

DIETARY HABITS OF BODYBUILDERS AND OTHER REGULAR EXERCISERS

F. VEGA^{1*} & RT. JACKSON²

¹ Departamento de Nutrición, Facultad de Farmacia, UCM.
Ciudad Universitaria. 28040 Madrid, Spain.

² Department of Nutrition and Food Science, University of Maryland.
3303 Marie Mount Hall, College Park, MD 20742, USA

ABSTRACT

The aim of this study was to describe dietary habits of regular exercisers attending a gym as a possible risk group for dietary patterns inadequacy, making special reference to bodybuilders, a specially vulnerable group. The sample (n=53) was divided in bodybuilders (BB n=13) and non-bodybuilders (non-BB n=40) to establish comparisons between both groups. An specific questionnaire providing information about variables affecting dietary habits was designed. The 24-hour recall for one weekday was used to obtain dietary information. All food intake data were evaluated for five food groups -dairy, meat, grain, fruit, and vegetables- using standard serving sizes and compared with the Food Guide Pyramid (FGP) developed by the USDA for active people. Energy and macronutrient intakes and dietary variety were also assessed. Results demonstrated a concern among members of the sample about achieving an optimal nutritional condition and a tendency to overdo their practices in order to obtain the ideal body shape: (a) BB emphasized the consumption of certain foods -meats (8.6 ± 4.0 and 6.6 ± 5.1 servings for men and women) and potatoes (5.4 ± 5.6 in women) in expenses of others that were not adequately consumed -colored vegetables (1.4 ± 2.0 and 2.1 ± 2.4) and dairy in women (0.6 ± 0.9); (b) non-BB calorie intake was below the recommendations for active people according FGP (1848 ± 608 and 1890 ± 1219 kcal for men and women), but the distribution among food groups was more balanced than BB'. The most omitted food groups were: colored vegetables, 41%; dairy products, 26% and fruit, 21%, putting the studied individuals at risk for marginal micronutrient intakes. Potatoes, poultry, tuna and pasta were the most commonly consumed foods while fat, sweets, pork and red meat were avoided.

Key words: dietary habits, bodybuilders, regular exercisers, food group intake, diet variety.

* Author to whom all correspondence and reprints request should be addressed

INTRODUCTION

Physical training is widely spread among the general population as is shown in the great number of gyms existing in the metropolitan areas. Participation in sport is frequently an incentive for learning about nutrition and what constitutes an optimum diet (1). This concern makes of regular exercisers a target group for a variety of nutrition messages, some legitimate and accurate and others of questionable validity (2). Paradoxically, people who give greater importance to nutrition may be more vulnerable to influence by inaccurate and incomplete information (3). Therefore, some health professionals believe there is no area of nutrition where faddism and misconceptions are more apparent than in athletics and the need for education of this group of population has been widely reported (4,5). Bodybuilders may be an exact example of this as the description of their extreme dietary habits shows (1,6).

Most of the studies on athletes are focused in analyzing energy and nutrients intake but to make an effective nutrition counseling and education it is also necessary to study food habits and factors influencing them -preferences, knowledge, goals looked through the diet, etc. The five food group system has been established as an efficient tool for nutritional assessment and screening diets for the number of food groups consumed can provide meaningful information about diet variety and quality (7,8). On the other hand, there is very little information describing diet strategies and practices of people attending gyms despite they may constitute a large and significant community for nutrition intervention.

For all this, the purpose of this study was to describe dietary habits of regular exercisers attending a gym as a possible risk group for dietary patterns inadequacy and making special reference to bodybuilders.

METHODS AND SUBJECTS

A descriptive study on regular exercisers was carried out to get information on: (a) factors conditioning dietary habits, (b) food group intakes compared with the Food Guide Pyramid recommendations and (c) dietary variety as an index of diet quality.

Fifty-three members, 28 males and 25 females, of a large gym in a metropolitan area in Maryland (USA) were recruited by placing a flyer on a bulletin board during two weeks. The flyer described the study objectives and offered the participants the possibility to get information on personal dietary assessment. The sample was divided in two groups: bodybuilders (BB) (n=13) and non-bodybuilders (non-BB) (n=40). The non-BB category included people practicing aerobics and/or using bike, treadmill, etc. among other facilities in the gym.

A general questionnaire was designed to provide information about different variables: health practices, activity and training regime, criteria for food selection, changes in food patterns during the week, basic sport nutrition knowledge and food preferences and aversions.

To describe their dietary habits the 24-hour recall for one weekday was used. All diet intake data were evaluated for five food group intake -dairy, meat, grain, fruit, and vegetable -using standard serving sizes. Meat group included: meats, poultry, fish, dried beans and eggs. Grain group included breads, cereals, rice and pasta. Mixed dishes were divided into their components using the descriptions given by the participants. To assess food dietary intake, serving sizes for each food group were compared with the Food Guide Pyramid (FGP) developed by the USDA (8). According the suggested calorie levels for active people, men were included in the 2,800 and women in the 2,200 calorie levels respectively. The number of daily servings suggested for that levels are shown in Table 1. Two servings were chosen for dairy between the 2-3 indicated in the FGP, to evaluate if individuals met at least the minimum required. Potatoes and colored vegetables were also studied separately within the vegetable group. Subjects' use of supplements was not considered due to the objective of assessing food intake. All diet record data were analyzed using the nutritionist software package (N-squared computing; Silverton, OR) for the intakes of energy and macronutrients.

TABLE 1

Food Guide Pyramid for active men and women

Food Group	Men 2,800 kcal	Women 2,200 kcal
Dairy	2*	2*
Meat	3	3
Grain	11	9
Fruit	4	3
Vegetable	5	4

USDA (11)

* USDA guidelines are 2-3

Dietary variety can be defined as including appropriate number of foods from each of the major food groups (9,10). To evaluate it, the Food Group Score (FGS) as described by Kant et al. was used (11). The FGS counts the number of food groups used; one point is scored for each group consumed, being the maximum score 5 and one serving the lowest amount to be given a score. A Variety Ratio (VR) between the mean FGS and the actual number of servings consumed by each group of the sample was calculated. This adjustment by amount of food consumed is a way to consider the possibility that individuals with greater intakes are more likely to include foods from every group. The consumption of different food items within each food group was also evaluated. To determine its frequency, we established a score in which each food item reported for each individual counted as one, even when it was consumed in less than one serving.

A t test was used to make statistical comparisons between the two groups. The level of significance was established at $p < 0.05$.

RESULTS AND DISCUSSION

General questionnaire: Subjects were concerned about their diets and achieving an optimum nutritional condition: a high percentage (62%) followed as the main criterion for their food choices the nutrition information and counsels. Carbohydrates and protein were the nutrients considered most important for exercise (60%) and fat the most detrimental (30%), as we also observed studying elite athletes during the Barcelona'92 Olympic Games (12). Vegetables (35%) and pork/red meat (25%) were the most unpopular foods, those meats probably because are associated with the idea of high fat content. Food preferences by sexes

TABLE 2Descriptive data ($\bar{x} \pm SD$) of the sample

Variable	Males		Females	
	BB	non-BB	BB	non-BB
	n=8	n=20	n=5	n=20
Age (years)	28.5 \pm 5.5	34.3 \pm 9.3	29.8 \pm 4.6	29.4 \pm 9.8
Height (cm)	175 \pm 6.0	176.7 \pm 6.6	172 \pm 6.8	160.7 \pm 10.4 *
Weight (kg)	84.6 \pm 11.6	79.7 \pm 10.5	60.0 \pm 3.7	60.2 \pm 11.5
Years of schooling	16.0 \pm 2.4	15.4 \pm 2.4	14.6 \pm 1.9	14.9 \pm 2.4
Years training	6.3 \pm 4.5	6.4 \pm 9.1	3.2 \pm 1.9	5.2 \pm 5.5
Hours training/week	10.0 \pm 2.8	6.0 \pm 2.4 #	9.8 \pm 4.4	6.3 \pm 2.9
Entering competitions (n)	5	0	2	1

* p < 0.05 # p < 0.005

TABLE 3

Food Group consumption (servings)

Food group	Males		Females	
	BB	non-BB	BB	non-BB
Dairy	2.8 \pm 2.0	1.9 \pm 1.8	0.6 \pm 0.9	1.4 \pm 1.0
Meat	8.6 \pm 4.0	3.5 \pm 3.4 *	6.6 \pm 5.1	1.7 \pm 1.3 @
Grain	7.8 \pm 11	4.9 \pm 3.6	6.1 \pm 2.9	4.4 \pm 2.4
Fruit	3.4 \pm 2.6	2.0 \pm 1.6	2.6 \pm 2.7	1.5 \pm 1.5
Vegetable	3.6 \pm 2.3	2.2 \pm 1.8	7.5 \pm 6.8	2.3 \pm 2.4 #
Potatoes	2.2 \pm 2.3	1.4 \pm 1.3	5.4 \pm 5.6	1.1 \pm 1.2 #
Colored vegetables	1.4 \pm 2.0	0.7 \pm 1.1	2.1 \pm 2.4	1.2 \pm 1.5

* p < 0.05 #p < 0.01 @p < 0.001

were in accordance with those for the general population (13,14): males reported vegetables among the dislikes and foods high in protein among the likes more frequently than females (41 vs 28% and 32 vs 8% respectively). Men preferences were for foods rich in the nutrients considered important for performance: complex carbohydrates and protein. That was not the case of women; one third of them reported as their favourite foods those with a high content of refined sugars, considered detrimental by 20% of the sample. Faber and Spinnler-Benadé have also observed in athletes a greater preference for sweets in the case of the females (15).

Food group intake adequacy to the FGP: Most of the individuals had a dietary control, only 30% reported relaxing it during the weekends. Mean number of meals eaten per day by BB was significantly greater than for non-BB (6 vs 4), being their intakes greater for all food groups, except for dairy among females (Table 3), which led to a greater calorie intake in BB: 3835 ± 1488 vs 1848 ± 608 kcal in men ($p < .0001$) and 2521 ± 1264 vs 1890 ± 1219 kcal in women. BB energy consumption exceeded the considered 2800 and 2200 kcal respectively, while non-BB, specially men, did not reach that values.

For BB' diets the results showed: (a) grain, fruit and colored vegetables did not meet the FGP guidelines but the grain intake was balanced with the high potatoe consumption (2.2 ± 2.3 and 5.4 ± 5.6 servings for males and females respectively), reaching a total carbohydrate intake of 506 ± 281 and 392 ± 173 g (b) meat intake was more than double the FGP suggested number of servings (8.6 ± 4.0 and 6.6 ± 5.1 respectively). Their excessive concern with meats as necessary for muscle development has been reported before by Hickson et al. and Kleiner et al. among others (1,4). Protein consumption reached 262 ± 104 and 158 ± 99 g for both sexes, although it has been demonstrated that large intakes of protein-rich foods are unnecessary for bodybuilding purposes (16,17); (c) among females dairy consumption was very poor (0.6 ± 0.9 servings). Low dairy products intake seems to be some frequent for female athletes as has also been described in other studies (18). BB tended to overdo their dietary behaviour emphasaziying the consumption of certain foods in expenses of others that were not adequately consumed. They also had standard diets with none or few variations during weekends. It is noticeable that among five of them -four of whom entered competitions- who followed the same dietary pattern every day, only two reported consuming colored vegetables, three did not eat dairy products and one of those three did not consume any fruit either. It may be unfortunately the case for BB that the more accomplished the athlete the more susceptible is to worse quality diets.

Due to non-BB low energy intake, their food intake did not reach the FGP guidelines for any group, except for dairy and meat among males, making it difficult to get adequate amounts of micronutrients. A consumption of 260 ± 113 and 249 ± 167 g of carbohydrates for men and women respectively and 70.8 ± 32.1 and 78.0 ± 29.8 g of protein was observed.

Diet composition for the whole sample showed a tendency to avoid fat in different ways: (a) in dairy products (87%), (b) in their cooking procedures, using mainly baked and boiled foods, (c) in the utilization of dressings, 90% ate plain baked potatoes, pasta, or rice. This is in accordance with the idea of fat as detrimental for performance showed by almost one third of the individuals. Fat consumption, for men ando women respectively, amounted 89 ± 53 and 37 ± 26 g among BB and 56 ± 26 and 68 ± 63 g among non-BB.

Food group variety and foods utilization: The sample demonstrated a lack of understanding about the value of eating a wide variety of foods as was shown by the fact that 80% of the females and 46% of the males scored below 5; that is, they did not consume at least one serving of food from each of the groups on the survey day (Table 4). The percentage of the sample reporting less than one serving of each food group was: vegetables other than potatoes, 41%; dairy, 26%; fruit, 21%; meat, 15% and grain, 6%. Poor vegetables and fruit intakes -based on fruit juices on a high percentage- is also a normal pattern for the general American population (9,19). These results could put them at risk for nutrition deficiencies. Despite non-BB lower intakes, according the VR (Table 4), non-BB distribution among food groups was more balanced.

TABLE 4

FGS frequency distribution of the studied diets

	FGS % *				Mean FGS (\pm SD)	VR#
	0-2	3	4	5		
Males						
BB	0	0	37.5	62.5	4.6 \pm 0.5	0.18
Non-BB	5	20	25	50	4.2 \pm 0.9	0.28
Females						
BB	0	20	60	20	4.0 \pm 0.7	0.15
Non-BB	10	10	60	20	3.9 \pm 0.8	0.40

* The Food Group Score (FGS) counts the number of food groups reporting at least one serving consumed. One point is counted for each food group consumed

Variety Ratio (VR) corresponds to the ratio between the mean FGS and the mean total number of servings consumed by each group of the sample

Among the foods most widely used (Table 5) the ones consumed in the greatest amounts and which therefore best characterize the participants' diets were in grams (edible): poultry (230), potatoes (208), tuna (196) and pasta (75). Egg consumption was restricted to BB, with a mean intake of 7.3 egg whites (2-20 range).

In conclusion, the results of the present study demonstrate that despite bias due to the somewhat selective participation, they all were volunteers, and their diet awareness, regular exercisers failed, specially the BB, in practicing the basic nutrition principles, as the need of variety, to get balanced diets. Concern about weight and the consecution of certain goals -maximizing muscle mass while minimizing body fat, among BB- were major determining factors in their food choices. These results are consistent with those found in other studies that underline the need for nutrition education of people involved in physical training programs (5,6,20). It is necessary to emphasize the appropriate foods selection from the different food groups and to increase the consumption of: a) colored vegetables, b) dairy products, specially among females and c) foods with high nutrient density for those with low calorie intakes.

TABLE 5

Food utilization in the survey day
(more than 25% of the sample)

Food	%	Foods	%	Foods	%
Dairy group		Fruit group		Drinks	
milk	72	banana	51	diet coke	43
cheese	43	fruit juices	49	coffee	36
Meat group		Vegetable group		Pastry	
poultry	43	potatoes	53	muffins	26
tuna fish	32	tomatoes	30	cookies	26
Grain group		lettuce	28		
ready to eat cereals	49	broccoli	28		
white bread	40				
pasta	34				

Our experience with a group of athletes during the XXV Olympic Games (21) showed that making exact and complete information about composition of foods and nutrition principles available for exercisers is necessary and so, the presence of dietitians in gyms is required, as regular exercisers may not have the reliable sources of information as the elite athletes have.

REFERENCES

- 1 Hickson JF, Johnson TE, Lee W, Sidor RJ. Nutrition and the precontest preparations of a male bodybuilder. *J Am Diet Assoc* 1990; 90:264-267.
- 2 Barr SI. Nutrition knowledge of female varsity athletes and university students. *J Am Diet Assoc* 1987; 87:1660-64.
- 3 Wise A, Liddell JA, Lockie GM. Food habits and nutrition education - computer aided analysis of data. *Hum Nutr Appl Nutr* 1987; 41A:118-134.
- 4 Brotherhood JR. Nutrition and sports performance. *Sports Med* 1984; 1:350-389.
- 5 Leaf A, Balniki K. Eating for health or for athletic performance? *Am J Clin Nutr* 1989; 49:1066-9.
- 6 Kleiner SM, Bazzarre TL, Litchford MD. Metabolic profiles, diet and health practices of championship male and female bodybuilders. *J Am Diet Assoc* 1990; 90: 962-967.
- 7 Kant AK, Schatzkin A, Block G, Ziegler RG, Nestle M. Food group intake patterns and associated nutrients profiles of the US population. *J Am Diet Assoc* 1991; 91:1532-1537.

- 8 United States Department of Agriculture. The Food Guide Pyramid. Home and Garden Bulletin No. 252. Washington, D.C.: GPO, 1992.
- 9 Krebs-Smith SM. The effects of variety in food choices on dietary quality. *J Am Diet Assoc* 1987; 87:897-903.
- 10 Krebs-Smith SM, Clerk LD. Validation of a nutrient adequacy score for use with women and children. *J Am Diet Assoc* 1989, 89:775-780, 783.
- 11 Kant AK, Block G, Schatzkin A, Ziegler RG, Nestle M. Dietary diversity in the US population, NHANES II, 1976-1980. *J Am Diet Assoc* 1991; 91:1526-1531.
- 12 Moreiras O, Varela G, Vega F, Ortega R, Carbajal A. Barcelona'92 Olympic Games: Nutritional Programme. 15th International Congress of Nutrition. Adelaide, 1993.
- 13 Nicklas TA, Webber LS, Thompson B, Berenson GS. A multivariate model for assessing eating patterns and their relationship to cardiovascular risk factors: The Bogalusa Heart Study. *Am J Clin Nutr* 1989;49:1320-7.
- 14 Waslien CI. Factors influencing food selection in the American diet. *Adv Food Res* 1988;32:239-269.
- 15 Faber M, Spinnler-Benade AJ. Mineral and vitamin intake in field athletes (Discus-, Hammer-, Javelin- Throwers and Shotputters). *Int J Sports Med* 1991; 12:324-327.
- 16 Anonymus. Position of the American Dietetic Association: Nutrition for physical fitness and athletic performance for adults. *J Am Diet Assoc* 1987; 87:933-9.
- 17 Tarnopolsky MA, McDouglas D, Atkinson SA. Influence of protein intake and training status on nitrogen balance and lean body mass. *J Appl Physiol* 1988; 64(1):187-193.
- 18 Perron M, Endres J. Knowledge, attitudes and dietary practices of female athletes. *J Am Diet Assoc* 1985; 85:573-76.
- 19 Patterson BH, Block G, Rosenberg WF, Pee D, Kahle LL. Fruit and vegetables in the american diet: data from the NHANES II Survey. *Am J Publ Health* 1990; 80:1443-1449.
- 20 Anonymous. Position of the American Dietetic Association and Canadian Dietetic Association: Nutrition for physical fitness and athletic performance for adults. *J Am Diet Assoc* 1993; 93(6):691-696.
- 21 Varela G, Ortega R, Moreiras O, Carbajal A, Vega F. Programa nutricional para las Villas Olímpicas de Barcelona'92. Departamento de Nutrición y División de Alimentación del Comité Organizador de la Olimpiada de Barcelona. Campofrío SA, 1992.

Accepted for publication December 12, 1994.