Original article

Effect of dairy milk, eggs, meat, fish and fruits intake on academic performances of secondary school students in Bangladesh

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Abstract:

Background: Contribution of dairy milk and other food items and schools to academic performances of students are the important factors to build a peaceful meritorious nation with sound mental and physical health. ***Objective:*** This experiment was designed to study the contribution of dairy milk and other food item intake pattern and schools to academic performances. ***Method:*** Students of class nine in Bangladesh were enumerated using a pre-prescribed questionnaire during March 2016 to June 2016 by direct interview method. Collected primary data were analyzed using the Statistical Package for the Social Sciences version 14.0[15]. ***Results:*** Male (69.63%) students and students of schools in the town (84.97%) performed better. Majority of the students in towns (46.85%; 49.65%) and villages (45.51%; 50.90%) drank dairy milk and ate meat respectively, once or twice in a week. Many students in towns (30.77%) and villages (38.92%) ate eggs for 3 to 4 days in a week. Maximum students in town (53.50%) and in village (46.71%) took fish for 5 to 7 days and 3 to 4 days in a week, respectively. Many students in town (39.86%) and in village (59.88%) took fruits 1 to 2 days and 5 to 7 days in a week, respectively. Most (74.31%) of the students who took dairy milk, meat (73.68%), fruits (66.67%), fish (65.81%) and eggs (64.71%) everyday in a week obtained A grade. ***Conclusions:*** Schools, availability of dairy milk, meat, fruits, fish and eggs, Tiffin intake status and gender affected the academic performances but educational institutions had no effect on weekly dairy milk, eggs and meat intake of the students but weekly fish and fruits intake status were affected.

Keywords: dairy milk; meat; fruits; fish; eggs; schools; academic performances; Bangladesh.

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Introduction:

Young students are the main focal point of an educated nation and smart future leaders who could contribute to guide and lead the family and society in the wisest way to build a peace and prosperous world. FAO recommended per capita requirement were, 104.00 pc/head/year, 120 gm/head/day and 250 ml/head/day, respectively where per capita availability of eggs, meat and milk in Bangladesh were, 50.00 pc/head/year, 65.03 gm/head/day and 91.03 ml/head/day, respectively[12]. A few numbers of students took eggs and milk everyday in a week and secondary school students were fonder of meat than that of milk and eggs[7]. Lactose is an important contributor from a nutritional perspective starting at infancy and it is unique to the milk of mammals. Dairy milk contains

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lactose and which is comprised of two simple sugars, glucose and galactose. Galactose is essential for the formation of cerebral galactolipids[18]. Eggs and chicken meat are two vital sources of high-quality protein, vitamins and minerals[3]. Standard Protein Requirements at 10,11,12,13,14,15 and 16 years old girls are 34.04, 38.70, 43.12, 46.85, 48.32, 47.70 and 46.98 g per day, respectively while the same for boys are 32.52, 36.63, 40.08, 47.00, 51.02, 53.36 and 56.43 g per day, respectively[10]. Inadequate dietary intake and prolonged undernourishment stunt growth, slow cognitive development, and increase susceptibility to illness[16]. Unhealthy eating during childhood might affect learning negatively[14]. Those who ate more fast food among the 5th grade students performed worse on math and reading scores[11]. Generally children took meat, fish, eggs, poultry meat and pulses during dinner and consumed milk (6.7%), fruit (8.3%), yoghurt (0.4%) and fruit juices (3.8%) to a lesser extent[1]. Institutional factors affect students' performance[2]. A balanced diet is crucial in promoting emotional well-being, psychosocial functioning and in maintaining physical health[5]**.** Boys tended to eat less fruit and vegetables and consume more soft drink than girls[17]. Meat supplementation increases in end of term test scores, intelligence and behavioral outcomes[13]. Study on contribution of dairy milk intake of secondary level students and schools on academic performances in Bangladesh are scanty. So this study was aimed, designed and conducted with following objectives:

a) To explore knowledge on dairy milk and other food intake pattern,
b) To find out the contribution of dairy milk, meat, fruits, fish, eggs and schools to academic performances.

Methodology:

A total 453 students of class nine in 6 secondary schools at towns and villages from the districts of Dhaka, Mymensingh, Pabna and Panchagar in Bangladesh were enumerated to generate the information from March 2016 to June 2016 (Table 1).

Table 1: Background of participating students and schools.

Locations of schools	Students Number	Gender		Mother's education			Father's education		
		M	F	1	2	3	1	2	3
Town	286	154	132	114	122	50	147	89	50
Village	167	60	107	37	42	88	67	36	64
Total	453	214	239	151	164	138	214	125	114

Note: Education: 1=graduate and above, 2= SSC & HSC, 3= JSC (junior school certificate) and below; Gender: M=Male, F=Female

A pre-prescribed questionnaire was used to collect the data by direct interview method. Data were collected from door to door visit in different secondary schools. Data on academic performances in GPA (grade point average), daily food intake and weekly food intake etc were documented. The statistical design of the study was unbalanced factorial in nature because; the observations number in different traits was unequal. Collected data were analyzed for having frequency and percentage through descriptive statistics menu under the Statistical Package for the Social Sciences version 14.0[15].

Results:

Academic performances variation for schools and gender

Performances of students of schools situated in towns were better than the students of schools in the villages (Table 2.1). Most of the students (84.97%) of schools in the towns obtained grade point A but some of the students (26.35%) of village schools did same result.

Table 2.1: Variation for schools and gender of students in academic performance

Traits	Category	Participants number	A
Schools	Town	286 (63.135)	243 (84.97%)
	Village	167 (36.87%)	44 (26.35%)
	Total	453	287
Gender	Male	214 (47.24%)	149 (69.63%)
	Female	239 (52.76%)	138 (57.74%)
	Total	453	287

Note: A= GPA 4.6 to 5.

Better results of junior school certificate (JSC) examination were reported for the male students than that of females (Table 2.1). Majority (69.63%)

out 214 male students got grade point A and many (57.74%) out of the 239 female students obtained this results (Table 2.1).

Variation in weekly food intake

Maximum (46.85%) students in town out of 286, took dairy milk one to two days in a week and a few (17.83%) of them took dairy milk for 5 to 7 days. Similarly, maximum (45.51%) students in village ate dairy milk once or twice in a week and a few (11.98%) of them have had dairy milk for 5 to 7 days (Table 2.2). Many (30.77%) students in town out of 286, took eggs for 3 to 4 days in a week and some (27.97%) of them ate eggs 5 to 7 days. However in village many students (38.92%) out of 167 ate eggs 3 to 4 days in a week and some (31.74%) of them took eggs for 5 to 7 days (Table 2.2). Many students in town (49.65%) and in village (50.90%) took meat once or twice in a week (Table 2.2).

Table 2.2: Variation for schools in weekly food intake

Traits	Schools	Participants number	Frequency in a week		
			2 days and below	3 to 4 days	5 to 7 days
Dairy milk	Town	286	134 (46.85%)	101 (35.31%)	51 (17.83%)
	Village	167	76 (45.51%)	71 (42.51%)	20 (11.98%)
	Total	453	251 (55.41%0	321 (70.86%)	56 (12.36%)
Eggs	Town	286	118 (41.26%)	88 (30.77%)	80 (27.97%)
	Village	167	49 (29.34%)	65 (38.92%)	53(31.74%)
	Total	453	167 (36.87%	320 (70.64%)	133 ((29.35%)
Meat	Town	286	142 (49.65%)	30 (10.49%)	114 (39.86%)
	Village	167	85 (50.90%)	17 (10.18%)	65 (38.92%)
	Total	453	227 (50.11%)	47 (10.38%)	179 (39.51%)
Fish	Town	286	28 (9.79%)	105 (36.71%)	153 (53.50%)
	Village	167	33 (19.76%)	78 (46.71%)	56 (33.53%)
	Total	453	61(13.47%)	183 (40.40%)	209 (46.14%)
Fruits	Town	286	114 (39.86%)	61 (21.33%)	111 (38.81%)
	Village	167	30 (17.96%)	37 (22.16%)	100 (59.88%)
	Total	453	144(31.79%)	98 (21.63%)	211 (46.58%)

Maximum students in town (53.50%) out of 286 and in village (46.71%) out of 167 took fish 5 to 7 days in a week and 3 to 4 days, respectively (Table 2.2). Maximum students in town (39.86%) out of 286 and in village (59.88%) out of 167 took fruits once and twice in a week and 5 to 7 days, respectively (Table 2.2).

Academic performance variation for daily food intake

Most (74.31% out of 109) of the students who took daily dairy milk, meat (73.68% out of 38 students), fish (65.81% out of 117) and eggs (64.71% out of 85 participating students) obtained A grade.

Table 3: Daily availability of food item and academic performance

Category	A	Total participants
Egg	55 (64.71%)	85
Dairy milk	81 (74.31%)	109
Meat	28 (73.68%)	38
Fish	77 (65.81%)	117
Fruits	28 (66.67%)	42

Note: A= GPA 4.6 to 5.

Among the students (42) who took fruits daily, most (66.67%) of them got A grade (Table 3).

Variation of academic performance for Tiffin intake status

Most of the students (82.78%) took Tiffin in school time.

Table 4: Effect of Tiffin intake pattern in schools on academic performance

Tiffin taken or not	A	Total
Yes	257 (68.53%)	375 (82.78%)
No	30 (38.46%)	78 (17.22%)
Total	287	453

Note: A= GPA 4.6 to 5.

More number of students (68.53%) got grade point A from the students those who took Tiffin in school time than those who did not take Tiffin (38.46%).

Discussions:

Academic performances variation for schools and gender

Academic performances of students in Bangladesh varied for the variation of schools, students at the town performed better than the students in the villages. However, gender had the effect on the JSC examination result, male students performed better than females. The differences between boys and girls in the scholastic achievements are generally attributed to biological causes and/or to cultural and stereotypes[8]. From the above discussions it might be pointed out that schools and gender affected the academic performances.

Variation in weekly food intake

Major number of students drank milk once or twice and few of them took milk nearly every day in a week in towns and villages. However, most of the students in town and villages took eggs for 3 to 4 days and some of them have had eggs nearly every day in week. About half of the students in towns and villages took meat for once or twice in a week. Maximum students took fish for nearly every day in town and for 3 to 4 days in a week in village. A few of them took eggs (9.0%) and milk (11.6%) every day in a week but many students ate eggs (42.3%), milk (32.7%) and chicken meat (51.2%) a day in a week[7]. Maximum students took fruits in town for once and twice in a week but most of the students in villages took fruits for nearly every day. The above discussions might be suggestive that schools had no effect on weekly dairy milk, eggs and meat intake of the students but weekly fish and fruits intake were affected.

Academic performance variation for daily food intake

Majority of the students who used to take dairy milk daily performed better than those who did not take daily. Many of the students who took meat, fruits, fish and eggs did perform better than those who did not take fish and eggs daily. Similarly, on a standardized literary assessment documented that, 5th grade students with less nutritious diets performed worse[4]. So, the above discussions might be indicative that daily intake of dairy milk, meat, fruits, fish and eggs contributed to achieve better academic Performances.

Variation of academic performance for Tiffin intake status

More number of students got grade point A from the students those who took Tiffin in school time than those who did not take Tiffin. However, at an inner-city school, students in a universal-free school breakfast program, showed improved math grade, six months after the start of the program[9]. The discussion might be indicative that school time Tiffin intake might have positive contribution in better academic performances.

Conclusion:

Schools, Tiffin intake status and gender affected the academic performances but educational institutions had no effect on weekly dairy milk, eggs and meat intake of the students but weekly fish and fruits intake status were affected. However, on the basis of daily availability of dairy milk, meat, fruits, fish and eggs academic performances were varied.

Future direction and research idea:

Further study with large number of participants, considering gender, previous academic performance record, pedigree performance, learning facilities, food source and amount intake daily and weekly, health status, socioeconomic condition, dairy milk, meat, eggs, fish or any other specific food item intake source, amount and frequency in a week for specific study to observe contribution of specific food item on academic performance of experimental students would be worthwhile.

Ethical issue: Study was approved by local authorities of all stake holders.

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Conflict of interest: None.

References:

1. Aurisinkala AS, Oogarah PB and Ruggoo A. Nutritional status of school children aged 8-12 years in deprived areas of Mauritius. *African Journal of Food, Agriculture, Nutrition and Development*, 2013; **13** (4).
2. Emmanuel AF, George AA and Frank FO. Institutional Factors Affecting the Academic Performance of Polytechnic Students in Ghana. *International Journal of Humanities & Social Science Studies (IJHSSS),* 2016*;* II (V): 102-109.
3. FAO. The role of poultry in human nutrition, by Farrel D. FAO Poultry Development Review Paper. Australia, 2013; pp 4.
4. Florence MD, Asbridge M and Veugelers PJ. Diet quality and academic performance. *Journal of School Health,* 2008; **78**(4), 209-215.
5. Fu ML, Cheng L, Tu SH and Pan WH. Association between Unhealthful Eating Patterns and Unfavorable Overall School Performance in Children. *Journal of the American Dietetic Association,* 2007;**107**: 1935-1943.
6. Gomez-Pinilla F. Brain foods: The effects of nutrients on brain function. *Nature Reviews Neuroscience,* 2008; **9**(7), 568-578.
7. Islam F, Khatun A, Hossain MS, Ali ML, Leena SA and Sumon MRA. EGG, Meat And Milk Intake Pattern of The Students At Secondary Schools of Hilly Area In Bangladesh. *International Journal of Multidisciplinary Research and Information*, 2016**; 2**(7):402-406.
8. Klein J. Who is most responsible for gender differences in scholastic achievements: pupils or teachers? *Educational Research*, 2004; **46** (2) 183 –193.
9. Kleinman RE, Hall S, Green H, Korzec-Ramirez D, Patton K, Pagano ME and Murphy J M. Diet, breakfast and academic performance in children. *Annals of Nutritional Metabolism,* 2002; **46**:24-30.
10. Lee DER. "Children's Protein Consumption in Southeast Asia: Consideration of Quality as Well as Quantity of Children's Protein Consumption in Southeast Asia". *Wharton Research Scholars Journal*. 2014; Paper 115.
11. Li J and O'Connell AA. Obesity, high-calorie food intake, and academic achievement trends among U.S. school children. *The Journal of Educational Research,* 2012; ***105***(6), 391-403.
12. MoFL. Department of Livestock Services, Ministry of Fisheries and Livestock (MoFL), Government of the People's Republic of Bangladesh, Dhaka, 2013.
13. Neumann CG, Murphy SP, Gewa C, Grillenberger M, Bwibo NO. Meat supplementation improves growth, cognitive, and behavioral outcomes in Kenyan children. *The Journal of Nutrition*, 2007; **137**(4), 1119-1123.
14. OSNP. Ontario Society of Nutrition Professionals (OSNP) in Public Health School Nutrition Workgroup Steering Committee. Call to Action: Creating a Healthy Eating Environment, 2004.
15. SPSS. Windows for version-14. Release on 27.10.2005. (Microsoft Corp. 1998). Trends SPSS Inc., Michigan Avenue, Chicago, IL. 19-182.
16. UNICEF. Improving child nutrition. The achievable imperative for global progress. United Nations Children's Fund, ed. New York, 2013.
17. WHO. Young People's Health In Context: Health Behaviour in School-aged Children (HBSC) study: international report from the 2001/2002 survey. Copenhagen: World Health Organization, Regional Office for Europe. 2004; Report No.: 4.
18. Dairy for Global Nutrition c/o U.S. Dairy Export Council - *2101 Wilson Blvd. Suite 400 - Arlington, VA 22201-3061 USA*