

An Assessment of Energy Intake And Energy Expenditure Of Male Football Players During Pre Competition Period

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ABSTRACT

Football is the one of most popular ball game played between two teams, eleven players in each team. The game play includes different variations in intensity such as bouts of high-intensity activities being interspersed with low intensity activities. During a pre competition training camp the players undertakes individual and team sessions encompassing technical training, skill practice, tactical training with high match frequency. our body needs energy to do any physical activity. These energy demands depend upon the nature and duration that specific physical activity. The optimum performance in game should be achieved by adequate energy balance, which obtained when energy intake is equal to energy expenditure. The muscle glycogen, a stored form of carbohydrates is considered major energy source during a football match. The main objective of this study was to determine the energy intake and energy expenditure of male football player during pre competition period. For this purpose primary data had been collected for the variables such as: Height, Weight, body mass index, Resting metabolic rate, Energy intake and Energy expenditure. To access dietary intake, 24 hours dietary recall method was used for consecutive three days. Resting metabolic rate of subjects was determined by bioScan 920-2 analyzer. The thermic effect of food is the energy expenditure in excess of basal metabolic rate after a meal. it is calculated as 10% of the resting metabolic rate. To access energy expenditure of physical activity all physical activities performed by them were recorded. For analyze the energy expenditure during physical activity the rate of expenditure in particular activity was multiply by duration of activity and total body weight of player in kg. The result of the study revealed that dietary intake of football players was inadequate to meet their energy demands. The percentage contribution of different macronutrients in total energy intake is also not appropriate as per recommended intake. The daily energy intake should be planned and maintained according to daily energy expenditure of players.

Keywords—dietary intake, energy expenditure, football, resting metabolic rate, thermic effect of food.

1. INTRODUCTION

Football is a game in which two opposing teams attempt to score points by moving an inflated oval or round ball into a goal. Football is characterized by variations in intensity such as Short sprints are interspersed with periods of jogging, walking, moderate-paced running and standing. From the nutritional point of view Meeting energy needs is the first priority for

athletes. Optimum game performance is promoted by adequate energy intake. Energy balance occurs when energy intake equals to energy expenditure. During the typical training week, players undertake individual and team including endurance, speed and strength conditioning, skill practice, tactical and match play [1]. The nature, volume and intensity of the training programme vary according to the time of the season, the calibre of player, and the player's position and individual goals. For professional players, camps may involve a schedule of two-a-day practice. During the competitive season, the week may also include one or two matches. The review will cover the players' needs to energy and carbohydrate to fuel, recover and optimise the adaptations from these sessions. Ideas for future research macronutrients composition of energy intake might be manipulated to further enhance training for adaptations. Energy needs, the total energy expenditure and requirements of each football players are unique, arising from the contribution of basal metabolic rate, thermic effect of food, thermic effect of activity, and in some cases, growth [2]. For many athletes, and in particular the professional players undertaking multiple training sessions in a day or more than one match in a week, the energy cost of training/ games is substantial. Meeting energy needs is the first priority of athletes for attaining optimum performance. Whether it is assessed in absolute terms or in comparison to estimates of energy requirement, the energy intake and expenditure of football players is interest for several reasons [3]. In scientific literature there are several reports of energy expenditure of particular groups of football players, derived from techniques such as doubly labelled water and indirect calorimetry. However, the expense and complex technology involved in these techniques confine them to the realms of research. Estimate and use the energy cost of daily activities is a practical and easy accessible method to assess the total daily energy expenditure of an athlete [4]. One of the available prediction equations, at the simplest level, a general activity factor is applied to the whole day to represent the athlete's typical exercise level. While this "factorial method" can provide a general estimation of a football player's energy requirements, there is chances of error. An alternative field method used in previous studies is the "energy availability model" in which the amount of energy available to the body to undertake its physiological processes is considered [5]. Energy availability is calculated as total energy intake minus the energy cost of the daily exercise program. We can assess the energy expenditure of an individual by estimating the Resting Metabolic Rate, expenditure during work and TEF. RMR is the minimum amount of calories needed to sustain the vital function of the body when at rest. Several previous research studies were reported that the nutritional intake of soccer players was not optimal, and that this intake was poorer among the adult players [6]. The mean daily energy intake of professional adolescent soccer players was founded lower than the energy expenditure during a competitive week. The difference between above two components was greatest on match and heavy training days. These deficits have negative impact on performance and physical development of adolescent soccer players [7]. Energy balance and appropriate macronutrient intake are essential for maintaining the demands of training, performance and recovery. In a previous study An energy deficit of average -356 ± 668 kcal per day was observed in football players over period of seven days [8],[9]. Magnitudes of these deficits were greatest deficits among training days.

2. OBJECTIVE OF THE STUDY:

Meeting energy needs is the first priority of athletes for attaining optimum performance. Whether it is assessed in absolute terms or in comparison, to estimates of energy requirements, the assessment of energy intake and energy expenditure of football players is very important. Keeping in mind of the above, the present study is undertaken with the following objectives:

- To determine energy intake of football players during pre competition period.

- To determine energy expenditure of football players during pre competition period.
- To compare the energy intake with energy expenditure.

PROCEDURE

Twenty two players (N = 22) who were attending the inter university camp held Punjabi University, Patiala were selected as subjects by simple random sampling. The age of the subjects was ranged between 18-25 years. Primary data had been collected for the variables such as: Height, Weight, BMI, Resting metabolic rate, Energy intake and Energy expenditure. Body weight of subjects had been taken with portable weighting machine and height measured with Stadiometer. With the help of height and weight the body mass index (BMI) of each subject was calculated. Twenty four hours dietary recall method was used for consecutive three days to determine the energy intake. A software named Dietcal.5 [10] was used for determine the intake of macronutrients (carbohydrates, fats, protein) and total energy intake by football players.

The sum of three factors determines total daily energy expenditure:

- Resting metabolic rate
- Thermic effect of food
- Energy expenditure during physical activity

RMR of subjects was determined by bioScan 920-2 analyser. The TEF (thermic effect of food) is the energy expenditure in excess of BMR (basal metabolic rate) after a meal. For practical purposes, it is calculated as 10% of the RMR (resting metabolic rate). Energy expenditure in physical activity is the expenditure in planned physical activity. To calculate energy expenditure during physical activity all physical activities performed by players were recorded and then the rate of expenditure in particular activity was multiply by duration of activity and total body weight of subject in kg [11],[12]. With regard to purpose of the study mean, standard deviation and paired “t” test was used to analyze the energy intake and expenditure of football players.

3. RESULTS

The main aim of the study was to find out the difference between energy intake and energy expenditure. Thus, the data were collected as per design of the study given in the procedure which was further subjected to statistical analysis.

Table 1:
 Descriptive statistics of Age, Height and weight of male football player

Variables	Mean	±S.D
Age (years)	19.95	1.86
Height (cm)	174.09	5.80
Weight (kg)	65.45	8.16
BMI (kg/m²)	21.54	2.39

The above table Revealed that mean age of football players participated in study was 19 +1.86(years), weight (kgs) 65.45+8.16, height (cm) 174.09+5.80, BMI(kg/m2) was 21.54+2.39.

Variables	Mean (kcal)	S.D ±
Resting Metabolic Rate	1969.09	131.1
Thermic effect of Food	196.90	13.11

Table 2:
 Descriptive statistics of Energy, Carbohydrate, Protein and Fat intake of male football players

parameters	MEAN±SD	percentage
Energy	3052.5±321.65(kcal)	
Carbohydrate	394.08±73.27(gm)	51.64 %
Protein	128.16±3.572 (gm)	16.79 %
Fat	107.05±11.03(gm)	31.56%

It was observed from table 2 that the mean value of Energy intake was 3052.52±321.657. Carbohydrate mean intake was 394.080±73.27, Protein 128.169±3.572, and Fat 107.057±11.034.

Table 3:
 Descriptive statistics of parameters included in calculating energy expenditure of male football players

The below table represent the components contribute in calculating total energy expenditure. The mean value of resting metabolic rate (RMR) was 1969.09+131.1 and thermic effect of Food was found to be 196.9091±13.11001kcal. The energy expenditure during physical activity was calculated as 1335.64±9.62 kcal.

expenditure during physical activity	1335.64	9.62
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Table 4:
 Difference between energy intake and energy expenditure of male football players

Variables	Mean	S.D±	t value (paired)
Energy Intake (kcal)	3052.52	321.657	26.63*
Energy Expenditure (kcal)	3501.54	330.393	

Table.4 represented mean Energy intake of the players which is 3052.52 kcal, and the mean energy expenditure of football players was 3501.54 kcal. There was a significant difference between energy intake & energy expenditure ($p < 0.05$).

4. DISCUSSION

The main finding of the present study was that the average energy intake and energy expenditure of players who were attending the inter university camp held in Punjabi University, Patiala were 3052.52 kcal and 3501.54 kcal respectively. The recommended mean energy intake for male football players with average weight of 65 kg is 4500 kcal [13]. The dietary intake of football players was inadequate to meet their energy demands. The energy deficits present among players may be followed by a decrease in performance [14]. The percentage contribution of different macronutrients in total energy intake is also not appropriate. Present study revealed that 51.64% of energy is being derived from carbohydrates in sampled subjects where RDA (recommended dietary allowance) is minimum 60%. So it is observed that the carbohydrate intake of football players is not sufficient according to recommended intake suggest by expert committees. Carbohydrate is the fuel of choice for high-intensity aerobic exercise. The mean protein intake was 16.79% in sampled subjects and RDA is 15% of total energy. The mean fat intake of football players of present study was 31% in football players where the RDA is 25% of energy. Various studies have been performed in this aspect with significant findings [15-19].

5. CONCLUSION

Players need better nutritional attentions to attain best results in sports. The daily energy intake should be planned and maintained according to daily energy expenditure. Nutritional practices and requirements vary according to different periods and levels of training. The more strenuous the activity, the longer it is performed, the higher is the energy cost. So the daily needs of energy for the training sessions are important point to consider while planning the diet for players. Football players should adjust their energy intake to match their training load. For this purpose nutritional education workshops and sessions related with sports nutrition are necessary to improve the nutritional knowledge in players.

6. REFERENCES

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