

Relationship Between Nutritional Health and Academic Performance of School Going Children

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ABSTRACT

Objective: The objective of the present study was to examine the significance of breakfast and nutrition with reference to academic performance of school aged children.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted in Lahore College for Women University, Lahore from March to April 2011.

Materials and Methods: 368 children of grade 3-5, both boys and girls, from five private schools of Lahore were studied using purposive sampling. To see the nutritional level and academic performance of children, two self - constructed questionnaires, a) Child Nutrition and Performance Questionnaire and b) Child's Performance Questionnaire were designed and used to collect the data.

Results: The findings suggest that the children of regular breakfast group are high in academic performance as compared to irregular breakfast and no breakfast groups. The correlation between nutritional value of breakfast and academic performance was found to be significant.

Conclusion: Considering the importance of children's health, this study can show new directions to nutritionists, diet planners and researchers interested in health and well being of children.

Key Words: Breakfast, Nutrition, Academic Performance

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INTRODUCTION

During the childhood daily routine in a twenty four hour period, the biggest interval in which a child lacks the outside supply of energy and nutrient is generally between the meal in the evening and the next morning breakfast. This long gap lowers the child's energy level as well as ability to perform up to the mark. The child physical and mental development needs an adequate supply of nutrition and this supply gives the child energy to perform properly both at home and at school.¹ Breakfast and its effects on children's performance have been a central area of concern for educators, nutritionists and health professionals. As the highly essential meal of the day, a breakfast can influence directly or indirectly many aspects of child growth and development. Breakfast is the beginning of a fresh start after the night's fast. Approximately 12 hours pass between dinner and breakfast and during that period of sleep the body continues to operate, and utilize the food consumed earlier. Therefore as a consequence of that night's fast the blood sugar level of the hungry person is at its minimum level. Insufficient energy supply to

the brain leads to deprivation that might lead to poor performance. The individual can suffer from problems such as tiredness, headache, low attention span and perception deficiency.²

According to one research, the child's ability to pay attention, performance on problem-solving tasks, and memory can be improved through the habit of breakfast.³ A healthy breakfast has also been linked to fewer absences and less tardiness.⁴

Lots of Asian countries are under rapid developmental changes. We can see that these changes are no doubt improving people's economic status and their standard of living. But this increase in urbanization is also affecting the healthy eating habits negatively as reflected in the increasing trend of consuming processed and junk food.

People can provide good quality food to their children, but fail to do so because of the lack of awareness and insufficient information about food properties. In Pakistan very little work has been done on the importance of breakfast, especially its relationship with children's academic performance. The present endeavor was designed to see the link between nutritional health and performance of school aged children.

In an earlier research it was observed that regular breakfast eaters scored high in tests as compared to no breakfast group.⁵ The importance of breakfast was seen with reference to the academic success in the work of

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some other authors too. Starting school breakfast program, a significant improvement was seen in the math grades of students.⁶ Students who are regular breakfast eaters are good and very good in their school performance.⁷

According to the Food Research and Action Centre, children who eat breakfast have high cognitive function with increased attention span and memory. Skipping breakfast among children can cause memory problems with poor academics. The same source confirms that children's habit of skipping breakfast decreases the ability to differentiate among visual images. Children who eat regular breakfast as compared to breakfast skipper make less mistakes, work fast in math problems and vocabulary test.⁸

The relation of nutrition and academic performance was seen in Malaysian school children of primary level. They explored academic performance's correlation with the aspect of breakfast taking.⁹ Junior school children who participated in school breakfast program scored high in math scores.¹⁰ The habit of taking breakfast can increase memory, and marks in school grades.¹¹ Another research showed that children who eat regular breakfast are high in energy levels and perform better in learning abilities than the no breakfast eating group.¹² Similar findings are reported about better marks on math.¹³

MATERIALS AND METHODS

This cross sectional study was conducted in Lahore College for Women University, Lahore from March to April 2011.

Sampling strategy: The 368 participants, both boys and girls, in classes 3-5 were selected through purposive sampling from branches of the private schools of Lahore including City School, Defense Public School, Salamat School Systems, Crescent Model Higher Secondary School, and Muslim Grammar School. The sample covered junior school grade 3(N=139), 4(n=117) and 5(N=111). Information about these children was gathered from their mothers and teachers. In case of non availability of mothers, the fathers were included. 368 parents in all were contacted.

Inclusion Criteria:

- Male and female private school students belonging to middle and upper middle class
- Students without a known chronic disease.

Exclusion Criteria:

- Students in public schools
- Students having a known chronic disease

Measures: Child Nutrition and Performance Questionnaire (CNPQ) and Child's Performance Questionnaire (CPQ) were designed and used for the data collection.

The CNPQ was sent alongwith children's diaries to their mothers to be filled out at home and returned. In

some cases the fathers too filled it out. Some mothers who could not be sent the CNPQ due to various reasons were interviewed in school on result day. CPQ was given to teachers for ratings on children's performance.

RESULTS

Three main breakfast intake categories were examined in the presen research; 200 (54.34%) participants were regular breakfast eaters, 124 (33.70%)were irregular, and 42 (11.41%) did not have the habit to take breakfast in the morning.

The participants were also asked to mention the number of food group that they took in their breakfast.

Table No.1: Food groups consumed in breakfast/ given in lunch box

S.No	food groups
1	Dairy group (milk, butter, cheese, etc)
2	Cereal group (roti, bread, paratha, cereal, biscuits,noodles, etc)
3	Fruit group (apple, banana etc)
4	Meat and egg group (kabab, home made curry, omelet)
5	Dessert group (pastry, sweet etc)
6	Junk food group (chips, burger, etc)
7	Any other

(Each group has 2 points. The more the variety of foods the child is taking the more the score will be)

Most of the participant took one type of food group in their breakfast rather than variety of food group i.e., balanced diet.

The list of behavioral and health complaints were also gathered about the participant from the mother of the participant. Health complaints comprised of weak eye sight, headache, asthma, tonsils, skin problems and issue of underweight whereas behavioral complaints included fighting with sibling, weeping in morning time, etc. The teachers' account about the child was taken in the form of behavioral and academic complaints too. Behavioral complaints consisted of over activity or hitting other children, whereas academic complaints comprised of poor hand writing, difficulty in understanding etc.

Overall performance of the participants in their last examination was taken in the form of percentage/grades categories that acted as a standard format of evaluation in schools. 27% of the participants were in the category of grade B or 75%-84%.

The mean age of the participants was 9 years. The mean height was 4feet and 3 inches, SD 0.4. The mean weight of the participants was 30 kg, SD 7.6.

The mean education of the mothers of the participants was 13 years with the SD 2.4. The mean age of fathers of the participant was 41 years, SD 2.4. The mean education of the fathers is 14 years, SD 2.4. The mean per month income of the family of the participant was Rs. 62271 with SD Rs. 63520.0.

The information regarding the nutritional value of food consumed by the participants yielded significant insight. The mean of the category of the nutritional value of the food group (cereal group, dairy group, fruit group, dessert group and junk food group) consumed by the participants was 4.7, SD 3. The mean of the category of the nutritional value of the food group in lunch box is 4.4, SD 2.6. The main behavioral complaints about the participant reported by mothers were anger problem, hyperactivity and weeping in the morning time. The main behavioral complaints about the child as reported by teacher were talkative, carelessness and shy. The main academic complaints reported by teachers were slow hand writing, and poor grades.

The following grade categories and corresponding points were considered while examining the students' academic performance:

Grades	Percentage of marks in last exam	Points
A+	95%-100%	7
A	85%-94%	6
B	75%-84%	5
C	65%-74%	4
D	55%-64 %	3
E	45%-54%	2
U	Below 45%	1

The mean performance of the participants in mathematics falls in the category 5 which represents 75%-84% with SD 1.5. The mean performance of the participants in English falls in the category 4 with SD 1.6(N=356). The mean of the class participation is around 4 on a 5- point rating scale where 1 is unsatisfactory and 5 is satisfactory with SD 1.1, the maximum being 1 and the minimum being 5. The mean of the performance in the first period is 4 with SD 1.1. The participants attendance record was also taken from the class teacher. The mean attendance percentage was 91 % with SD 10.

This difference between the overall performances of the participants coming from three breakfasts categories was analyzed through analysis of variance (ANOVA).

Table No.2: Analysis of variance (ANOVA) of breakfast categories and overall academic performance

Variable and source	SS	df	MS	F	p
Between Groups	43.54	2	21.772	12.285	0.000*
Within Groups	634.456	358	1.772		
Total	678.000	360			

* F value significant at $p < 0.05$

Table No.5: Multiple comparisons of nutritious breakfast and academic performance

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	Post hoc
OAP	4.0	1.7	4.6	1.2	4.8	1.3	4.7	1.3	5.2	1.0	4.3	1.2	4.1	1.5	4.0	2.0	1<5

The finding of ANOVA reflect that there is a highly significant difference between breakfast categories and overall performance, $F = (2,358) = 12$, $p < 0.05$. This significant difference is further looked into by using Tuckey's post hoc analysis.

Table No.3: Multiple comparisons of breakfast categories and overall performance

	Regular break fast(3)		Irregular break fast(2)		No break fast(1)		Post hoc
	M	SD	M	SD	M	SD	
Overall performance	4.9	1.2	4.4	1.3	3.9	1.5	1<2<3

Table 4 presents the post hoc multiple analysis. The Tukey's post hoc multiple analysis output indicates that the difference between regular and no breakfast group is highly significant $p = 0.00$, $p < 0.05$. Whereas the difference between irregular and no breakfast group is also significant $p = 0.04$, $p < 0.05$.

The significant difference between the nutritional value of breakfast and the academic performance is seen by applying the Analysis of Variance (ANOVA).

Table No.4: Analysis of variance (ANOVA) of nutritious breakfast and academic performance

Variable and source	SS	Df	MS	F	p
Between Groups	28.411	7	4.059	2.248	0.03*
Within Groups	628.428	348	1.806		
Total	656.840	355			

* F value significant at $p < 0.05$

The findings of ANOVA show that there is a significant difference between nutritional value of breakfast and academic performance. The difference $F = (7,348) = 2.24$, $p < 0.05$ proves the hypothesis that there is a significant difference between the academic performance of children eating breakfast containing variety of nutritional substances. This significance of difference is further seen by using post hoc analysis.

OAP=overall academic performance No food group=(1) one food group=(2),two food groups=(3),three food group=(4),four food groups=(5),five food groups=(6),six food groups=(7), and seven food groups=(8). It can be seen that the performance of those having five nutritional groups is better than that of those did not take any food group, no breakfast.

DISCUSSION

The authenticity of the results increases when it is validated with literature related to it. In the current research academic performance of children who eat regular breakfast was higher than academic performance of children in no breakfast group. The findings of the present research find support from the investigations made in other parts of the world. Students who received nutrition, and better nutrition, performed better than those who missed many nutrients. When the relationship between nutritional status and performance in academic activities were assessed and it is seen that the children who eat nutritional breakfast perform well in academics. children who used cereal breakfast were more active mentally in the morning and the attention and memory of those children was also not declined.³The relation of nutritional value with the academics were also seen.¹⁴ Some researches also showed the link between quality of diet and its effects on the academics. The results of their findings stated that when the quality of food lowers down the performance on different assessment also decreases.¹⁵In India the work on the breakfast and its link with performance was conducted. According to their findings children who skip breakfast are also poor in total intake of other nutrients especially protein than children who take breakfast.¹⁶ One of the research findings on the breakfast type stated that the composition of breakfast matters a lot in the child's ability to perform. They found out that the children who consumed oat meal performed better on different task that involve cognitive functioning. Due to the difference in composition oatmeal consumed slowly and the energy level sustained which indirectly increased the performance level of children. By using different variety of foods the nutritional need of the child can be fulfilled.¹⁷Many research works are conducted on the types of breakfast and its positive influence on school going children. The breakfast which is rich in carbohydrate can positively influence the performance of children that involve mental activity at school.³ The effect of breakfast in nourished and under nourished children with relation to achievement was studied. According to the findings the nourished children scored high on arithmetic, reading and spelling as compared to undernourished children.¹⁸ The quality of food in the current research is measured through the number of food groups that are cereal group, dairy group, fruit group, dessert group and junk food group. It has been proved from different researches that every food has its unique make up of nutrients which make it important for diet.

CONCLUSION

The current study is one of its own kind in the field of Health Psychology in Pakistan. In this emerging field

very little work has been done for children's well being especially on nutritional health and breakfast habits. The present study will help the nutritionists, educationists, teachers, parents and health professional to work in new dimensions for the betterment of children.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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