

## Differences in nutritional assessment of Indian throwers and physical education students

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**Abstract.** *Introduction:* As sports nutrition is becoming more and more an interesting and in-demand field in scientific study, venues to expose and encourage developments has been established. The objective of the study was to assess and compare the nutritional assessment of National level Indian throwers and physical education students with their recommended daily allowances (RDA). *Methods:* The study was conducted on twenty four subjects including twelve male National level throwers from Madan Mohan Malviya Stadium, Allahabad whose competition experience at National level was of minimum three years at the time of evaluation and twelve physical education students from Allahabad University were selected. Mean age of throwers was 16 – 25 years and Physical Education Students was 18 – 21 years. Dietary variables like energy, protein, fat, carbohydrate, calcium, iron and dietary fiber were calculated as per values recorded by self evaluation questionnaire of 24 hours dietary recall. *Results:* The 't' test was applied for statistical treatment of data. The major findings revealed the following conclusions: (1) there were significant differences between fat, carbohydrates, calcium intakes of National level Indian throwers and their RDA. (2) there were significant differences between energy, carbohydrate intakes of physical education students and their RDA. *Conclusion:* There was a gulf between the beliefs and practices of many power and strength athletes and the current sports nutrition guidelines. Further studies are needed to investigate the optimal amount of timing of nutrients intake in relation to training and recovery and where's enhances training responses.

**Key Words:** *energy, calcium, iron, dietary fiber.*

### Introduction

Nutrition is important in all aspects of life but specific requirements are altered by changes in activity. Dietetic interventions before and during the contest can mean the difference between success and failure (1). Dietary recommendations are, however not exactly the same for all disciplines (2). It has become clear that different sports and types of exercise have different energy nutrient requirements and therefore food intake must be adjusted accordingly like, bursts of very intense work are creatine -phosphate dependent and require an optimal creatine status of the muscle. As a competitive athlete, he knows that what he eat and drink can significantly at a high level, the types, amounts and timing of foods, fluids supplements is especially critical. Certain nutritional strategies can enhance performance, improve recovery and result in more profound training adaptations. There is also a considerable amount of quackery in sports nutrition and a large

number of nutrition supplements are on the market with claims to improve performance and recovery (3).

Mullins et al. (4) organized a study on the nutritional assessment of the elite Heptathletes of U.S.A., indicated that most of the athletes have adequate to high intakes of calories, carbohydrate, protein, and fat, are lean, and are in good iron status. Another study showed that, although the athletes reported an adequate mean energy and micronutrient intake, the intake of macronutrients was not in balance. This calls for an urgent need of nutrition education for the athletes, in order to improve their diet and achieve an optimum athletic performance (5). It is vital to educate the sportsmen and accustom them to dietary pattern in different regions of India and abroad (6).

Profusion of literature is achievable on the dietary or nutritional profile on sports persons of different sports and activities world wide (7-13).

And also the role of nutrition has been well examined in attaining optimum sports performance; it is rather disappointed that limited systematic work has been done to assess dietary intakes of throwers. Thus, this research topic under investigation would be beneficial in Indian concern and level the gulf of scanty research work on Indian throwers and others. The objectives of the present study are to: assess and compare the intake of selected nutrients with their recommended daily allowance (RDA) of National level Indian throwers (NIT) and physical education students (PES); provide assistance to these subjects for development of the dietary intakes and nutritional practices in order to improve or maintain desirable nutritional status as per their RDA and training requirements.

### Materials and Methods

*Sample.* Twenty-four male athletes constituted the sample for the investigation. Out of them twelve National level throwers (Five international, two national record holders, one national place holder, and four national level athletes of all four throws events) were under training in Madan Mohan Malviya stadium, Allahabad, and rest of the total, twelve students of Bachelor of physical education, Allahabad University, who ages ranged from 16 to 25 and 18-21years respectively. Participation in all aspects of the study was voluntary.

*Dietary Analysis.* Age, height, weight was also recorded as it is an important part of the study. The instruments were calibrated using recommended techniques of Lohman, Roche, & Martorell (14) prior to use. The stature was measured by anthropometer (Harpender Anthropometer, Pfister Imp. Exp, Inc. Holtain Ltd) to nearest 0.5 cm. The body weight was measured using beam-weighing machine to 0.5kg (barefoot and in light clothing).

Nutrient intake was calculated as per values given by Gopalan, Rama Sastri and Balasubramanian

(15). They were also asked to mention food likes and frequency of meals outside the home. The data was recorded separately for each subject. The data of nutritive values of throwers were cited in our previous work also (16). To collect the required data for the study on proper dietary intake and to compare it with RDA following methods were used: self-evaluation questionnaire; interview technique; 24-hour day dietary recall in which energy, protein, carbohydrate, fat, iron, calcium and dietary fiber intake was included.

*Statistical Analysis.* To achieve the results of collected scores, the study designed with following statistical objectives: to analyze the nutritional status of participants, the mean and standard deviation ( $M \pm SD$ ) were calculated; for the comparison of nutrient intakes and RDA of the subject's t-test was used. Data was analyzed using Excel 2003 (Microsoft Corporation) software. The significance value was set at  $p < 0.05$  level.

### Results and Discussion

The results of the nutritional analyses of the diet records for the twenty-four subjects for average daily calorie intake, protein, fat, carbohydrate, calcium, iron and dietary fibers intakes in grams are summarized in table I. Table I displays that there was a vast difference in the actual consumption in concern of RDA except calcium (both groups) and iron intakes in throwers only. Graphical representation (1-7) indicates the mean nutritional values and RDA of both groups more fairly.

Table 2 represents the significance mean differences of energy, protein, fat, carbohydrate, calcium, iron and fibers intake and RDA of NIT and PES. The nutrient intake of throwers was well comparable with RDA except for calorie, protein, iron and fibers intakes. The physical education group was significantly low in most dietary intakes with their RDA except in energy and carbohydrate intakes.

**Table I.** Mean and Standard Deviation of nutritional assessment of Indian throwers and physical education students

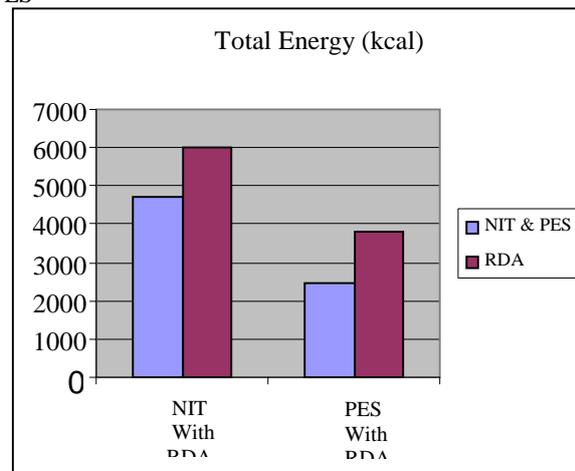
Nutrients	National Indian Throwers		Physical Education Students	
	Mean/RDA	S.D.	Mean/RDA	S.D.
Energy	4728/6000kcal	985.64	2063/3800 kcal	533.766
Protein	1038/600 kcal	103.21	328/380 kcal	16.30
Fat	1422/1800 kcal	31.98	351/1140 kcal	17.20
Carbohydrate	2208/3600 kcal	156.73	1332/2280 kcal	123.40
Calcium	3342/1500mg	648.34	1199/400 mg	699.83
Iron	43.75/30mg	58.01	23.83/28 mg	4.61
Dietary Fiber	16.46/30gm	7.85	11.15/30 gm	2.94

**Table II:** Mean Differences of nutrients intake and RDA in Indian throwers and PES

Nutrients and RDA	df	t- value of Indian Throwers	t- value of Physical Education Students
Energy	22	0.010	2.9914 *
Protein	22	0.00	0.01
Fat	22	5.132 *	0.003
Carbohydrate	22	2.354 *	9.487 *
Calcium	22	8.63 *	1.21
Iron	22	0.26	1.10
Dietary Fiber	22	0.04	1.13

Note: \* t=2.07 Significant at < 0.05 level

**Figure 1.** Total energy intakes and RDA of Indian throwers and PES



**Figure 2.** Mean protein intake and RDA in Indian throwers and PES

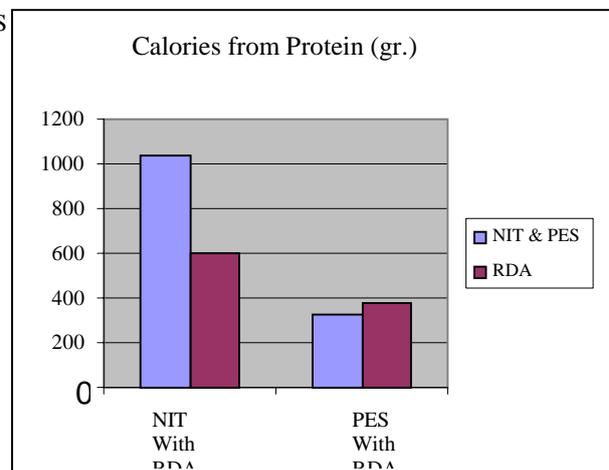


Figure 3. Mean fat intake and RDA in Indian throwers and PES

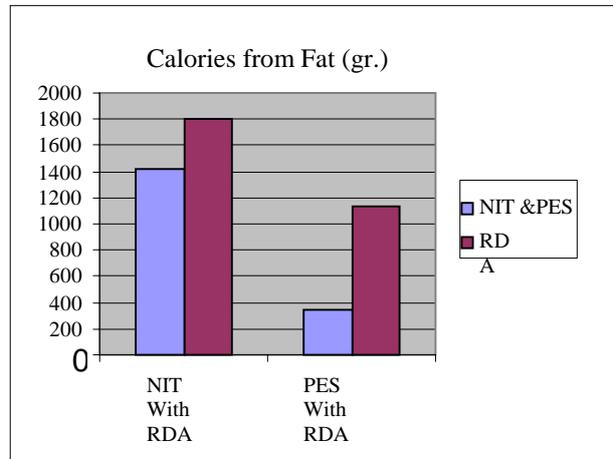


Figure 4. Mean carbohydrate and RDA in Indian throwers and PES

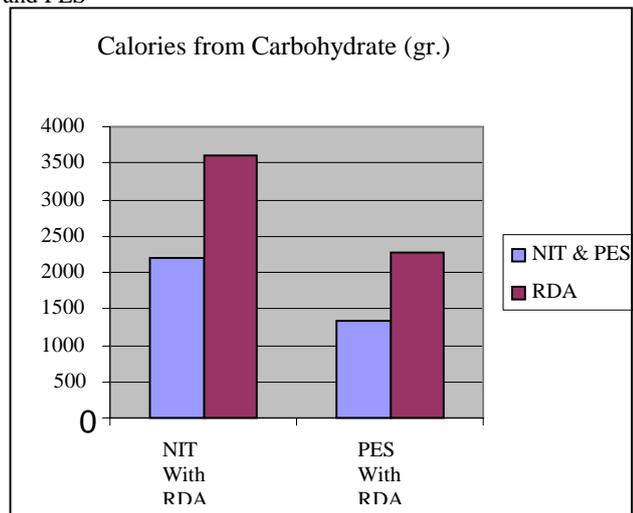


Figure 5. Mean Calcium and RDA in Indian throwers and PES

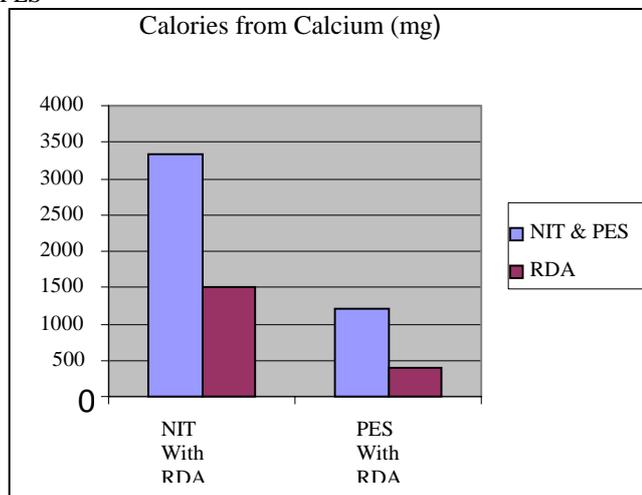


Figure 6. Mean Iron and RDA in Indian throwers and PES

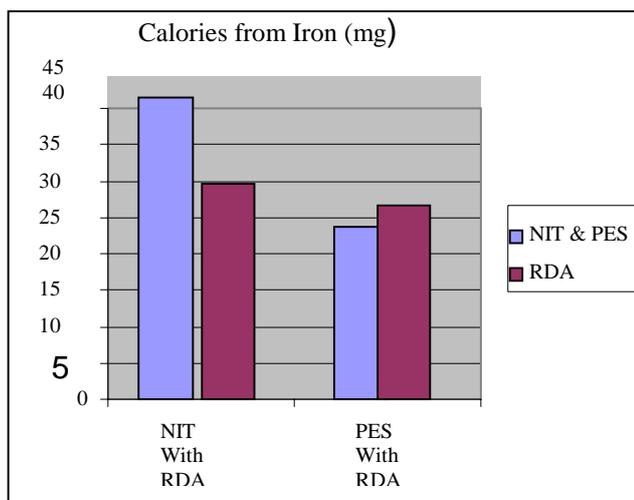
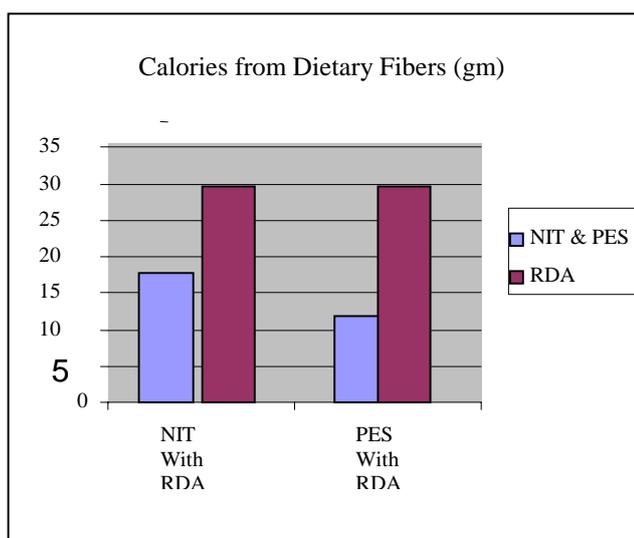


Figure 7. Mean dietary Fibers and RDA in Indian throwers and PES



**Total Energy.** According to RDA the total calories intake should be 6000 cal/day for NIT. But they were taken average 4728.35cal/day. For physical education student RDA was 3800kcal/day but they were taken 2063kcal/day. Mean energy intake was lower in the both groups than their required value of energy. Beals & Manore (17) were indicated that dietary intakes of energy, protein, carbohydrate and certain micronutrients that were below from the recommended level in athletes. Self-report dietary records of young athletes indicate that energy, carbohydrate, and select micronutrient intakes of certain athletic groups

and individual athletes may be marginal or inadequate (1\*).

**Protein.** The average calorie intake of Indian throwers in the form of protein was 259.67gm/day or 1038kcal/day and according to RDA they should take 10% of total calories or 600kcal/day in the form of protein/day. They exceeded from RDA value. Power sport participants are best advised to consume moderately higher protein diet (4). Throwers of the present study were more aware of the role of protein in muscle building. Tarnopolsky (19) reported that most power athletes have high intakes of protein.

For PES, RDA was 380 kcal/day and they were taking 320kcal/day.

*Fat.* The fat calories should be 1800 kcal/day from total calorie intake in the throwers but they were taking 1422 kcal/day, which was very less from RDA. The RDA of PES was 1140 kcal/day and they were taking 351kcal/day which also was very less than RDA. These differences may be a direct result of lifestyle factors and most notably fear regarding fat consumption. Houtkooper conducted the study on national Heptathletes and reported that these athletes it is desirable to have less than 30% of calorie intake provided by fat (20).

*Carbohydrate.* The intake of carbohydrate of NIT was below the recommended guideline according to RDA they should take 3600 kcal/day in the form of carbohydrate but they were taking 2208kcal/day. The PES group were taken 1332 kcal/day which was less than 2280 kcal/day. A high carbohydrate diet has recently been shown to enhance performance during intermittent high intensity exercise (11, 21).

*Calcium.* The throwers exceeded intakes of Calcium that was 3342mg/day where the recommended calcium intake value was 1500mg/day. For PES, RDA was 400 mg/day however they were taking 1199mg/day. The both groups consumed calcium which was exceeded the RDA value. Calcium intake is an important source of growing strong healthy bones (22). The both groups had a better high consumption of milk and supplements and aware about the role of calcium. Regarding diet recall responses of the all participants drank 2-3 cups of milk 3 times every day. A product that contains 40 percent or more of the daily value for calcium must state on the label that a total dietary intake greater than 200 percent of the daily value for calcium (that is, 2,000 mg or more) has no further known benefit (13).

*Iron.* The National throwers exceeded intakes of iron that was 43.75mg/day and recommended iron intake was 30mg/day. William (13) also reported the same views in his findings that the athlete has a better knowledge about the role of iron and calcium. The PES group was taken 23.83mg/day only which was less than recommended value (28mg /day).

*Dietary fiber.* A dietary fiber intake according to RDA was 30 grams a day. An intake of 20-30 grams dietary fiber a day was suggested intake by the American Cancer Institute (23).

The National level Indian throwers were taking 16.46 grams/day. For Physical education student's dietary fibers RDA was 30 mg/day and they were taking 11.15mg/day that was very less than RDA which may harmful and suspect their health and performance. Peerkhan & Srinivasan (6) strongly supported that not getting proper amounts of fibers in the diet can pose a big health risk for adolescent's athletes now and in the future.

### Conclusion

On the basis of above findings and discussion the following conclusions were drawn. There was a significant difference between energy intakes of physical education students and their RDA. No significant difference was found in protein intakes of both groups. There was a significant difference between fat intakes of Indian throwers and their RDA. Both groups were had significant differences between carbohydrate intakes. Significant differences were reported in calcium intakes of throwers and their RDA. No group was reported significant difference in iron and dietary fibers intakes. The results of this study suggested that there is a need to increase energy intake to match energy requirements. The protein, calcium and iron intake of the throwers were high and comparable excess than RDA. The intakes of calorie, fat, carbohydrate and fibers were less among all the participants. The overall findings indicate and the researchers of this study concluded that most sportsmen had no satisfactory knowledge of nutrition in both groups. Because values of the few intakes (see table I) were lower and higher than recommended values of daily allowances in both groups except few intakes. Beals & Manore (17) was also reported with same conclusion that although athletes with sub clinical eating disorders had dietary intakes of energy, protein, carbohydrate and certain micronutrients that were below recommended levels, micronutrients status appeared relatively unaffected, probably due to their use of supplements.

There was a gulf between the beliefs and practices of many power and strength athletes and the current sports nutrition guidelines. Further studies are needed to investigate the optimal amount of timing of nutrients intake in relation to training and recovery and where's enhances training responses.

*Practical Application.* The findings and conclusion of the study will acquainted with assessment of macro and micro nutrients intakes.

It will help to perceive the role and importance of nutrition, diet plans, dietary habits and its rapport with performance during training and competition. This will establish as reference data and dietary guideline for trainers and physical education teachers to make dietary plans of their athletes according to individual requirements.

The athletes will cognizant of need and importance of training diet and competition diet. Supplementation may not be necessary since the additional nutrients required will be present in the extra food eaten to meet energy needs, consistent with increased physical activities (24).

Ismail, Nudri & Zawiah (24) stressed on nutritional conditioning, like physical conditioning is a continuous quest and that nutritionists/dietitians have a role to play in educating sportsmen on the importance of eating for training and the need for a sensible approach in preparing themselves for competitions. Coaches and sports teachers will deliver continuous education through workshops and courses helps to improve trainees' nutritional knowledge, attitudes, habits and practices.

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