportiva” by Feevale in the city of Novo Hamburgo, Rio Grande do Sul Brasil. For measuring weight a *Filizola* ™ scale with accuracy up to 100 gram was used and for measuring height a stadiometer *Gofeca* ™, with accuracy of up to milimeters(mm), fixed on a wall, without baseboard. The athletes were barefoot and wearing a minimum of clothes.

Afterwards, food intake was assessed. As a final stage an indiviual interview took place, the “24h recall inquiry” (R24), and after that athletes were given a “food control table” where they registered their daily consumption of food and their respective amounts for seven days. Food consumption was analyzed by means of the software “DietWin Clínico 3.0” and compared to recommendation proposed by *Sociedade Brasileira de Medicina do Esporte* (SBME, 2003).

This project was authorized by Comitê de Ética em Pesquisa do Centro Universitário Feevale RS, Brasil. All athletes gave voluntary, written informed consent prior to participation in this study. Statistical Analysis: After data were processed, they were treated through descriptive analysis (SPSS v.12.0) for determination of means, standard deviations and percentages.

RESULTS

The sample features related to the means and standard deviations for athletes' age, stature and weight according to their sport can be observed in table 1.

TABLE 1 - Means and standard deviations for athletes' age, height and body mass according to sport modality.

Variables	Swimmng (Female)	Swimming (Male)	Soccer	Volleyball
Age	22 ± 10.2	15.86 ± 1.77	18 ±0.66	24.33± 4.35
Height (cm)	165.13 ±8.45	176.29 ± 8.95	174.9 ±7.63	195.76 ± 5.9
Body Mass (Kg)	59,45 ± 9,83	65,3 ± 10,14	71,8 ± 10, 48	94,82 ± 8,91

Regarding the carbohydrate and calories quantities, we verified that athletes of all modalities presented with an intake under recommendation (37 to 41 kcal/kg/day; 5-10g/kg/day respectively. (Tables 2).

The most significant imbalance was observed among female swimmers. 75% of them presented with inadequate energetic consumption and 87.5% presented with insufficient carbohydrate quantity. (Table 2).

Protein and fat consumption was also inadequate, showing consumption over or under recommendation (1.2 to 1.6g/kg/d; 25 to 30% respectively) for most athletes (Table 2).

TABLE 2 - Calories and macronutrients consumption: Percentage distribution according to sport modality practiced and recommendation (RDA y SBME)

Variables	Recommendation	Swimming (Female)	Swimming (Male)	Soccer	Volleyball
Calories (Kcal/Kg/d)	37 to 41 Kcal/Kg/d	75 % #	28.6% #	40 % # 10 % ?	40 % #
Carbohydrates (g/Kg/d)	5-10g/Kg/d	87.5 % #	28.6 % #	50 % #	60 % #
Proteins (g/Kg/d)	1,2 to 1,6g/kg/d	12.5 % # 27.5 % ?	28.6 % # 43 % ?	20 % # 40 % ?	20 % # 26.7% ?
Fat(%/d)	25 to 30%	62.5 % # 25 % ?	57 % # 29 % ?	60 % # 20 % ?	20 % # 26. 7% ?

Below or ? above recommendation *(RDA y SBME)*
Kcal/Kg/d = calories per Kg of body mass a day; g/Kg/d= gram per kg of body mass a day;
%/d = total lipid percentage a day;

DISCUSSION

Regarding calories quantities, we verified that athletes of all modalities had calories intake lower than recommedation. But the highest percentage of inadequacy was observed among female swimmers. 75% of them presented with energetic consumption under recommendation (Table 2).

Studies like the as of Pamplona and Kazapi (2004), and as of Ribeiro (1999), carried out with swimmers have showed that most of the athletes present with insufficient consumption of calories, usually due to low carbohydrate intake and this is also true for this study, seeing that 87,5 of the athletes swimmers presented with carbohydrate intake under recommendation (5g/kg/d) (Table 2).

According to Bernardot (1989), female swimmers usually limit their calories intake in order to reduce body mass so that they have better professional performance. Although Bernardot's studies were made with gymnasts and ballerinas, there was similarity to this study.

Regarding protein consumption, we observed that 43% of the male swimmers and 40% of the soccer players consume around 2.0g/kg/day, which is above recommendation (1.6g/kg/day).

(Table 2)

Parreira et al. (2004), has verified that 29.4% of the soccer players in his studies presented with calories consumption under recommendation, and the average protein consumption (1.9g/kg/day) was also above recomendation.

Grandejean (1997) has analyzed dietetic habits in elite athletes and found values of 33 and 57% for carbohydrates, 29 to 49% for fat and 12 to 26% for proteins out of total calories ingested.

Regarding fat intake we verified that from 20 to 29% of athletes of all modalities presented with consumption above recommendation (30%). (Table 2).

Almeida et al. (2003) in studies with female volleyball players found inadequate percentages of macronutrients when compared to recommendation, distributed as follows: 20% for proteins, 48% for carbohydrates and 32% for fat. Kazapi & Ramos (1998) and Paschoal (2002) found that most athletes present with calories consumption under energetic output and higher intake of protein and fat than recommendation.

It is agreed among *American Dietetic Association, Dietitians of Canada*, and *American College of Sports Medicine (2000)* that physical activity, athletic performance and post-exercise recuperation improve with balanced eating. Recommendation is that athletes select appropriately food and drinks, using supplementation correctly, when necessary, in order to maintain perfect health and optimal performance in exercise.

CONCLUSION

Based on the results obtained in this study we can conclude that most athletes need to increase energy intake and adequate proportion between each of the macronutrients, making evident the necessity of changing eating habits in order to improve performance and health in general.

REFERÊNCIAS

SOCIEDADE BRASILEIRA DE MEDICINA DO ESPORTE (SBME). Modificações dietéticas, reposição hídrica, suplementos alimentares e drogas: comprovação de ação ergogênica e potenciais riscos para a saúde. **Rev. Bras. Med. Esporte,** São Paulo, vol.9, n. 2, p.57-68, mar./abr 2003.

MAUGHAN, R. J.; BURQUE, L. M.; **Nutrição esportiva**. Trad. Denise Regina Sales. Porto Alegre: Artmed, 2004.

GONZÁLEZ-GROSS, M. et al. La Nutrición en La Práctica Deportiva: Adaptación de La Piramide Nutricional a Las Características de La Dieta del Deportista. **Archivos Latinoamericanos de Nutrición**, Caracas, v. 51, n. 4, 2001.

MELVIN, W. H. **Nutrição: para saúde, condicionamento físico & desempenho esportivo**. 5. ed. Barueri, SP: Manole, 2002.

BURKE, L.M. Energy needs for athletes. **Can J Appl Physiol**, 26: 202-19, 2001.

NATIONAL RESEARCH COUNCIL. *Recommended Dietary Allowences (RDA).* 10. ed. Washington DC; **National Academy Press**, 1989.

AMERICAN COLLEGE OF SPORTS MEDICINE (ACSM) (2000) Disponible in: http://www.acsm.org. Acesso em 15 de setembro, 2006.

TARNOPOLSKY, M.A. Protein and physical performance. **Curr Opin Clin Nutritional Metab**. **Care**, v. 2 p. 533-7, 1999.

PAMPLONA, A.P.; KAZAPI, I.A.M. Avaliação dietética de praticantes de atividade física em diferentes modalidades esportivas: Um estudo comparativo. **Revista Nutrição em Pauta,** São Paulo, n. 66, p.61-65, maio/junho. 2004.

RIBEIRO, B.G. et al. Avaliação do Consumo de Alimentos de Atletas de Diferentes Modalidades Esportivas da Região Sudeste do Brasil. In: **XXII Simpósio Internacional de Ciências do Esporte,** 1999; São Paulo, Anais do Congresso p.86.

BENARDOT, D.; SCHWARZ,M.; HELLER, D.W. Nutrient intake in young, highly competitive gymnast. **Journal of American Dietetic Association**, Chicago, v. 89, n.3, p.401-403, 1989.

PARREIRA, L.M., LONGO, S., MARCHIONI, D.M.L. Avaliação Dietética e Antropométrica de Jogadores Profissionais de Futebol de Campo. In: V Congresso Internacional de Nutrição, Longevidade e Qualidade de Vida, nov. 2004 São Paulo.

GRANDEJEAN, A.C. Diets of elite athletes: has the discipline of sposts nutrition made na impact? **Journal Nutrition**, v.127, p.874-877, 1997.

ALMEIDA, Tania Abreu de; SOARES, Eliane Abreu. Nutritional and anthropometric profile of adolescent volleyball athletes. **Revista Brasileira de Medicina do Esporte, São Paulo,** v. 9 n. 4. jul/ago, 2003.
KAZAPI, Ileana Mourão; RAMOS, Lúcia Andréa Zanete. Hábitos e consumo Alimentares de atletas nadadores. **Revista de Nutrição,** v.11, p.117-124, 1998.
PASCHOAL, V.; KAWAI, C.M.; SOUZA, S.A. Condutas Nutricionais para Nadadores. **Rev. Nutrição & Performance**, v.15, 12-14, 2002.
JOINT POSITION STATEMENT NUTRITION AND ATHLETIC PERFORMANCE. In: **Med. Sci Sports Exerc**. v. 32 n. 12, p. 2130-2145, dec. 2000.

DIETETIC EVALUATION IN ATHLETES OF DIFFERENT SPORTS MODALITIES

ABSTRACT

The aim of this study was to assess the consumption of calories, macronutrients (carbohydrates, protein and fat) of athletes in different sports modalities. Methods: A nutritional evaluation was done to verify stature, weight and eating habits of 40 athletes, 10 footballers, 15 swimmers (7 men, 8 women) and 15 volleyball players, participants in the project "Nutrição Desportiva" by Feevale in the city of Novo Hamburgo, Rio Grande do Sul, Brazil. For measuring weight a *Filizola* ™ scale with accuracy up to 100 gram was used and for measuring height a stadiometer *Gofeca* ™, with accuracy of up to milimeters(mm), fixed on a wall, without baseboard. The athletes were barefoot and wearing a minimum of clothes. Afterwards, food intake was assessed. As a final stage an indiviual interview took place, the "24h recall inquiry" (R24), and after that athletes were given a "food control table" where they registered their daily consumption of food and their respective amounts for seven days. Food consumption was analyzed by means of the software "DietWin Clínico 3.0" and compared to recommendation proposed by *Sociedade Brasileira de Medicina do Esporte* (*SBME*). After data were processed, they were treated through descriptive analysis (SPSS 12.0) for determination of means, standard deviations and percentages. Results suggest that the calories consumption was lower than the recommended in all modalities. 75% of the female swimmers did not reach the energy recommendation; 43% of the male swimmers and 40% of the soccer players consume protein quantities above nutritional recommendation; from 20 to 29% of the athletes of all modalities consume lipid above nutritional recommendation. We conclude that most athletes should increase their energy intake and adequate the macronutrients proportion. KEY WORDS: energy consumption, sport, macronutrients.

EVALUATION DIETETIQUE DES ATHLETES DANS DIFFERENTS TYPES DE SPORT

RESUMÉ

L'objectif de cette étude était d'évaluer le nombre de calories de macronutriments des athlètes dans différents types de sports. On vérifié le poids, taille et les habitudes alimentaires de 40 athlètes, 10 hommes footballeurs, (5) dans la natation, (7) hommes et 8 femmes, et 15 de sexe masculin de volley-ball. Une enquête « recorde de 24 heures a évalué la consommation alimentaire, et par une description alimentaire de tous le jours. Ils ont écrits pour 7 jours, la consommation de nourriture et de leurs quantités respectivement. Les calories et la consumation de macronutriments ont été déterminées par l'intermédiaire d'un logiciel « le « Die win clinic 3.0 » et les valeurs par rapport aux recommandations proposées par SBME, RDA et le DRI (1989). Les résultas indiquent que la consommation de calories a été inférieure à celui recommandé par tous les types de sport. Soixante-quinze pour cent des femmes nageuses n'ont pas atteint à l'énergie recommandée ; 43% des hommes nageurs et 40% des joueurs de football consomme des quantités de protéines recommandées ci-dessus ; et de 20% à 29% des athlètes de tous les types de sport au-dessus de la consommation de lipides recommandée. On suggère que la plupart des athlètes doivent accroître l'énergie et adapter à la proportion des macronutriments. MOTS-CLES: consommation, énergie, sport et macronutriments.

EVALUACIÓN DIETÉTICA DE ATLETAS EN DIFERENTES MODALIDADES DEPORTIVAS

RESUMEN

El objetivo de este estudio fue evaluar el consumo de calorías y macronutrientes (carbohidratos, proteína y grasas) de atletas en diferentes modalidades deportivas. Métodos: fue realizada una evaluación nutricional donde se verifico el peso (P) y la talla (T), costumbres alimentarias de 40 atletas, siendo 10 practicantes de fútbol, 15 de natación (7 V y 8 M) y 15 de balonmano, en la ciudad de Novo Hamburgo, RS, Brasil. Para las mediciones del peso (P) y la talla (T) se utilizó una balanza *Filizola* , con precisión de hasta 100 gramos y un *estadiómetro Gofeca* con precisión en mm, fijado en una pared, sin zócalo. Los atletas estaban con un mínimo de ropa y descalzos. Se realizó una entrevista particular "interrogatorio de 24hs" (R24), y posteriormente se les entregó una "plantilla del control de alimentos" donde escribieron el consumo diario de las comidas y las respectivas cantidades durante una semana. El consumo alimentario fue analizado mediante la aplicación del programa "*DietWin Clínico 3.0"* y comparado con las recomendaciones propuestas por (*SBME).* Los datos, fueron tratados utilizándose el análisis descriptiva (SPSS 12.0) para la determinación de las medias, desviación-estándar y porcentajes. Resultados: se observó que los atletas de todas las modalidades tuvieron una ingestión menor de calorías de lo que se recomienda. El mayor déficit fue observado entre las nadadoras, pues un 75 % de ellas tuvieron un consumo energético inferior del recomendado. En relación al consumo de proteínas, se observó que un 43 % de los atletas de natación y un 40 % de fútbol ingieren alrededor de 2,0 g/kg/ día, cantidad superior al consumo máximo recomendado (1,6 g/Kg/día). En relación a ingesta de grasas observamos que 20 a 29 % de los atletas de ambas las modalidades presentaron un consumo arriba del recomendado (30%). Conclusiones: La mayoría de los atletas necesitan incrementar el aporte de energía y adecuar la proporción entre cada uno de los macronutrientes.

PALABRAS CLAVE: calorías, consumo, deporte, macronutrientes.

AVALIAÇÃO DIETÉTICA DE ATLETAS DE DIFERENTES MODALIDADES ESPORTIVAS

RESUMO

O objetivo deste estudo foi avaliar o consumo de calorias e macronutrientes de atletas em diferentes modalidades desportivas. Materiais e métodos: Foi realizada uma avaliação nutricional onde se verificou o peso (P), estatura (E) e hábitos alimentares de 40 atletas, 10 de futebol (masc), 15 de natação (7 homens e 8 mulheres) e15 de vôlei (Masc) participantes do projeto "Nutrição e Atividade Desportiva" da Feevale na cidade de Novo Hamburgo, RS, Brasil. Para as medidas do peso (P) e da estatura (E) utilizou-se uma balança *Filizola* , com precisão de até 100 gramas e um *estadiômetro Gofeca* com precisão em mm, fixado em uma parede sem rodapé. Os atletas estavam com um mínimo de roupa e descalços. O consumo alimentar foi avaliado através de um inquérito alimentar "recordatório de 24hs" (R24), e através de um "Diário Alimentar" onde eles anotaram por sete dias os alimentos consumidos e suas respectivas quantidades. As calorias e o consumo de macronutrientes foram determinados utilizando-se o software "*DietWin Clinico 3.0"* e comparados com as recomendações propostas pela *SBME.* Os dados foram tratados utilizando-se a análise descritiva (SPSS 12.0) para a determinação das médias, desvio padrão e percentagens. Os resultados sugerem que o consumo de calorias foi menor do que o recomendado em todas as modalidades. 75 % das nadadoras não atingiram a recomendação de energia; 43% dos nadadores (gênero masculino) e 40 % dos jogadores de futebol consomem quantidades acima do recomendado para proteínas; e 20 a 29 % dos atletas de todas as modalidades consomem lipídeos acima do recomendado. Concluímos que a maioria dos atletas deve aumentar o aporte de energia e adequar as proporções entre macronutrientes.

PALAVRAS CHAVE: calorias, consumo, esporte, macronutrientes.