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## Fat intake and academic performance: A relation beyond imagination

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### Abstract

Diet is vital in life as a major determinant of health, while good nutrition is essential for growth, development and maintenance of health throughout the life. It is highly important to have adequate dietary intake to complement daily physical and mental activities. Brain accounts for only about 2% of a person's body weight, but consumes between 20-30% of the body's available energy and oxygen (Gustafson, 2010) [1]. Adequate and sufficient healthy intake of food is essential to brain function (Bloom, 2009; Dauncey, 2009; Kazal, 2002; Shariff, Bond, & Johnson, 2000). Moreover, maximizing brain function is a prime factor in seizing appropriate cognitive capability – for example, ability to focus, comprehension, evaluation, and application – in learning (Kretchmer, Beard, Carlson, 1996; Schmitt, 2010).

Life can be sustained only with adequate nourishment. Since time immemorial the focus has been given to taking balance diet or proper nutrition. There are two groups of nutrients- Macro & Micro.

The study was conducted among 60 students (30 boys and 30 girls) from all colleges of Dr. RPCAU who were residing in University hostel and studying in seventh semester. In order to extract relevant information an interview schedule was developed. In order to know about the dietary intake of subjects 24 hours dietary recall method was used study showed that boys were consuming more protein (28.82%), fat (10.33%), iron (42.12%), vitamin-c(36.4%) and less calorie(-6.93%), calcium(-6.91%),vitamin B12 (-83%) and folic acid(-14.11%) in comparison to RDA. Whereas, girls were consuming more protein (9.85%), fat (7.64%) vitamin-c (55.17%) and less calorie (-0.93%), iron (-7.1%), calcium (-22.23%), vitaminB12 (-76%) and folic acid (-18.89%) when compared with RDA 2010. O GPA of students were negatively and non-significant with carbohydrate, protein, iron and vitamin B<sub>12</sub> but significantly correlated with energy and fat whereas negatively significantly correlated with calcium study shows that girls are consuming more fat and less energy than boys students and their academic performance is also better than boys students. A Significant relation of energy and fat is also found with academic performance of students. Consuming fat in acceptable amount may be helpful in better academic performance. So students need restrict fat intake in view of gaining weight.

**Keywords:** academic performance, RDA, University student, fat

### Introduction

Diet is vital in life as a major determinant of health, while good nutrition is essential for growth, development and maintenance of health throughout the life. A Balance dietary intake which contains all the five classes of food is essential in maintaining good health. It is highly important to have adequate dietary intake to complement daily physical and mental activities. Brain accounts for only about 2% of a person's body weight, but consumes between 20-30% of the body's available energy and oxygen (Gustafson, 2010) [1].

Adequate and sufficient healthy intake of food is essential to brain function (Bloom, 2009; Dauncey, 2009; Kazal, 2002; Shariff, Bond, & Johnson, 2000). Moreover, maximizing brain function is a prime factor in seizing appropriate cognitive capability – for example, ability to focus, comprehension, evaluation, and application – in learning (Kretchmer, Beard, Carlson, 1996; Schmitt, 2010).

Indian Council of Medical Research (2010) has recommended diet and nutrient intake for all age groups and activities, which may be considered while deciding about balance diet. Life can be sustained only with adequate nourishment. Since time immemorial the focus has been given to taking balance diet or proper nutrition.

Nutrients are derived from good food and functions in one or more ways i.e. maintenance of biological functions, including metabolism, growth, and repair. There are two groups of nutrients- Macro & Micro. Micronutrients are needed by the body in much smaller amounts but still play a vital role in the body. If not available, the body may develop deficiencies.

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Micronutrients (vitamins and minerals) from food promotes variety of process of brain functioning. It synthesizes neurotransmitters, which carry messages across the synapses and helps in better transmission of messages from brain to body parts and from body parts to brain. Neurotransmitters “influence mood, sleep patterns, and thinking. Deficiencies or excesses of certain vitamins or minerals can damage nerves in the brain, causing changes in memory, limiting problem-solving ability, and impairing brain function” (Gustafson, 2010, p. 351) [1].

Fruit and vegetable consumption is crucial to the availability of micronutrients to the body. This is because these food items are a rich source of vitamins and minerals which are required for the normal functioning of the human body.

**Methods**

The study was conducted among 60 students (30 boys and 30 girls) from all colleges of Dr.RPCAU who were residing in University hostel and studying in seventh semester. In order to extract relevant information an interview schedule was developed and was subjected to pretesting before starting the research work.

- In order to know about the dietary intake of subjects 24

hours dietary recall method was used. All the subjects were interviewed in the lunch time and dietary intake of previous day of each subject was noted down in the developed interview schedule. Daily intake consisted of the meal which subjects consumed at the time of breakfast, mid- morning, lunch, snacks and tea, dinner and bed time.

- To assess the quantity of food consumed, subjects were shown the standardized utensils and asked to express the amount of food consumed. In addition for eating habit of subject’s consistency and size of cooked food for e.g. rice, pulse, vegetable and chapatti were also shown to the subject.
- Academic performances of students were decided by the O GPA of the students till seventh semester.
- The data was entered in Microsoft Office Excel and statistical analysis was done using SPSS 16 software. Mean± SD, frequency, percentage, correlation and t-test were calculated for selected variables. A p-value of < 0.05 and <0.01 was considered to be statistically significant.

**Result and Discussion**

**Table 1:** Nutrient intake of boys and girls

Particulars	Subjects (N= 60)					
	Boys (30)	Girls (30)	RDA*(ICMR)			
			Boy		Girl	
Nutrients	Mean ± SD	Mean ± SD	2010	2020	2010	2020
Energy (kcal)	2159.30±342.28	1882.31± 279.19	2320	2110	1900	1660
Protein (g)	77.29± 19.31	60.42±12.71	60	54.0	55	45.7
Fat (g)	34.97±10.87	33.37±8.35	39	35	31	28
Iron (mg)	24.16 ± 9.76	19.51±7.80	17	19	21	29
Calcium (mg)	558.52± 297.13	466.60±180.20	600	1000	600	1000
VitaminC(mg)	54.56± 22.69	62.07±22.04	40	80	40	65
VitaminB12(µg)	0.17± 0.16	0.24±0.41	1.0	2.5	1.0	2.5
Folicacid(µg)	171.78± 58.15	162.23±59.12	200	300	200	220

**\*Recommended Dietary Allowance (ICMR, 2010&2020)**

Present study showed that boys were consuming more protein (28.82%), fat (10.33%), iron (42.12%). vitamin-c (36.4%) and less calorie (-6.93%), calcium (-6.91%), vitamin B12 (-83%) and folic acid (-14.11%) in comparison to RDA. Whereas, girls were consuming more protein (9.85%), fat (7.64%) vitamin-c (55.17%) and less calorie (-0.93%), iron (-7.1%), calcium (-22.23%), vitaminB12 (-76%) and folic acid (-18.89%) when compared with RDA 2010.

Similarly when the study was compared with latest RDA 2020 both the groups were consuming more calorie, proteins and less calcium, vitamin C, vitamin B<sub>12</sub> and folic acid. In terms of fat and iron consumption, boys were taking less fat and more iron whereas girls were taking more fat and less iron.

This finding is similar to Al-Rewashdeh *et al.* (2010) [3], conducted anthropometry and dietary assessment of males and females students at Mu’tah University. They found males and females received lower vitamins (except E), macro minerals (except sodium) and micro minerals (except iron in males) than recommended. This finding is also similar to Hakim *et al.* (2012) [4]. Study was conducted among University students in selected universities in Selangor, Malaysia. They found a significant difference in energy intake, protein and fat intake in regards to gender.

**Table 2:** Academic performance (OGPA) of boys and girls

Particulars	Subjects (N= 60)			
	Boy		Girl	
	Frequency	Percentage	Frequency	Percentage
AOGPA				
<5	6	20	-	-
5-5.9	2	6.66	1	3.33
6-6.9	5	16.66	9	30
7-7.9	14	46.66	14	46.66
8 & >8	3	10	6	20

Table 2 revealed that 46.66 per cent boys and girls students were having OGPA in the range of 7-7.9 followed by 20 per cent boys and 30 per cent girls students having OGPA in the range of <5 and 6-6.9. 16.66 percent boys and 20 per cent girls students reached in the range of 6-6.9 and 8 & >8 followed by 10& 3.33 per cent girls and boys students had OGPA in the range of 8 & > 8 and 5-5.9.

**Table 3:** Comparison of nutritional knowledge between boys and girls

	Mean±SD (Boy)	Mean±SD (Girl)	Difference (t-test)
Nutritional knowledge	67.23±17.60	85.83±17.57	3.651**

\*\*Correlation is significant at the 0.01level

This finding is similar to the study of Labban L (2016). Study was conducted among Syrian University students and female students were found slightly higher points in nutrition knowledge score.

### Correlation coefficient of nutritional intake with academic performance

**Table 4:** Correlation coefficient of nutritional intake with academic performance

	Carbohydrate	Protein	Fat	Energy	Iron	VitB <sub>12</sub>	Calcium	Folicacid	Vitc
OGPA	-0.133	-0.246	0.269*	0.277*	-0.143	-0.159	-0.273*	0.018	0.118

\*Correlation is significant at the 0.05 level

Table 4 revealed that OGPA of students were negatively and non-significant with carbohydrate, protein, iron and vitamin B<sub>12</sub> but significantly correlated with energy and fat whereas negatively significantly correlated with calcium. Similar to this study Ghosh *et al.* (2013) [6] also found energy and fat correlation with academic performance of college students of North Tripura. Supporting to fat relation with brain function an article named “Dietary Fat that Improve Brain Function” published in Psychology Today by Prof. Gary L. Wenk. Table 4 further showed that OGPA of students were positively but non-significant with folic acid and vitamin C.

10. Short Report of Nutrient Requirement For Indians (ICMR and NIN, 2020).

### Conclusion and Suggestion

The study shows that girls are consuming more fat and less energy than boys students and their academic performance is also better than boys students. A Significant relation of energy and fat is also found with academic performance of students. Since early life of an individual growth and development, it is presumed that consuming more fat through the diet will make the person dull and so he or she may be less alert in any brain related work especially in academic performance. But consuming fat in acceptable amount may be helpful in better academic performance. So students need restrict fat intake in view of gaining weight.

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