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Evaluation of Energy Sufficiency in the Hostel Diets for College Sports Team Members

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At present majority of the sports activities are centered around the academic institutions and residential requirement is compulsory for professional academic institutions. Students engaged in sports activities are depending on hostel diets and the present study is an evaluation of Energy Sufficiency in the hostel diets for selected college sports team member. 60 men students actively participating in Football, Basketball and Cricket were selected as respondents in this study and their age group were 20 to 22 years. Evaluating the existing hostel diets, energy sufficiency of the students and energy sufficiency of hostel diets were tabulated and discussed in this study. It recommends to increase the quantity of energy giving food and the frequency of the food intake.

Food is the prime necessity of life. It provides energy for doing work .For maintaining good health and physical efficiency, the diet should provide adequate amounts of all nutrients. For designing balanced diets, it is essential to know the daily requirements.

For estimating the caloric requirements, the physical activity, body size and composition, age and sex, physiological state, and climate and environment should be taken in to consideration.

Food refers to anything which nourishes the body. It is a mixture of different nutrients and non nutrients. The physiological functions of food are energy giving, body building, protective and regulatory functions .We need energy every moment of our lives for performing various types of activities such as sitting, standing, walking, and running and performing all our personal and other tasks .

Based on the nature of work and level of activity, energy needs are standardized. Activities are classified as sedentary, moderate and heavy. Sports activities are coming under the third group .

Objectives of the present study:-

At present majority of the sports activities are centered around the academic institutions and residential requirement is compulsory for professional academic institutions. At present data related to the food consumption pattern of sports team members residing in the hostels of professional institutions are not available. Students engaged in sports activities are depending on hostel diets and the present study is an "Evaluation of Energy Sufficiency in the hostel diets for selected college sports team members".

METHODOLOGY

The present investigation on "Evaluation of Energy Sufficiency in the hostel diets for college sports team members" comprises of

1. Selection of area
2. Selection of samples
3. Evaluating the existing hostel diets
4. Energy sufficiency of the students
5. Energy sufficiency of hostel diets

1. SELECTION OF AREA:

Men 's hostel of T.K.M. College of Engineering , Kollam was selected for the Project.

2. SELECTION OF SAMPLES:

60 Men students who were hostelers and who were actively participating in college sports activities were selected for this project as follows.

1. Football —20 students.
2. Basketball—20 students
3. Cricket — 20 students.

Age range of the respondents was 20 to 22 years.

3. EVALUATING THE EXISTING HOSTEL DIETS

1. Inventory Method (Food List Method) was used to elicit information on the quantity of different foods consumed by the respondents.
2. Nutritional composition of the diets was Calculated using the Food Composition Table of National Institute of nutrition.

4. ENERGY SUFFICIENCY OF THE STUDENTS

1. Time utilization pattern of the respondents was assessed using standard schedules.
2. Energy expenditure pattern of the respondents were assessed from the information generated through time utilization pattern studies.

5. ENERGY SUFFICIENCY OF HOSTEL DIETS

Energy sufficiency of hostel diets were assessed through suitable energy balance studies.

RESULTS AND DISCUSSION

Results pertain to the investigation on Evaluation of Energy Sufficiency in the hostel diets for college sports team members comprises of

1. Selection of area and samples
2. Evaluation of the existing hostel diets
3. Energy availability from the hostel diets
4. Energy sufficiency of hostel diets

1. SELECTION OF AREA AND SAMPLES

60 Men students who were hostelers and who were actively participating in college sports activities were selected for this project as follows.

5. Football —20 students.
6. Basketball—20 students
7. Cricket — 20 students.

Age range of the respondents were 20 to 22 years. Weight, height and BMI particulars of the respondents were presented in Table 1

Table-1

Total number of respondents	Mean weight (in K.g)	Mean Height (in metres)	Mean BMI
Cricket- 20	63.9	1.76	20.61
Football- 20	65.3	1.77	20.86
Basketball-20	66.4	1.78	20.89

Individual particulars are presented in annexure (Appendix I, II & III). Mean weight and height of the respondents are comparable with the Indian standards.

Information pertaining to BMI are presented in Table-2

Table-2

Particulars	BMI	Number of respondents
1. Under weight	<18.5	6
2. Normal	18.6 to 25	54
3. Obese	>30	0

As indicated above, six respondents were underweight and the remaining 54 respondents were normal. None of the respondents were found obese.

2. EVALUATION OF THE EXISTING HOSTEL DIETS

Inventory method is often employed in the institution where homogeneous groups of people take their meals from a common kitchen. In the study, the amount of food stuff's issued to hostel kitchen as per the records maintained by the warden were taken in to consideration for computation of consumption. No direct measurement of weighing was made. Reference period used was one week.

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Food consumption pattern of the respondents are presented in Table 3

Table-3
Main food items included in the daily diet of the respondents

Days	Break Fast (7.30 to 8.30am)	Lunch (1130 to 1pm)	Evening Tea (3.30 to 5pm)	Dinner (7 to 8.30pm)
Monday	Uppuma, Plantain, Tea	Rice, Egg, cabbage, carrot, green gram curry	Tea, cake	Chappathi, bengal gram curry, salad, black coffee
Tuesday	Banana, Egg, Milk	Rice, Sambar, Beetroot curry, Achinga thoran, Fish curry	Tea, banana roast	Chicken biriyani, salad, lime juice
Wednesday	Iddli, Chutney, Tea	Rice, Fish curry, Beans Thoran, Puliserry	Puffs, Tea	Puttu, Beef curry, black coffee
Thursday	Bread, Egg, milk, jam, tea	Rice, ada pradaman, upperi, avial, dal curry, padavala thoran	Vadai, Tea	Idiappam, Vegetable kuruma, black coffee
Friday	Puttu, Plantain, Bengal gram	Rice, dal curry, rasam, beef fry	Cutlet, Tea	Tapioca, Fish curry, plain tea
Saturday	Poori, Vegetable Masala, Tea	Rice, Egg thoran, achinga thoran, sambar, puliserry, ladies finger	Samosa, Tea	Chappathi, chicken curry, salad, coffee
Sunday	Masala dosai, Chutney, Tea	Fried rice, salad, chicken curry	Vadai, Tea	Rice, beans, mango chammanthi, sambar, puliserry

The food items included in the daily diets of the respondents were classified as **energy-giving, body building and protective/ regulatory**. The details are presented in Table-4

Table-4
FREQUENCY OF USE OF VARIOUS FOODS IN THE HOSTEL DIETS

Particulars	Different foods	Frequency of use (percentage)
Energy- Giving Foods	Cereals	100
	Roots&Tubers	71
	Sugars	100
	Fats &Oils	100
Body Building Foods	Milk &Milk Products	100
	Pulses	86
	Meat &Poultry	86
	Fish &Sea Foods	57
Protective / Regulatory Foods	Leafy Vegetables	57
	OtherVegetables	100
	Fruits	71
	Oil seeds	100
	Spices	100

Maximum scores (100%) were obtained for the food groups such as cereals, sugars, fats and oils, milk and milk products, other vegetables, nuts and oilseeds and spices followed by foods such as pulses, meat and poultry which scored 86%, and roots and tubers and fruits around 71%, Fish and sea foods and leafy vegetables 57% were found to be the lowest.

Most frequently used foods (scores 76 –100) in the hostel diets were cereals, sugars, fats and oils, milk and milk products, other vegetables, nuts and oilseeds and spices. Medium frequently used ones (scores 51–75) were, fish and sea foods, roots and tubers and fruits. Less used (score 26-50) and least used (score <25) foods were found nil.

Food combinations followed in the meals prepared in the hostel diets were presented in Table-5.

Table-5

Food combinations observed in the hostel diets

Monday	Cereals +milk+vegetables+egg+fruits+roots+pulses+green leafy vegetables
Tuesday	Cereals+ fruits+egg+ milk+vegetables+roots+fish+meat
Wednesday	Cereals+pulses+coconut+fish+curds+vegetables+meat
Thursday	Cereals+egg+milk+fruits+vegetables+pluses
Friday	Cereals+fruits+pluses+meat+roots+fish
Saturday	Cereals+vegetables+egg+chicken+curd
Sunday	Cereals+vegetables+coconut+fruits+curd+pulses

Many of the food items stipulated in the balanced diet prescribed by ICMR were found included in the hostel diets. From the quantity of different foods issued to kitchen daily and the number of inmates consumed these foods, exact amounts of foods consumed in terms of grams or litres were asessed and their nutrients contents in the meals were estimated.

Average food in take per day by each respondent is presented in Table-6

Table-6

Average Food in take by the respondent

Food Group Percentage	RDA (in grms)	Average in take(in gms)	
Cereals	420	350	83
Pulses	60	130	216.7
Milk & Milk Products	300	175	58.3
Roots and tubers	200	80	40
Green leafy vegetables (GLV)	100	36	36
Other vegetables	100	400	400
Fruits	100	30	30
Sugars	25	90	360
Fats & Oils	20	80	400
Meat/Fish/Egg	30	117	390

Comparisons of food intake with the stipulated balanced diet for this age group and comparison of nutrient intake with the Recommended Dietary allowance (RDA) provide a measure of adequacy or inadequacy of food / nutrient consumption. Informations elicited on these lines are presented in Table-6

A comparison with balanced diet indicate that in the hostel diets, food items such as cereals, milk and milk products, roots and tubers, green leafy vegetables and fruits were not included in sufficient amounts while other foods were found in excess.

Nutrients present in these foods were calculated using food compositions table of National Institute of Nutrition and the details are presented in Table-7

Average nutrients available in the hostel diet are presented in Table-7

Table-7
Average nutrient intake by the respondents

Nutrients	RDA	Average nutrient intake	Percentage
Energy (Kcl)	3800	3700	97.4
Protein (gm)	60	110	183.3
Fat (gm)	20	90	450
Calcium (mg)	400	686	171.5
Iron (mg)	28	33	117.9
Vitamin-A (Retinol)			
(µg)B-carotene	6002400	2411740	40.272.5
Thiamine (mg)	1.6	1.9	118.8
Riboflavin (mg)	1.9	1.4	73.7
Vitamin-C (Niacin) (mg)	21	18.9	90
Folic acid (µg)	100	338.8	338.8

Nutrient analysis of the daily diet of hostel meals indicate that the diets are deficient only in calories, riboflavin, vitamin A and vitamin C.

3. ENERGY AVAILABILITY FROM THE HOSTEL DIETS

Energy availability from the main meals in a week are presented in Table-8

Table -8
Energy Availability From The Hostel Diets (in Kcal)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Break Fast	1191	805	1006	996	1198	1069	1174
Lunch	1226	1242	1170	1455	1106	1166	1242
Evening							
Tea	370	472	320	310	325	355	310
Dinner	999	1116	1072	1030	897	1140	1200
Total	3786	3635	3568	3791	3526	3730	

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3926 Major three meals, breakfast, lunch and dinner needs to be equal in adequacy of quantity and quality. Considering the work pattern of inmates and the lunch needs to be made simpler. The distribution of energy for different meals in a week is not found uniform. Energy availability from carbohydrate, fats and proteins from the hostel diets are presented in

Table-9
Energy availability from the major nutrients (in Kcal) per day

Total energy (in Keal)	Energy availability from		
	Carbohydrates (in keal)	Fats & oils (in keal)	Proteins (in keal)
3700	2200 (59.5 %)	800 (21.6 %)	700 (18.9 %)

Carbohydrates and fats are the major sources of energy in the hostel diet. Carbohydrates are derived from food sources such as cereals, pulses, roots and tubers, fruits, sugars, fats and oils and also from animal foods.

Dietary fats are derived from both plant and animal sources and are classified as visible or invisible types. Fats used for cooking are termed as "visible fats". Fats that are present as an integral component of different foods are referred to as "Invisible fats". The small amounts of invisible fat present in different foods add up to a substantial level in the hostel diet.

The total fat (invisible + visible) in the diet should provide between 15-30% of total calories considering the physical activity and physiological status. The daily requirement of fats works out to be 20-50g. Individual performing hard physical work must take a minimum of 30g of fat in their daily diet.

Spices generally used in the hostel diets are Coriander (19), Green Chilly(34), Dry Chilly (42), Turmeric (14), Cardamom (7), Cumin seed (31), Ginger (20), Mustard (23), Garlic (Dry) (17), Tamarind (2), Fenugreek (5), and Pepper (7). The numbers given in the bracket indicate the frequency of use of the spices.

4. ENERGY SUFFICIENCY OF HOSTEL DIETS

Efficiency of work of hostel inmates and energy utilized for physical activity can be defined as net efficiency or mechanical efficiency which describes the efficiency with which energy is converted to mechanical work. To assess the energy expenditure pattern of the 60 respondents, they were questioned to find the items of activities, they were engaged in all through out the day and the duration for which they were engaged in their activities, on a day randomly chosen. Energy expended for each activity was calculated using the schedule of energy expenditure of the activities.

Energy expenditure pattern of the respondents are presented in table-10

Table-10
Energy expenditure pattern of the respondents

Item & work done for which energy is utilised	Number of respondents	Time interval (hours)	Average energy expended (in kcal)	Range (in Kcal)	
				Min	Max
Personal care (eating, personal hygiene etc)	60	3	258	246	270
Studying, TV watching	60	4	344	328	360
Class room studying	60	7	602	590	6.14
Sleeping	60	8	456	402	510

Total energy expended in 22 hours- 1660 Kcal

As indicated in table 10, the respondents on an average were taking rest for 8 hours in a day (sleep). Average energy expenditure during routine work such as personal care ,TV watching, and Class room studying was observed to be 258 kcal, 344 kcal and 602 kcal respectively.

Energy expenditure pattern for different sports activities are presented in Table-11

Table-11
Energy expenditure pattern for different sports activities

Sports activity	Respondents	Total energy expenditure by each respondent (in Kcal)
1. Basketball	20	2150
2. Cricket	20	2020
3. Football	20	2444

As indicated in table-11, on an average, the total energy expenditure of 20 respondents engaged in Basketball were 2150 Kcal, While there engaged in cricket and Football were expending 2020 Kcal and 2444 Kcal respectively.

Energy balance details are presented in Table-12

Table-12
Energy Balance Table

Sports Activity	Respondents	Energy in take (in kcal)	Energy expenditure (in kcal)	Energy balance (+ / -)

Basketball	20	3700	2150	+1550
Cricket	20	3700	2020	+1680
Football	20	3700	2444	+1256

As indicated, all the respondents were found to be in positive energy balance.

CONCLUSION

Food is needed for performing various types of activities. Sports activities are coming under heavy work. A very good nutrition routine should be developed by the respondents for the better performance in sports and studies. Students engaged in sports activities were depending on hostel diets and the present study is an "Evaluation of energy sufficiency in the hostel diet for selected sports team members".

60 men students actively participating in Football, Basketball and Cricket were selected as respondents in this study and their age group were 20 to 22 years. Evaluating the existing hostel diets, energy sufficiency of the students and energy sufficiency of hostel diets were tabulated and discussed in this study.

90% of the respondents were coming under normal BMI and only 10% were under weight.

The menu showed the tasty, common and regional food items. It included Kerala's delicious food stuffs. The food items from all the three food groups were included.

The frequency of fish and leafy vegetables should be increased in the diet. The amount of cereals was not sufficient as per the RDA requirements. So it should be increased.

Similarly the quantity of milk, roots & tubers, fruits etc should be increased more in the diet. The most important green leafy vegetables were not found included sufficiently in the diet. So leafy vegetables, which have more nutrient value should be included in the diet.

The average energy obtained from the food should be increased slightly.

The quantity of Retinol, B-carotene, Riboflavin and Vitamin-C were not included sufficiently.

So the quantity of the food items having the above nutrients should be enhanced.

A vital reason for the poor performance of Indian sportspersons in the international arena is our failure to provide them with diets containing sufficient nutrients right from childhood onwards. Besides, both the authorities and the sportspersons lack an awareness in this area. This project attempts to address both the issues. The study will be helpful to the hostel authorities to modify the diet pattern.

A systematic and comprehensive study along the lines of this project may be conducted among sportspersons, both male and female, belonging to the district, state and national levels, different age groups and various sports.

RECOMMENDATIONS

1. Increase the quantity of energy giving food groups
2. Increase the frequency of the food intake.
3. Sports students may be given additional supplementary foods rich in protective nutrients.
4. The frequency and quantity of spices should be reduced.
5. Include more Green leafy vegetables in the diet
6. Include more Iron, Vitamin A, Vitamin C, Thiamine, Riboflavin and other nutrient rich food stuffs in the diet.
7. More fruits and whole cereals should be included in the diet
8. Diet with fibre content should be increased