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Nutritional and anthropometric profile of selected kabaddi players

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Abstract

Provision of sufficient nutrients and energy to meet metabolic needs for optimal functioning of the body constitutes what one refers to as a 'nutritionally adequate' diet. In the development and maintenance of top physical performance, diet plays a vital role, a fact recognized long before nutrition became a science of its own. Despite intense interest and effort in research related to optimal performance, the dietary regime to support such achievements requires a level of nutrition knowledge and practice that may not be present. Factors effecting requirements for and availability of nutrients include physical and nutritional status, age and genetic make-up of individuals. These are further compounded by man's ability to adapt according to his needs, thus making effective analysis of the relationship of diet to optimal performance much more difficult than it has been envisaged. Kabaddi is a contact sport that alternates aerobic and anaerobic activity, thus requiring muscular strength and power capability. The athlete must possess flexibility, strength, power, agility and aerobic fitness to practice it. In the light of the above, the objective of the present study was to assess the nutritional and anthropometric profile of selected kabaddi athletes in the city of Bulandshahar, Uttar Pradesh.

Keywords: Nutrients, anthropometric measurement, kabaddi, hemoglobin, BMI

Introduction

Materials and methods

Selection of Sample

The study was conducted on kabaddi players of Panipat city, belonging to the age group of 18-22 years. The samples were selected purposively for the study. The nutritional status of subjects was assessed by nutritional anthropometry, hemoglobin estimation and diet survey. The anthropometric data were further used for computing BMI, by the formula expressed as the ratio of weight in kgs to height in square meters. Further individuals were classified into different classes based on WHO (2002) classification for Asian adults. The abdominal obesity was judged by waist to hip ratio.

Diet survey was conducted to elicit the information regarding dietary habits, through 24 hours dietary recall method was employed and the nutrient intake was computed for all the subjects and compared with RDA (ICMR, 2004). The raw food equivalents of cooked foods were computed from the standardized cups.

Blood Hb levels were estimated using Sahil's Hemoglobin meter as it was convenient to use in the stadium premises and their mean Hb levels were compared with WHO standards.

Results and discussion

Anthropometric Profile

The anthropometric measurements such as Height, Weight, Waist circumference, Hip circumference, Waist-to-hip ratio, mid upper arm circumference (cm), Hemoglobin of the selected Kabaddi Players are given in Table 1. The mean height of the Kabaddi players was 183.34cms. And mean body weight was 70.21 kg with a mean BMI of 20.82.

The waist (79.6 cm) and hip circumference (90.65 cm), waist to hip ratio (0.82) and mid upper arm circumference (27.9 cm) were within the normal range which may be because, the kabaddi players need to develop strength and good body positioning to withstand contact in game and hence gaining lean body mass is crucial for kabaddi players. Fleck mentioned that among all sports Kabaddi, Basketball, Volleyball and Rowing players have lean body mass higher than the athletes of other sports modality. The mean hemoglobin level of kabaddi

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players was 12.88 g/100ml which was considered as less because; the hemoglobin level of a sportsmen should be > 14 g/100 ml. Care has to be taken to overcome this deficiency because iron deficiency anaemia impairs work capacity and results in reduced resistance to infection. It was also found that many athletes have iron deficiency anaemia and suggested systematic screening and adequate treatment.

Table 1: Mean anthropometric and Bio Chemical measurement of subjects

| Anthropometric and Hemoglobin Parameters | Mean |
|--|--------|
| Height (cm) | 183.34 |
| Weight (kg) | 70.21 |
| BMI | 20.82 |
| Waist circumference (cm) | 79.60 |
| Hip Circumference (cm) | 90.65 |
| Waist-to-hip ratio | 0.82 |
| Mid upper arm circumference (cm) | 27.90 |
| Hemoglobin (g/100ml) | 12.88 |

The data on classification of kabaddi players based on BMI is presented in Table 2, and it is clearly noticed that around 66 percent of the players were in the normal category (BMI 18.5 – 24.9). About 19 percent were under weight (BMI <18.5) this may be due to the adolescent age group. Around 9 percent of them were overweight i.e., BMI >25 percent, followed by obese grade I (BMI >30) who were around 6 percent. None of them were found to be in obese II group (BMI >35).

Table 2: Distribution of subjects according to body mass index (N=36)

| BMI Classes | Presumptive diagnosis | Frequency | Percentage |
|-------------|-----------------------|-----------|------------|
| < 18.5 | Under Weight | 6 | 18.75 |
| 18.5-24.9 | Ideal BMI | 21 | 65.62 |
| >25.0-29.9 | Over Weight | 3 | 9.37 |
| >30.0-34.9 | Obese grade I | 2 | 6.25 |
| >35.0-39.9 | Obese grade II | – | – |

Body Mass Index (WHO, 2002) >40.0 Grade III

Our Indian athletes face several barriers to achieve a good nutritional status mainly because of cereal based and vegetarian food habits when compared with non-vegetarian food habits of other western countries. Other reasons may be increase in price of food, tonic, sports supplements and medicines and also due to lack of nutrition knowledge, dietary extremism, poor practical skills in choosing or preparing meals, athletics are lagging behind in building sound endurance capacity. Athletes with less than optima nutritional status results in decreased endurance capacity and hence compromise their physical performance.

Nutrient intake

Mean food adequacy of the Kabaddi players are presented in the Table 3. The habit of eating fruits, eggs and sweets every day hence, adequacy was more than 100 percent for pulses, fruits, fats and oils, sugars and egg. Mean intake of cereals was 439g which was below the SDA (Suggested Dietary Allowance) level which is 550g with mean percent adequacy of 80 percent.

Most of the players believed that milk, fruits and non-vegetarian foods were proper food choices for increasing their strength rather than eating vegetables (10.85g and 83.62g) was below the SDA level (150g and 200g) with mean percent adequacy of around 7 percent and 42 percent

respectively. The mean percent adequacy for roots the tubers was around 68 percent with mean intake of 102g which was below the SDA level (150g). The inadequate consumption of food groups by the Kabaddi players in the present study may be due to lack of awareness about SDA. The sportsperson’s diet should be high in carbohydrate, low in fat and moderate in protein. Around 60-70 percent of total energy should be derived from carbohydrates. 25-30 percent from fat and 10-15 percent from protein.

Kabaddi players in the present study, had a marginal nutrient intake of energy (Table 4) as the diet provided 51 percent of calories from carbohydrate, 10 percent from protein and 35 percent from fat, which adhere closely to the recommendations of Satyanarayana *et al.* The percent of total energy from fat were higher than the recommendations where as carbohydrates and protein were lower than the recommendations, this may be due to excess consumption of fats and oils and also inadequate consumption of milk and animal foods by the subjects as observed in the Table 3.

The mean percent of adequacy of players for niacin and iron was less than 50 percent while thiamine, riboflavin and calcium was less than 80 percent when compared to the intake of folic acid, potassium and zinc which was more than 90 percent. This may be because of low intake of green leafy vegetables and other vegetables (Table 3). More than 90 percent adequacy of folic acid, potassium and zinc may be due to regular consumption of foods like fruits, curds, cereals and pulses.

Table 3: Mean Food Adequacy of Kabaddi Players (N=36)

| Food Groups (g) | SDA | Intake | % Adequacy |
|------------------------|-----|--------|------------|
| Cereals | 550 | 438.83 | 79.78 |
| Pulses | 40 | 79.09 | 197.72 |
| Green Leafy Vegetables | 150 | 10.85 | 7.23 |
| Other Vegetables | 200 | 83.62 | 41.81 |
| Roots and Tubers | 150 | 101.54 | 67.69 |
| Fruits | 150 | 135.58 | 90.38 |
| Milk | 750 | 566.54 | 75.50 |
| Fats and Oils | 50 | 90 | 180 |
| Nuts and Oil Seeds | NA | 46.93 | – |
| Sugars | 80 | 95.70 | 119.62 |
| Egg | 100 | 98.75 | 98.75 |
| Animal Foods | 250 | 182.22 | 72.80 |

* SDA (Suggested Dietary Allowance)

Source: Satyanarayana *et al.* (1985)

Table 4: Mean percent adequacy of nutrients by subjects (N=36)

| Nutrients | RDA | Actual intake | % Adequacy |
|----------------------|----------|---------------|------------|
| Energy (kcal/d) | 4320 | 3546 | 82 |
| Protein (g/d) | 100-120 | 95 | 86.36 |
| Fat (g/d) | NA | 140.83 | – |
| Carbohydrates (g/d) | 250-1200 | 452.27 | 62.38 |
| Retinal (ug/d) | 900 | 747.12 | 83.01 |
| Ascorbic acid (mg/d) | 100-120 | 71.35 | 64.86 |
| Folic acid (ug/d) | 400 | 385.12 | 96.28 |
| Thiamine (mg) | 3-4 | 2.57 | 1.42 |
| Riboflavin (mg) | 3-4 | 2.3 | 65.71 |
| Niacin (mg) | 40-50 | 22.35 | 49.60 |
| Zinc (mg/d) | 11 | 10.1 | 91.81 |
| Iron (mg/d) | 50-75 | 26.11 | 41.77 |
| Potassium (mg/d) | 2000 | 1935.56 | 96.77 |
| Calcium (mg/d) | 1000 | 794.58 | 79.45 |

*RDA-Recommended Dietary Allowance

Low intake of iron by athletes was reported by Tingler and Schiller. Sohni and Singh observed inadequate nutrient intake of riboflavin (67.71%) and iron (41.77%) by sportsmen and women.

The other limiting nutrient observed was niacin in which the diet of 6 subjects did not meet the RDA. The role of niacin, as a control agent that aids in converting protein to glucose and oxidizes glucose to release controlled energy, makes it an important component in the diet of sportsmen.

Supplementation is necessary only if the diet is unbalanced, however, judging from the overall results, the deficiency was probably due to inadequate intake of food sources rich in niacin by some subjects during the centralized training period. It was also interesting to note that the percentage contribution of protein, fat and carbohydrate to total energy intake of the subjects corresponds well to healthy eating guidelines of 10- 15% for protein 25-30% for fat and 60-70% for carbohydrates.

Summary and conclusion

The study revealed that, most of the kabaddi players in the present study have tall, muscular, well balanced physique however; the players had varying anthropometric variables depending on the genetic variation and most of them were having BMI ranged between 18.5-22.9. Kabaddi players were having average hemoglobin level. They were in the habit of consuming high calorie foods.

With regard to foods and nutrient intake it can be concluded that, all the Kabaddi players were having marginal food intake and the adequacy was very less for green leafy vegetables and other vegetables. Whereas it was comparatively high for pulses, fruits, fats and oils, sugars and egg. Therefore, the mean percent adequacy of players for niacin and iron was less than 50% while thiamine, riboflavin and calcium was less than 80% when compared to the intake of folic acid, potassium and zinc which was more than 90%, it may be due to regular consumption of foods like fruits, curds, cereals and pulses. Low intake of food revealed that there is a need to improve the dietary practices of Kabaddi players.

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