



Physiological and Nutritional Profile of National level Basketball Players

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Abstract: The aim of this study is to inspect the aerobic capacity, anaerobic power of national level basketball players through some physiological test, and further assess the dietary intake to monitor the nutritional demands of participation in game. Subjects: Thirty national level male Basketball players from different places of Northern part of India were inducted into the study during the academic year 2013-2015. The age of subjects ranged between 18 to 30 years and all thirty players is having more than six year of experience. Material & Methods: The investigator noted down their respective height, weight, (BMI) kg/m² and Hemoglobin (Hb) of the subject were measured by using standard instrument and techniques. Nutrients intake was determined with help of 24 hrs dietary recall method for consecutive three days. Then the aerobic capacity and anaerobic power of each subject was found over using the Beep Test and RAST Test. Result: The study is merely a descriptive analysis and frequency distribution pattern of physiological and nutritional profile of players, it shows the majority (80%) of players have good level of aerobic capacity, while in anaerobic power (57%) of players mostly have low level of fatigue index. Coming to the Hemoglobin (Hb) level majority (90%) of them fall in normal range. However majority (90%) of B.M.I was found to be normal in category. Dietary recall schedule revealed that all players were well nourished in terms of protein, fat, and carbohydrate (CHO) and as well as 80% of players were also found well nourished in terms of energy and iron. Conclusion: though, the investigator should be made to quantify and establish certain parameters on which to base training programs targeted at preparing players for competition games. This type of study is most valuable in this area. Effectively, increasing knowledge of the physiology and nutrition will lead to more successful basketball coaching and training.

Keywords: Anaerobic & aerobic, O₂max, beep test, RAST method, BMI, dietary intake, Iron, Hb, protein, carbohydrate, Basketball.

Introduction:

Basketball is one of the most popular team sports in the world and it comprises of specific structural and functional characteristics. Game performance is therefore affected by multiple factors (technical, tactical, psychical, conditional, and social) which form one complex unit. From the conditional standpoint basketball is characteristic for its intermittent load, whilst it is demanding in the aerobic and anaerobic area. (McInnes et al., 1995; Rodríguez-Alonso et al., 2003; Abdelkrim et al., 2007).

In recent years, the number of studies which determined the physiology of basketball

in different ways has increased (Gillam, 1985a) the question that is asked of many people is whether basketball is mainly an aerobic or anaerobic sport? An activation of energy processes during a basketball game is mainly based on aerobic sources (McInnes- 1995). On the other hand, it can be said that there are some differences between basketball being played in the U. S. and Europe. Basketball being played in Europe is mostly aerobic, while American basketball, which is different based on its rules and dynamics, is mostly anaerobic (Scheller&Raskm 1993). It is assumed that anaerobic metabolism is essential for a basketball game. Many studies point to the fact that the success of the basketball game to a large extent depends on the anaerobic capabilities of basketball players themselves and that they are the most important in the game (Parr et al. - 1996). Basketball is a sport which relies on ATP-CP and the anaerobic lactate system (Bergh et al., 1978). On the other hand, the aerobic system is indispensable in building anaerobic systems during the training process for basketball players.

There is a close relationship between nutritional practices and athletic performance, which lead to success.

Nutrition is considered as one of the main factors as others like genetics and exercise, in this regard (Driskell JA: 2000, McArdle WD et al., 1999). Besides proper nutrition, physiological capacity and fitness including aerobic power expressed as maximum oxygen consumption (O_2max) and anaerobic power are important in athletic performance and success. Study has shown that improvement in O_2max and anaerobic power through proper nutrition planning, exercise, technical education and body building can result in maximum physical capacity (Singh VNA: 1992).

Proper nutrition based on type of activity and the needs of athletes especially during preparatory camps for national, regional and global competition is vital (Wolinsky I: 1998). As basketball is a medal-winning sport in many countries and nutrition has shown a positive influence on their success, the nutritional status of male basketball players in national camps was assessed by using daily food intake, as well as aerobic ability and anaerobic performance by measuring O_2max and fatigue index in the subjects.

Subjects:

The subjects for the study were selected from the national level male Basketball Players from different places of Northern part of India during the academic year 2013-2015. The age of subjects ranged between 18 to 30 years and all thirty players is having more than six year of experience.

Procedure:

To accomplish this purpose the investigator were taken random only thirty subjects from Basketball. The players were selected from different places of Northern part of India. The investigator noted down their respective Height and weight of the subject were measured by



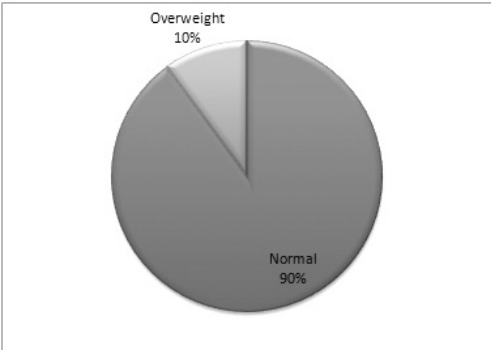
using standard instrument and techniques. The portable weight machine was pre - calibrated and used to measure the body weight (Kg) of the athletes. Studio meter was used to measure the height (cms) of sports persons. Body mass index (BMI) kg/m² was computed for each subject. Hemoglobin (Hb) g/dL content from the blood sample was determined by finger prick method with the use of Hemoglobin meter. Nutrients intake was determined with help of 24 hrs dietary recall method for consecutive three days. The calculations for the amount of nutrients was made with the help of nutritive values of (Indian food by ICMR 2004), (Indian Institute of Nutrition, Hyderabad), (Sports Authority of India) and compared with RDA values with (RDA table ICMR 2010). Then the aerobic capacity and anaerobic power of each subject was found over using the Beep Test and RAST Test. The statistical computations were made using a computer M.S. Excel and SPSS software for applying statistical formulae (Ahmaid S, Collomp K et. al 1992) (FALK, B. et al. (1996)

Results:

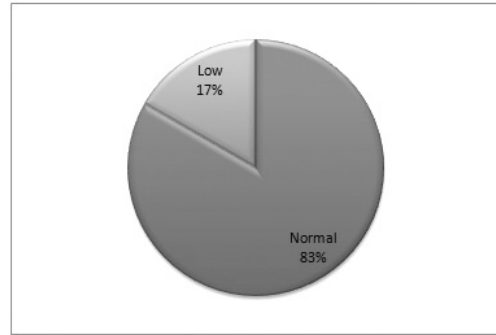
The BMI percentage analysis of thirty National level Basketball players reflects the 90% of players under normal weight category and 10% of players in overweight category. (Hb) Hemoglobin is also found 83% normal in players but 17% of players found lowest Hb level in their body. The maximum oxygen uptake O₂max is tested by the help of Beep test method which found a very good result, 80% of player's aerobic capacity is good but 20% of players O₂max are found above average. The anaerobic power or fatigue index is tested by Running based Anaerobic Sprint Test (RAST), the performance of 43% of players is good and 57% of players fatigue performance is low. After assessing the dietary intake percentage in national level Basketball players. The percentage of energy consumption in players were found very high 80% in adequate amount and 20% were found low energy intake, As well as percentage of protein. fat and carbohydrate found 100% in adequate amount. In

	Mean Value	Standard Deviation
AGE IN YEARS	22.5	2.7
WEIGHT in (Kg)	75.83	7.9
HEIGHT in (Cms)	182.7	7.7
B.M.I	22.7	1.2
Hb g/dl	14.5	0.9
VO₂Max in (ml/kg/min)	54.0	3.1
FATIGUE INDEX in (Watts/sec)	10.8	1.7
ENERGY in (Kcals)	4819.8	648.8
PROTIENS in (Grams)	91.0	9.5
FAT in (Grams)	83.4	8.7
CHO in (Grams)	608.1	63.1
IRON in (Milligrams)	18.8	2.4

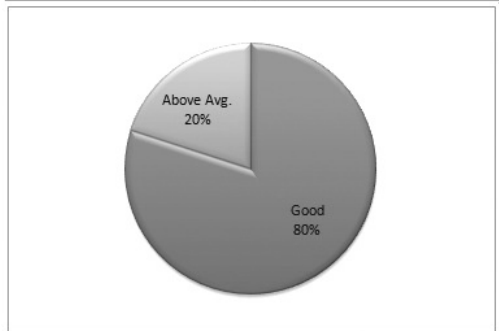
B.M.I	
Parameter	Percentage
Normal	90.0
Overweight	10.0



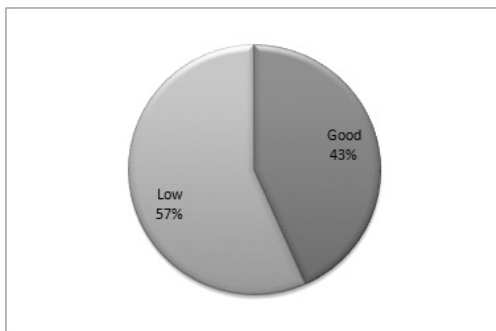
Hb Hemoglobin (g/dl)	
Parameter	Percentage
Normal	83.0
Low	17.0



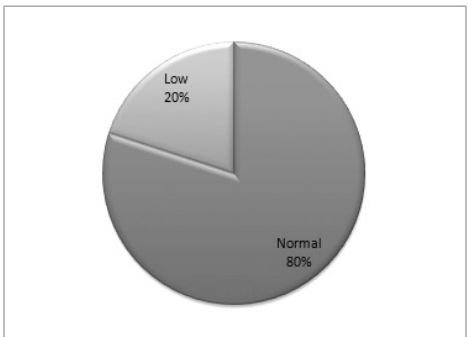
VO ² Max (ml/kg/min)	
Parameter	Percentage
Good	80.0
Above Avg.	20.0



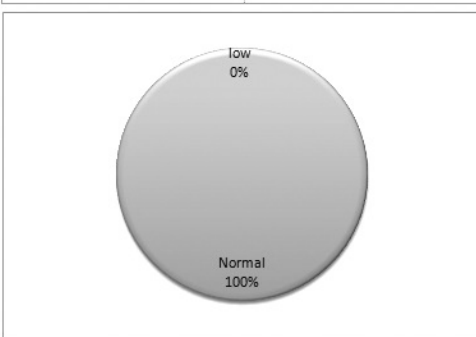
Fatigue Index (watts/sec)	
Parameter	Percentage
Good	43.0
Low	57.0



Energy (Kcal/day)	
Parameter	Percentage
Normal	80.0
Low	20.0



Protein (g/day)	
Parameter	Percentage
Normal	100.0
Low	0

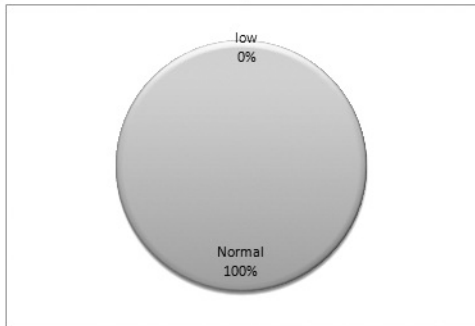


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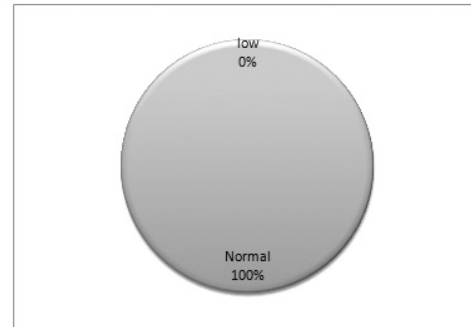
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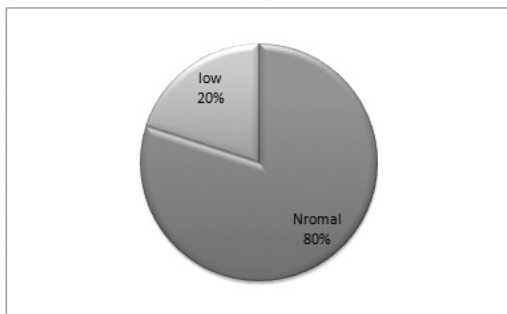
Fat (g/day)	
Parameter	Percentage
Normal	100.0
Low	0.0



CHO Carbohydrate (g/day)	
Parameter	Percentage
Normal	100.0
Low	0.0



Iron (g/day)	
Parameter	Percentage
Normal	80.0
Low	20



The BMI percentage analysis of thirty national level Basketball players reflects the 90% of players under normal weight category and 10% of players in overweight category of the recommended range of B.M.I scale of W.H.O. These 10% of players need to decrease their weight according to their height for better speed and agility in during game time. (Hb) Hemoglobin is also found 83% normal in players but 17% of players found lowest Hb level in their body according to (Thomas P. (2003). Blood: Principles & Practice of Hematology.) These 17% of players having a low R.B.C count compare to other players and this factor will create a problem for players in oxygen supply in aerobic workout. The maximum oxygen uptake O₂max is tested by the help of Beep test method conducted on national level Basketball players which found a very good result. 80% of player's aerobic capacity is good but 20% of players O₂max are found above average because some of players are very tall and heavy weight, for that they need to increase their endurance workout level to increase their aerobic

capacity by using continuous training method. The anaerobic power or fatigue index is tested by Running based Anaerobic Sprint Test (RAST). The performance of 43% of players is good and 57% of players fatigue performance is low, which shows the higher number of players fatigue index performance is not up to the marks according to the recommended score which shows in this study (KEIR, D. A. et al. (2013), Evaluation of the running-based anaerobic sprint test). The players who comes in low level of fatigue performance should increase their anaerobic performance by speed training, and interval training methods.

After assessing the dietary intake percentage in national level Basketball players, the percentage of energy consumption in players were found very high 80% in adequate amount and 20% were found low energy intake as per the guidelines of National Institute of Nutrition, (2005), I.C.M.R (2010), The low amount of energy in body which lead to lack of oxygen consumption and low aerobic performance in game time. Player should have to increase energy level in their daily diet plan by including rice, maize, pasta, maintain the proper hydration level before and after workout session by plenty amount of fluids intake e.g. sports drinks, shakes, juice ect.[Apndx-III] As well as percentage of protein, fat and carbohydrate found 100% in adequate amount which is recommended by (NIN-2005, Sports Authority of India, and I.C.M.R-2010). In Iron intake proportion 80% of players having a plenty amount of Iron content and 20% of players found low iron content in their body at recommended level of (not <17 mg/day) by NIN-2005, Sports Authority of India, I.C.M.R-2010). The low level of iron intake in players which leads to increase anemic risk factor for body and also decrease the level of Hb which leads to low R.B.C level in body, by this players will not able to perform properly in workout session as well as in competition. Players should increase the intake of iron in their diet plan by including green vegetables, red meat, ect.

Conclusion:

The present study is merely a descriptive analysis and frequency distribution pattern of physiological and nutritional profile of national level Basketball players conducted on thirty players, although it should be considered that it is not easy to obtain data for professional players, especially in competition period.

In conclusion, our results shows the maximum number of players found good level of aerobic capacity only 20% of players aerobic capacity found at low level, In anaerobic power more number of players 57% were found low level of fatigue index and 43% of players were found good fatigue index. The Hb level of overall thirty national basketball players was found 83% normal and 17% having a low Hb level than the standard Indian value of Hb ie; 13.6-17.7 g/dl. However BMI of majority (90%) of players was found to be normal but the 10% of players found in overweight category.

Results also found from the twenty four hour dietary recall schedule revealed that all players were well nourished in terms of protein, fat, and carbohydrate (CHO) and 80% of players was also found well nourished in terms of energy and iron but the 20% players are found under nourished in terms of energy and iron. The iron deficiency may be attributed as leading indicator of low iron in their diet. It was further concluded that the low level of competitive performance among players may be attributed by the factor of low Hb content and simultaneously low level of energy in players.



However, should be made to quantify and establish certain parameters on which to base training programs targeted at preparing players for competition games. It is in this area that this type of study is most valuable. Effectively, increasing knowledge of the physiology and nutrition will lead to more successful basketball coaching and training.

Recommendations:

The following recommendations have been from the finding of the analysis of the data and within the limitations of the study.

1. A similar study can be conducted on players of different age groups and genders.
2. A similar study can be conducted on players of different games.
3. Sports federations, institutions and academies are the main agencies to promote players & grassroots sports institutions must provide adequate sports science support to the young players.
4. All the coaches and trainer who are conducting the games & sports must be specialized in their own field and sports science, so that the best learning can be made possible among the participants.

Acknowledgement:

The authors wish to thank her Guide Dr. Ajita Singh (Assistant Professor) and her friend Dr. Athoni Rhetso for their collaboration in the study.

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