

IMPACT ASSESSMENT OF NUTRITIONAL EDUCATION ON HEALTH AND SCHOOLING OF PRIMARY CLASS STUDENTS

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ABSTRACT: *In less developed countries millions of children suffer from poor health and nutrition, they complete their education far fewer years of schooling and cram less as per year of schooling than the children in developed countries. Recent research was carried out to study influence of nutrition on health and education of primary school students. It was found that nutrition had important effects on health and education. The students' attitude somewhat changed towards selection of healthy foods. That's why most of the students selected grains and cereals as healthy food for them. The results also indicated that primary school students had poor knowledge and understanding of facts about energy and nutritive value of food. Knowledge and understanding about the energy and nutritive value of a particular food for humans required an abstract thinking ability, which student, due to their cognitive development find difficult. It is strongly recommended that nutrition education should be adopted at cognitive development level of students.*

INTRODUCTION

Food nutrients maintain the day to day living activities, safeguard cells from damage and repair any type of cellular damage. Also, protein rebuilds the injured tissues and encourages strong immune system. Vitamins A, E and E act as antioxidants to defend cells against contaminants and vitamin B helps to extract energy from the foods. In today's world, advancing in nutrition is a requirement, not an extravagance. A nutritious food may be hypothesized as one that provides the suggested amount of crucial nutrients without the undue consumption of energy and food constituents (such as fat) associated to enduring diseases [1, 2]. Many kids of the developing countries suffer from deprived healthiness. In children's diets milk is the primary source of calcium and displacement of milk by soft drinks can lessen calcium intake among youngsters [3, 4, 5, 2]. According to the United Nations estimations one third of playgroup age children in less developed countries experience stunting growth relative to international norms [6], while millions more suffer from tropical diseases, including intestinal parasites and malaria [7]. Deprived health and nutrition has negative impact among youngsters on their schooling, children are most susceptible to the effects of nutritional insufficiencies in the first few years of life and that some of these effects may be permanent, much can still be done to improve the learning latent of underweight school children. Deprived health may decrease learning for a variety of reasons, including lower daily attendance, fewer enrolled years and less effective learning per day. Policies and programs should be made to improve children's health prominence and also to mend their education concerns because nutrition affects school performance indirectly. Children in the less developed countries usually have worse health and education consequences than children of advanced countries. Many scientists have endeavored to estimate the influence of child health on education results, but there are challenging hindrances for attaining reliable evaluations therefore, data are often infrequent (much less scarce than in the previous years), but even more prominently there are many possible sources of unfairness when trying to estimate relationships

between child well-being and education. Due to this reason, this study aims to investigate the relationship between students' health and their learning abilities, educating school children about health and healthy diet is intended to accomplish two important objectives. The first is to study impact of nutrition on health and education of primary school students. The second is to change students' unhealthy attitudes and to motivate them to establish healthy eating practices.

RESEARCH METHODOLOGY

Selection and Recruitment of Primary Schools

After complete discussion with education department and Government schools' staff, 30 schools from both project areas were selected to participate in the study. Regular lectures were delivered in the selected schools to create awareness among school children especially the nutritional value of carrot in human nutrition.

Study Design

The Cluster sampling was used to select 30 schools from full list of Government schools in District Layyah and District Faisalabad provided by the Education department.

The Study was conducted among selected primary schools in District Layyah and District Faisalabad from 28th November to 12th December, 2014. Only students from Primary class 4th and 5th were selected because students of the younger classes (1st to 3rd) might have some difficulties in understanding the questions or to answer on their own.

Population of Study

Participants of the study were fourth and fifth class students.

Data collection

School teachers circulated the questionnaires to all fourth and fifth standard students whose parents had previously showed willingness for their children to participate in this study. During classroom session all of them were asked to complete the questionnaire.

Period of Fieldwork

Survey forms were distributed among the students of both project areas and completed questionnaires were collected on the same day.

Quality Control:

Few quality control (QC) measures incorporated in the study were as follows:-

- The collected data was subjected to range checking and logical checking. Illogical and unclear answers were recoded as unacceptable.
- Questionnaires with more than half of the questions unanswered were regarded as incomplete and excluded from analysis.
- Missing answer in the corresponding question was excluded from analysis.

Data Analysis

Data was statistically analyzed using Statistics 8.1. One sample T-test was used to check significance of the data.

Gender	Total
Male	200
Female	200
Total No. of students	400
Class	4 th & 5 th

RESULTS AND DISCUSSION OF THE QUESTIONNAIRE

Total of 425 questionnaire copies were distributed among the students in 30 participating schools. 425 copies of the completed questionnaires were collected with a response rate of 94%. Of all the questionnaires collected, 25 questionnaires were excluded as more than half of the questions in these questionnaires were unanswered. The remaining 400 questionnaires were used for further analysis.

Class wise comparison

Highly significant (P<0.01) differences were observed among students of 4th and 5th class (Table 1). Students of 4th class liked more food items (0.98%) such as fried and deep-fried foods (2.10%), foods with high sugar (1.93%) and drinks (1.88%) than students of 5th class. More number of students had their breakfast (0.53%) in 5th class and liked grains and cereals (2.60%), vegetables (2.46%), fruits (2.39%), dairy products (2.36%), protein rich foods (2.28%), and foods with high fats (1.74%). Four Class students were healthier (1.60%) than five class students due to their keenness in selection (1.40%) of healthy (1.63%) and beneficial (0.58%) diets. Generally primary school students preferred grains and cereals (2.54%) over other food items (Table 2). Three foremost components known to be real in treating and avoiding obesity comprises of nutritional education, exercise and behavior modification [8]. These three fundamentals have been engaged in a number of programs but the limitation of the previous efforts is that programming may have been started too late in the education progression [9].

Table 1. Mean comparison between four and five class students for different food items

Variables	Class 4 (Mean ± SD)	Class 5 (Mean ± SD)	Total (Mean ± SD)
	N=200	N=200	N=400
Favorite	1.95±0.89**	1.74±0.75**	3.69±1.64**
Breakfast	1.00±0.00**	1.05±0.21**	2.05±0.21**
Fruits	4.65±1.50**	4.77±1.29**	9.42±2.79**
Vegetables	4.25±1.71**	4.91±1.30**	9.16±3.01**
Dairy Products	4.65±1.46**	4.72±1.23**	9.37±2.69**
Protein rich foods	4.20±1.61**	4.56±1.29**	8.76±2.90**
Grains and Cereals	4.95±1.57**	5.20±1.20**	10.15±2.77**
Fried and deep-fried foods	4.20±1.51**	3.88±1.43**	8.08±2.94**
Drinks	3.75±1.62**	3.55±1.45**	7.30±3.07**
Foods with high sugar	3.85±1.39**	3.77±1.48**	7.32±2.87**
Foods with high fat	3.10±1.55**	3.48±1.59**	6.58±3.14**
Health	3.20±1.47**	2.69±1.22**	5.89±2.69**
Healthy Diet	3.25±0.85**	3.11±1.04**	6.36±0.89**
Selection	2.80±1.32**	1.75±1.08**	4.55±2.40**
Beneficial Diet	1.15±0.37**	1.11±0.31**	2.26±0.68**

There were highly significant differences between 4th and 5th class students, P<0.01 for all traits under study. SD=standard deviation

Table 2. Mean performance of four and five class students for different food items in term of percentage

Variables	Class 4(%)	Class 5(%)	Total (%)
Favorite	0.98	0.87	0.92
Breakfast	0.50	0.53	0.51
Fruits	2.33	2.39	2.36
Vegetables	2.13	2.46	2.29
Dairy Products	2.33	2.36	2.34
Protein rich foods	2.10	2.28	2.19
Grains and Cereals	2.48	2.60	2.54
Fried and deep-fried foods	2.10	1.94	2.02
Drinks	1.88	1.78	1.83
Foods with high sugar	1.93	1.89	1.83
Foods with high fat	1.55	1.74	1.65
Health	1.60	1.35	1.47
Healthy Diet	1.63	1.56	1.59
Selection	1.40	0.88	1.14
Beneficial Diet	0.58	0.56	0.57

Gender wise comparison

Highly significant (P<0.01) differences were recorded among boys and girls in the choice of different food items (Table 3). In gender comparison, girls had more food choices (0.89%) and liked fruits (2.42%), foods with high sugar (2.04%), fried and deep fried foods (1.99%), drinks (1.95%) and foods with high fats (1.80%). The results are in line with “sweet tooth

hypothesis” which states that the people that strongly liked sweets (foods with high sugar e.g. snack) also frequently eat more fruits [10, 2]. Girls had less number of breakfast (0.50%) habits. On the other hand, boys had more number of breakfasts (0.53%) and liked grains and cereals (2.63%), vegetables (2.50%), dairy products (2.41%) and protein rich foods (2.32%). Boys were healthier (1.38%) than girls as they selected healthy (1.70%) and beneficial (0.56%) diets (Table 4).

Table 3. Mean performance of boys and girls in selection of different food items

Variables	Boys (Mean ± SD)	Girls (Mean ± SD)	Total (Mean ± SD)
	N=200	N=200	N=400
Favorite	1.74±0.79**	1.77±0.68**	3.51±1.47**
Breakfast	1.06±0.24**	1.00±0.00**	2.06±0.24**
Fruits	4.74±1.25**	4.84±1.45**	9.58±2.70**
Vegetables	5.00±1.22**	4.49±1.57**	9.49±2.79**
Dairy Products	4.81±1.21**	4.46±1.27**	9.27±2.48**
Protein rich foods	4.63±1.26**	4.27±1.42**	8.90±2.68**
Grains and Cereals	5.25±1.13**	4.99±1.45**	10.24±2.58**
Fried and deep-fried foods	3.87±1.43**	3.98±1.46**	7.85±2.89**
Drinks	3.45±1.44**	3.89±1.45**	7.34±2.89**
Foods with high sugar	3.68±1.49**	4.07±1.38**	7.75±2.87**
Foods with high fat	3.42±1.55**	3.60±1.69**	7.02±3.24**
Health	2.71±1.23**	2.76±1.29**	5.47±2.52**
Healthy Diet	3.02±1.00**	3.40±1.05**	6.42±2.05**
Selection	1.79±1.11**	1.82±1.15**	3.61±2.26**
Beneficial Diet	1.11±0.31**	1.10±0.30**	2.21±0.61**

There were highly significant differences between boys and girls, P<0.01 for all traits under study. SD=standard deviation

Table 4. Mean performance of boys and girls in selection of different food items in term of percentage

Variables	Boys (%)	Girls (%)	Total (%)
Favorite	0.87	0.89	0.88
Breakfast	0.53	0.50	0.52
Fruits	2.37	2.42	2.40
Vegetables	2.50	2.25	2.37
Dairy Products	2.41	2.23	2.32
Protein rich foods	2.32	2.14	2.23
Grains and Cereals	2.63	2.50	2.56
Fried and deep-fried foods	1.94	1.99	1.96
Drinks	1.73	1.95	1.84
Foods with high sugar	1.84	2.04	1.94
Foods with high fat	1.71	1.80	1.76
Health	1.38	1.36	1.37
Healthy Diet	1.70	1.51	1.61
Selection	0.91	0.90	0.90
Beneficial Diet	0.56	0.55	0.55

Age wise comparison

Students with different ages showed highly significant (P<0.01) differences among them (Table 5). Eleven to thirteen years old students had better choices (0.89%) than 8-10 years old students. They liked grains and cereals (2.60%), dairy products (2.38%), Protein rich foods (2.28%), healthy

diets (1.57%) and were healthy (1.40%). Eight to ten years old students took their breakfast (0.53%) more regularly than 11-13 years old students as they needed more energy. They also liked vegetables (2.51%), fruits (2.40%), fried and deep-fried foods (2.12%), foods with high sugar (1.91%) and fats (1.82%) (Table 6). Biswas *et al.* [11] and Haldar *et al.* [12] showed similar result in intervention study involving secondary school students in rural West Bengal. Change in health nutrition behavior among primary school students by health nutrition education, was also revealed from other studies Anderson *et al.*, [13], Poh *et al.*, [14], Ruzita *et al.*, [15] Haldar *et al.*, [12].

Table 5. Mean performance of students of different age for different food items

Variables	Age 8-10 years (Mean ± SD)	Age 11-13 years (Mean ± SD)	Total (Mean ± SD)
	N=200	N=200	N=400
Favorite	1.61±0.71**	1.78±0.77**	3.39±1.48**
Breakfast	1.05±0.21**	1.04±0.21**	2.09±0.42**
Fruits	4.79±1.20**	4.76±1.33**	9.55±2.53**
Vegetables	5.01±1.10**	4.84±1.39**	9.85±2.49**
Dairy Products	4.57±1.23**	4.76±1.23**	9.33±2.46**
Protein rich foods	4.51±1.38**	4.55±1.29**	9.06±2.67**
Grains and Cereals	5.15±1.31**	5.19±1.20**	10.34±2.51**
Fried and deep-fried foods	4.24±1.36**	3.81±1.44**	8.05±2.80**
Drinks	3.56±1.41**	3.56±1.47**	7.12±2.88**
Foods with high sugar	3.82±1.27**	3.76±1.52**	7.58±2.79**
Foods with high fat	3.63±1.54**	3.42 ±1.60**	7.05±3.14**
Health	2.45±1.13**	2.79±1.26**	5.24±2.39**
Healthy Diet	3.05±0.99**	3.14±1.04**	6.19±2.03**
Selection	1.82±1.11**	1.79±1.12**	3.61±2.23**
Beneficial Diet	1.11±0.31**	1.11±0.31**	2.22±0.62**

There were highly significant differences between students of different ages, P<0.01 for all traits under study.

SD=standard deviation

Comparatively, less improvement in 8-10 years old students might be due to inability to realize the whole thing or failure to motivate parents for required change in diet.

Table 6. Mean performance of students of different age for different food items in terms of percentage

Variables	Age 8-10 years (%)	Age 11-13 years (%)	Total (%)
Favorite	0.81	0.89	0.85
Breakfast	0.53	0.52	0.52
Fruits	2.40	2.38	2.39
Vegetables	2.51	2.42	2.46
Dairy Products	2.29	2.38	2.33
Protein rich foods	2.26	2.28	2.27
Grains and Cereals	2.58	2.60	2.59
Fried and deep-fried foods	2.12	1.91	2.01
Drinks	1.78	1.78	1.78
Foods with high sugar	1.91	1.88	1.90
Foods with high fat	1.82	1.71	1.76

Health	1.23	1.40	1.31
Healthy Diet	1.53	1.57	1.55
Selection	0.91	0.90	0.90
Beneficial Diet	0.56	0.56	0.56

CONCLUSION

Students' attitude towards selection of healthy foods was improved. Most of the students liked grains and cereals as beneficial diet. Knowledge about relationship between dietary patterns and food intake give useful evidence for scheming effective nutrition schooling plans to improve primary school student's diet. Inclusion of nutritional education in primary schools could be adopted for better health of students ultimately leading towards a healthy society.

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