

Breakfast Consumption Pattern and its Association with Academic Performance

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ABSTRACT

Nearly 30 per cent of the Indian adolescents tend to skip breakfast, and the prevalence of this trend has been growing gradually over the year. Breakfast as the first meal of the day, has been studied for its influence on health issues, psychological impact, as well as day- to- day performance. Beyond simply satisfying hunger, breakfast has been shown to improve both, the health and the cognitive abilities, of individuals. The main aim of the present study was to find out the association of breakfast consumption patterns with Academic performance of adolescent girls. In the present study, 213 students were selected as the study subjects. Among these it was found that 27 per cent of the subjects were breakfast skippers, and 73 per cent of them were Regular breakfast eaters. Skipping Breakfast was shown to interfere with cognition, with a significant difference (p value 0.026) being observed when the cognitive abilities of regular breakfast eaters was compared to that of skippers. Also the varying pattern of mean memory capacities was found to be dipping vertically (66.40 to 61.77) among the regular breakfast eaters as compared to the skippers. Regular breakfast eaters (62.5 per cent) had a high average IQ level as compared to a much lower, 37.5 per cent skippers. 73.8 per cent college going girls who consume breakfast regularly follow a similar pattern of having normal/average IQ levels as compared to that of just 26.19 per cent breakfast skippers. Regular breakfast eaters hence, possess a clear advantage over skippers, when compared in terms of Academic performance and IQ levels. Skipping Breakfast has shown to interfere with cognition. Whopping 90 per cent regular eaters were found to have very good cognitive ability as compared to just 10 per cent skippers. Following a similar trend, 87.5 per cent regular breakfast eaters were analyzed to have good cognitive abilities when compared to skippers in this category (12.5%).

Key words: Regular breakfast eaters; Breakfast skippers; Academic performance; IQ levels;

Breakfast as the first meal of the day has been studied for its influence on health issues, psychological impact, as well as day- to- day performance. Beyond simply satisfying hunger, breakfast has been shown to improve both, the health and the cognitive abilities, of individuals. The United States Department of Agriculture (USDA) defines breakfast as “a meal that encompasses at least 10 per cent of RDA for energy and food from at least two major food groups.” This definition was later clarified by explaining that outside the United States there are often more rigid definitions of breakfast that require the meal to total 20-25 per cent of the recommended daily allowance for energy and include

foods from at least three food groups (Murphy, 2007). Through several studies, frequency of breakfast food consumption has been linked with a range of health benefits; better weight management, lower cholesterol, reduced risk of metabolic syndrome, diabetes mellitus and coronary heart disease, better digestive functioning, fewer upper respiratory tract illnesses and better mental health (Smith, 2009). Despite breakfast's positive traits, many children go to school without eating breakfast. According to a study undertaken in Andhra Pradesh, India, more than half of the school children skip breakfast on at least some days of the week (Chitra et al., 2007). Regular breakfast consumption is correlated with higher

intake of important micronutrients. This may increase the likelihood of meeting nutritional needs. Whereas, breakfast skippers may not make up for the missed nutrients at other meals

METHODOLOGY

A cross sectional study with a pre-structured questionnaire was conducted with a sample size of 213 students belonging to the age group of 15-17 years, from three selected pre- university colleges. A consent letter was addressed to the respective principals of the three institutions in order to permit data collection. Interested subjects participated in the study, and were permitted to discontinue if they were not willing to participate further for any reason. The data was collected with the help of a questionnaire-cum-interview method. The questionnaire was designed to analyze the breakfast patterns, habits and associated awareness amongst the adolescents. Breakfast has many definitions as they can vary depending on various factors. For the purpose of this survey, an adequate breakfast was defined as consumption of 25 per cent of the caloric requirement per day, as given for Indians by the *National Institute of Nutrition (2010)*. Based on this other nutrient requirements were calculated as well. However, the Breakfast consumption pattern was classified based on the frequency of breakfast consumption as:

1. Regular breakfast consumers were the subjects who had breakfast for more than 4 days in a week.
2. Breakfast skippers were those who had breakfast for less than 4 days in a week.

The nutrient adequacy for each of the study subjects was calculated using three-day dietary recall method. This average consumption was compared to that of the RDA of Indians given by the *National Institute of Nutrition (2010)* for each nutrient. The nutrients selected to assess the adequacy were; Energy, protein, Fat, Carbohydrates, Iron, and Vitamin A. The breakfast adequacy for subjects was determined by comparing the average nutrient intake for the breakfast consumed over three days to 25 per cent of the RDA (NIN, 2010). Breakfast must meet at least 25 per cent of the daily RDA for Indians (Malathi et al., 2012). During adolescence, healthy eating behavior is a fundamental prerequisite for physical growth, psychosocial development and cognitive performance,

as well as prevention of diet-related chronic diseases in adulthood. A psychological test is an objective, organized and statistically refined method to measure a specific skill, behavior or a set of characteristics under standardized conditions. The present standardized test (Group test of Intelligence- G.G.T.I- Aby Dr. G.C. Ahuja) was devised in order to meet the pressing demand for a group test of intelligence in English. The test was meant for assessing the general mental ability/ IQ . The entire test takes an average of 35 minutes. Marks obtained from tests and examinations were also collected from the concerned class teacher's to analyze the cognitive and memory abilities of the students. The mathematics marks reflected the cognitive performance of the adolescents, while the English, second language and social science results indicated the memory capacity of the adolescents.

RESULTS AND DISCUSSION

In the present study, 213 students were selected as the study subjects. Among these it was found that 27 per cent of the subjects were breakfast skippers, and 73 per cent of them were regular breakfast eaters (Fig-1). A similar prevalence of breakfast skippers (29%) was found in a study conducted among under graduate students in Kuala Lumpur University, Malaysia (Moy et al., 2009).

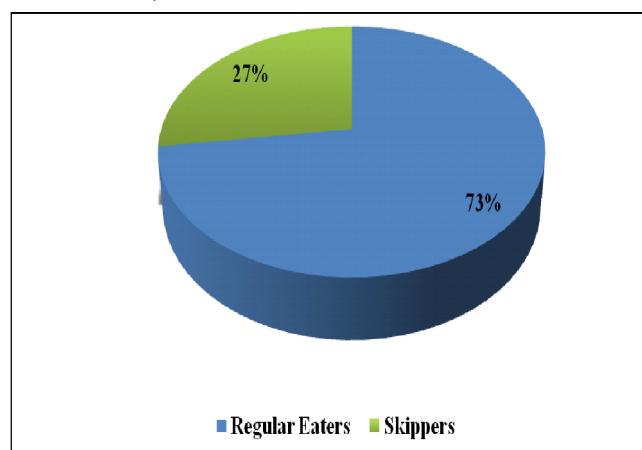


Fig 1: Breakfast consumption pattern of college going girls (15-17 years)

In the present study, 213 students were selected as the study subjects. Among these it was found that 27 per cent of the subjects were breakfast skippers, and 73 per cent of them were Regular breakfast eaters (Fig- 1)

Table 1: Association of Breakfast Consumption Pattern with Cognitive Ability

Breakfast Consumption Pattern	Cognitive Ability					t-test
	>85 Excellent	70+ Very Good	50-70 Good	35-49 Satisfactory	<35 average	
	No (%)	No (%)	No (%)	No (%)	No (%)	
Regular Eaters		27 (90)	35 (87.5)	19 (70.37)	9 (64.28)	0.026
Skippers	0	3 (10)	5 (12.5)	8 (29.62)	5 (35.71)	
Total	0	30 (100)	40 (100)	27 (100)	14 (100)	

Table- 2: Association of Breakfast Consumption Pattern with Memory Capacity

Breakfast Consumption Pattern	Memory Capacity					t-test
	>85 Excellent	71-84 Very Good	50-70 Good	35-49 Satisfactory	<35 Average	
	No (%)	No (%)	No (%)	No (%)	No (%)	
Regular Eaters	13 (92.85)	16 (66.66)	19 (46.34)	12 (70.58)	2 (100)	NS
Skippers	1 (7.14)	8 (33.33)	22 (53.65)	5 (29.41)	0	
Total	14 (100)	24 (100)	41 (100)	17 (100)	2 (100)	

Cognitive ability is an integral part contributing to Academic performance of students. This was determined by taking mathematics and science marks into consideration. Table 1 reveals an excellent depiction of breakfast consumption that plays important role in enhancing cognitive skills amongst college going students. However, 90 per cent of the regular eaters were found to have very good cognitive ability as compared to 10 per cent skippers. Following a similar trend, 87.5 per cent regular breakfast eaters were found to have good cognitive abilities when compared to skippers (12.5%).

Among the regular eaters, 70.37 per cent had satisfactory cognition while only 29.62 per cent skippers were found in this category. However in the below average category, more regular breakfast eaters (64.28%) were found as compared to breakfast skippers (35.71%). This finding opposes the trends observed in the former categories. On plotting the mean cognitive abilities of regular breakfast consumers against breakfast skippers, the line dropped vertically (58.84 to 48.49) among the regular breakfast eaters as compared to the breakfast skippers (Fig-2). Hence, in the present study, skipping breakfast has been shown to pose a negative outcome on cognition of the study subjects. A significant difference (p value 0.026) was observed when the cognitive abilities of regular breakfast eaters were compared to that of skippers.

**Figure 2. Mean Score Depicting the Association of Breakfast Consumption Pattern with Cognitive Ability****Fig- 3: Mean Score Depicting the Association of Breakfast Consumption Pattern with Memory Capacity**

Skipping breakfast is prevalent in school age youth and it has a negative impact on academic achievement. Most of the American youth do not participate in school breakfast programme. High quality breakfast is for youth who are not likely to get good nutrition the rest of the day (Basch, 2011).

Table 3: Association of Breakfast Consumption Pattern with IQ

Breakfast Consumption Pattern	IQ						t-test
	<70 Mentally Defective	70-79 Borderline Defective	80-89 Low Average	90-99 Normal/Average	100-110 High Average	110< Superior No (%)	
	No (%)	No (%)	No (%)	No (%)	No (%)		
Regular Eaters	35 (71.42%)	47 (73.43%)	31 (73.80%)	31 (73.80%)	5 (62.5%)	1 (100%)	NS
Skippers	14 (28.57%)	17 (26.56%)	11 (26.19%)	11 (26.19%)	3 (37.5%)	0	
Total	49 (100%)	64 (100%)	42 (100%)	42 (100%)	8 (100%)	1 (100%)	

Above given table- 2 depicts the varying memory capacities associated to the breakfast consumption patterns of college going girls. A clear difference was observed as 92.85 per cent breakfast eaters were found to have excellent memory as compared to only 7.14 per cent skippers. The category of very good memory projected similar results where Breakfast eaters (66.66%) exactly double the number of breakfast skippers (33.33%). Satisfactory memory also showed similar trends where skippers were found to have a lower satisfactory memory (29.41%) as compared to regular breakfast consumers (70.58%). On the contrary, good memory was found to be higher in skippers (53.65%) than observed in regular breakfast consumers (43.64%). Another prominent opposing projection in this Figure was that there were two study subjects with below average memory capacities in spite of being regular breakfast eaters but no skippers were found in this category. The varying pattern of memory capacities as analyzed from excellent memory to that of below average memory was found to be dipping vertically (66.40 to 61.77) among the regular breakfast eaters as compared to the skippers, (Fig- 3).

Mahoney et.al, 2005 in their study observed that breakfast intake enhanced spatial memory in boys and girls. Girls showed improvement in memory after consuming oatmeal in breakfast. Younger children have shown better memory capacity and auditory attention after consuming oatmeal. The difference in the composition of breakfast of oatmeal like protein, fibre content, glycemic scores and rate of digestion may release slower and sustained energy result in cognitive enhancement. Whereas *Sobaler, 2003* in his study on 180 subjects belonging to the age group of 9-13 years of age found no difference between the personal data of adequate breakfast eaters and inadequate breakfast eaters. In an extended study, by *Smith et al., 2009*

breakfast was also found to have no effect on free recall in the late morning or after lunch, which suggests that the effects of breakfast on episodic memory are restricted to a few hours after the meal. However, the mean score projected in this study, clearly suggests that breakfast consumption does contribute positively to memory.

From table- 3, a mixed trend was observed. Only one study subject, who was a regular breakfast consumer, was found to have a superior IQ score. Regular eaters (62.5%) had a high average IQ level as compared to a much lower, 37.5 per cent skippers. Maximum 73.8 per cent college going subjects who consume breakfast regularly follow a similar pattern of having normal/average IQ levels as compared to that of 26.19 per cent breakfast skippers. However, in the low average, borderline defective, and mentally defective categories, breakfast eaters were found to be higher; 73.80 per cent, 73.43 per cent, and 71.42 per cent, respectively. The remaining study subjects were breakfast skippers in each of these classifications. Hence the former three categories oppose that of the latter three categories of IQ scores. On plotting the mean IQ levels of regular breakfast consumers against breakfast skippers, the line decreased vertically with a small difference (79.15 to 78.64) among the regular breakfast eaters as compared to the breakfast skippers (fig-4).

In the present study therefore, breakfast consumption is said to have a positive effect on IQ though a very small difference between regular breakfast eaters and skippers was observed. Very few researches have studied about this association. A study which examines IQ and breakfast consumption found that children who ate breakfast regularly had significantly higher full scale, verbal and performance IQ test scores (*Lien et al., 2007*).

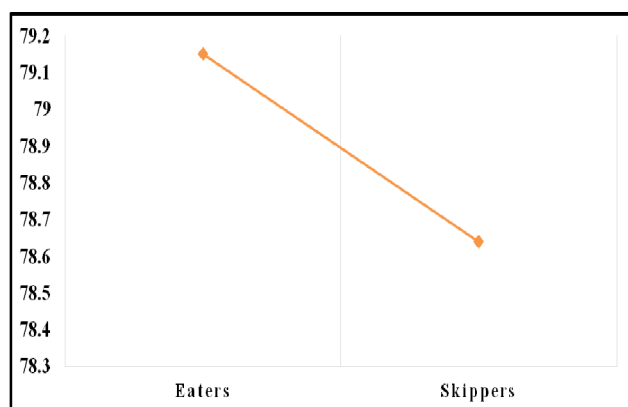


Fig-4 : Mean Score Depicting the Association of Breakfast Consumption Pattern with IQ

CONCLUSION

In the present study overall data depict that skipping Breakfast may interfere with cognition. A whopping 90 per cent regular eater was found to have very good cognitive ability as compared to just 10 per cent skippers. Following a similar trend, 87.5 per cent regular breakfast eaters were analyzed to have good cognitive abilities

when compared to skippers in this category (12.5%). A significant difference (p value 0.026) was observed when the cognitive abilities of regular breakfast eaters were compared to that of skippers. A clear difference was observed as 92.85 per cent breakfast eaters were found to have excellent memory as compared to only 7.14 per cent skippers. Regular eaters (62.5%) had a high average IQ level as compared to a much lower, 37.5 per cent skippers. 73.8 per cent college going girls who consume breakfast regularly follow a similar pattern of having normal/average IQ levels as compared to that of just 26.19 per cent breakfast skippers. However, in the low average, borderline defective, and mentally defective categories, breakfast eaters were found to be higher; 73.80 per cent, 73.43 per cent, and 71.42 per cent, respectively. The remaining study subjects were breakfast skippers in each of these classifications. Mean scores did not depict a significant difference. Therefore, Regular breakfast consumption is correlated with higher intake of important micronutrients which positively influence nutritional needs.

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