International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

The Role of Adequate Nutrition on Academic Performance of College Students in North Tripura

Santanu Ghosh

Department of Human Physiology, Government Degree College, Dharmanagar, North Tripura.

Correspondence Email: sgrintuk11@gmail.com

Received: 14/05//2013 *Revised: 28/06/2013* *Accepted: 26/08/2013*

ABSTRACT

The development of a nation is closely interlinked with the education level of its population. Various studies have provided enough evidence of the importance of proper nutrition to the cognitive development of an individual which also affects their education achievements. Bur till date, the pathway as to how nutrition develops or hinders academic achievement is still not very clear. It has been established that poor health and malnutrition in early childhood may affect cognitive abilities. This study looks into the effect of nutritional on college students in North Tripura district which has hitherto not been documented earlier. The study shows that, the tribal students have lower BMI values than their nontribal counterparts which may be due to the tribal students having less access to convenience foods. Their poor nutritional status reflects in their academic achievements which are lower than their nontribal counterparts.

Key Words: Nutrition, College students, Tripura, Academic status.

INTRODUCTION

Since national or community development depends largely on the quality of education, an understanding of the nature of the relationship between health and education is important for policy planners as well as the masses. [1-4] Consequently, in the context of universities or colleges, promoting the health and well-being of all members means promoting effective learning. [5] Many studies have related lifestyle of students, particularly breakfast consumption, to their cognitive abilities as reflected in their academic performance. [6-9] But sadly, most of these studies have failed to include young adults or even adolescents studying in the tertiary institution. [10-14] Undernourished children have been shown to have decreased attendance, attention, and academic performance as well as experience more health problems compared to well-nourished children. [15, 16] More recently, studies have examined the impact of breakfast on cognition, behavior, and academic performance of school-age children. [17-21]

Most studies of health-promoting profiles of students, such as the European Health and Behaviour Survey conducted in 20 countries, did not explore the associations]between health and academic achievement. [22-25] Geographically, the majority of research conducted assessed the associations between health/health programmes and academic achievement and were undertaken in the USA, [26-30] with fewer studies from the UK or elsewhere. [25, 32, 33]

Low anthropometric measurements (height-for-age, weight-for height and head circumference) have been frequently associated with poor school outcomes. [34-36, 37] Studies of nutrition and academic performance have typically focused on hunger, malnutrition, and micronutrient deficiency. [38-40] The predominant approach to studying diet has focused on the role of individual nutrients or foods. [41, 42, 43] Academic performance influences future educational attainment and income, which, in turn, affect health and quality of life. [44-50]

This study hopes to find out the relationship between the nutritional status of college students and its effect on their academic status in a sample of college students in Dharmanagar district in North Tripura, India, which has not been documented by any workers earlier.

METHODOLOGY

The study was conducted on undergraduate students of Government Degree College, Dharmanagar, North Tripura. Subjects were day scholars and randomly selected from across the all faculties and all courses in the campus. Subjects who had taken ill in the last 4 weeks and those currently on medication will be exempted from the study. The age group of the subjects was 19-22 years which was verified from their date of birth as recorded in their School leaving examination admit card. A total of one hundred students (58 girls and 42 boys) completed the survey from one hundred fifteen students selected for the survey. All the subjects were explained the modalities and objectives of the study and informed oral consent were taken both from the subjects as well as the principal of the college for undertaking the study.

Recording of height and weight of the subjects were carried out with the help of an anthrop meter and a weighing machine respectively, calibrated every day before the start of work. All anthropometric measurements were taken following the standard techniques recommended by Lohman *et.al*. [51] BMI was calculated as per WHO norms. [52]

There are divergent views as to how many days of dietary survey are required to exactly represent the intake of an individual. [53, 54] For this study, dietary survey was conducted on each individual for a period of seven days and then nutritional status of each individual was calculated with the help of food composition table. [55] Standard Diet survey questionnaire as used by National Institute of Nutrition and ICMR modified as per local requirement was used in the collection of food consumption data.

Academic performance of the students was assessed by the marks scored by the students in the test exam conducted by the college prior to them being sent up for their university final exam.

Statistical analysis was done using SPSS version 10 to find out the means and also to test for relationship between various dietary nutrients on academic achievement. Regression equations were developed for the effects of certain major nutrients on academic achievement of the students.

RESULTS

Table:1- Age and Sex Distribution of the Studied Population:

Age Range	Tribal Males	Tribal Female	Total Tribal Subjects	Non Tribal Males	Non Tribal Females	Total Non Tribal Subjects	Grand Total
Adolescent	27	15	42	31	27	58	100

Table: 2 BMI Values of the Surveyed Population (Mean Value).

CATEGORY	BMI VALUES
Tribal Males	18.9
Tribal Females	18.6
Non tribal Male	19.2
Non tribal Female	19.4

Table: 3 - Food Intake of Tribal &Non Tribal Students (Mean±SD).

Population Type	Sex	Cereals	Pulses	GLV	Roots & Tubers	Other Veg.	Fruits	Milk/Milk foods	Flesh foods	Fats	Sugar/ Jaggery
Tribal Students	M	438±36.6	13±12.8	31±8.8	54±9.7	42±6.1	18±8.3	17±5.8	12±6.7	6±4.4	12±5.2
	F	411±49.9	12±11.1	27±9.5	49±12.3	42±7.9	12±9.9	15±7.5	11±5.9	6±3.6	12±4.7
RDA	M	420	60	100	100	100	100	500	-----	25	35
	F	300	60	100	100	100	100	500	-----	25	30
% of RDA	M	104	22	32	55	43	19	4	-----	24	37
	F	137	20	28	49	43	13	3	-----	24	40
Nontribal Students	M	405±51.2	32±15.4	12±7.7	31±9.9	44±7.4	35±4.5	65±9.1	22±3.3	11±2.2	19±3.8
	F	399±47.1	26±10.9	16±9.2	35±10.2	44±6.4	16±2.8	56±8.6	18±4.5	9±5.1	18±4.3
RDA	M	420	60	100	100	100	100	500	-----	25	35
	F	300	60	100	100	100	100	500	-----	25	30
% of RDA	M	97	53	13	32	47	35	13	-----	44	54
	F	133	43	17	35	44	16	11	-----	36	60

Analysis of dietary survey data (Table.3) shows that the tribal students take in more of cereals, green leafy vegetables, roots and tubers but less of fats, flesh foods and fruits. Non tribal students consume less vegetables, but good amount of flesh foods, fats and sugar.

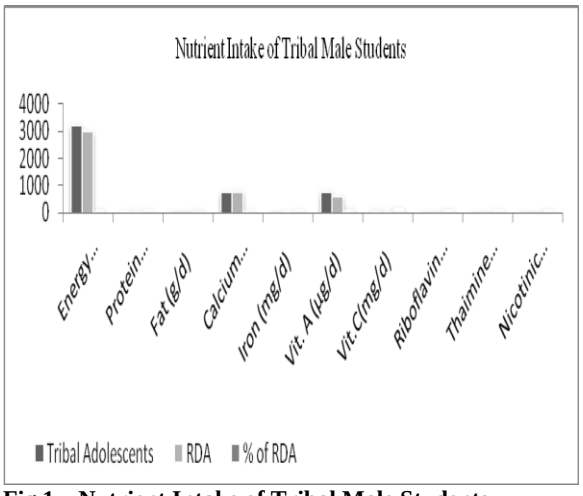

Fig 1 – Nutrient Intake of Tribal Male Students.

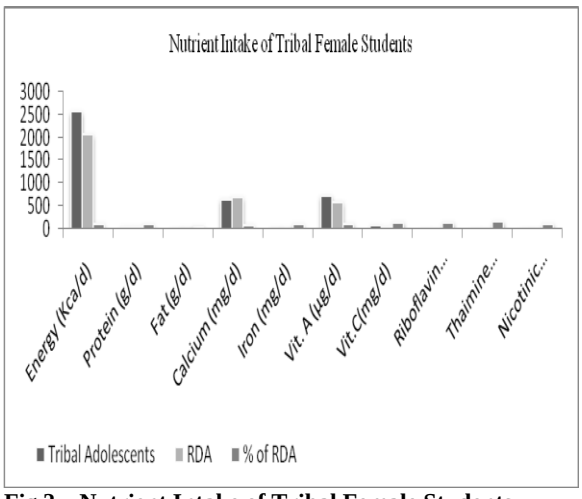

Fig 2 – Nutrient Intake of Tribal Female Students.

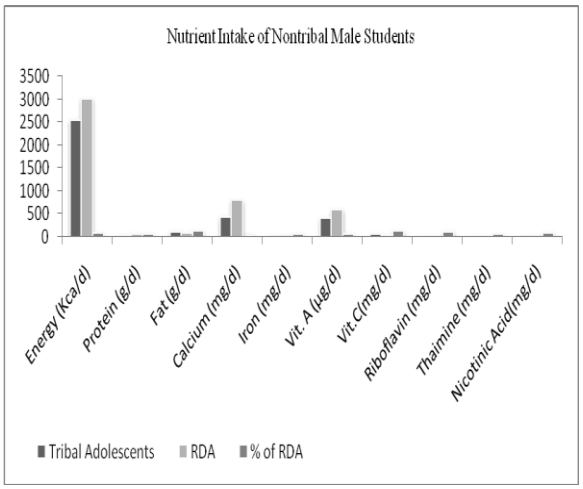

Fig 3 – Nutrient Intake of Nontribal Male Students.

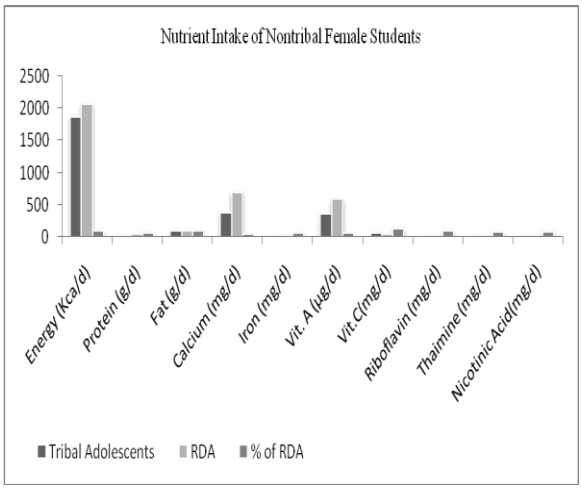

Fig 4 – Nutrient Intake of Nontribal Female Students.

Nutrient consumption table shows that the energy consumption of tribal students is slightly higher. Fat intake is very less in the nontribal group but consumption of minerals like calcium, iron and those of various vitamins are quiet high in the tribal group than in the nontribal population.

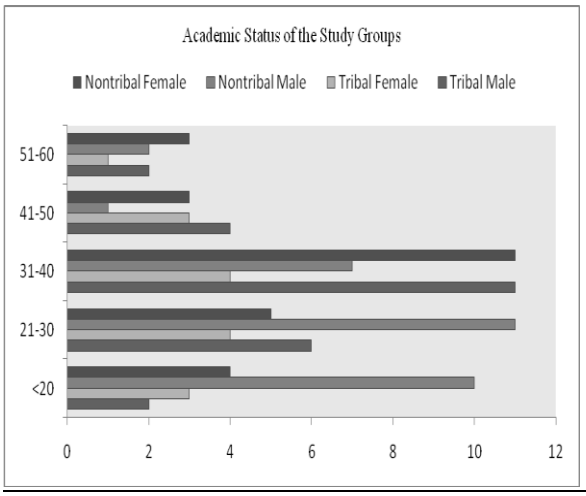

Fig 5 – Academic Status of the Study Groups.

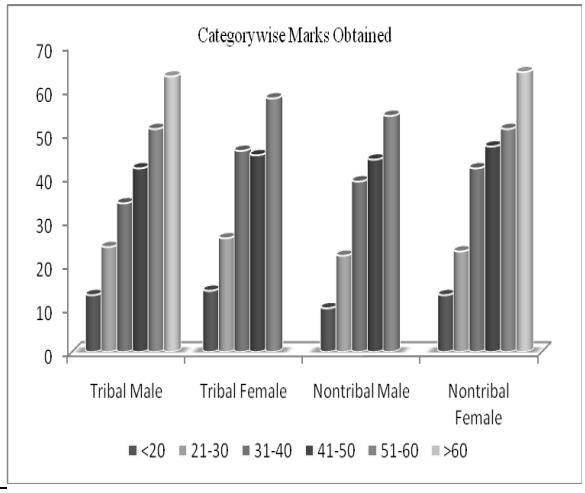

Fig 6 – Category wise Average Marks Obtained.

DISCUSSION

The dietary survey shows that tribal students take in more of cereals, green leafy vegetables, roots and tubers and less of fats, flesh foods and fruits as also minerals like calcium, iron and those of various vitamins. This may be due to the higher cost associated with these food groups which they can ill afford. The energy consumption of tribal students is slightly higher, with tribal female students having adequate energy consumption, but nontribal populace suffers from deficient energy consumption.

The data from the study was analyzed with the help of SPSS (version-10) software to find out the correlation between academic status of the students of the study group and the various factors, and also to develop regression equations to understand the degree of association between the

various variables that affect the academic status of these students.

They are detailed below:

I. BMI levels are negatively correlated, albeit weakly with academic achievement(R square value 0 .236 at 0.005 level of significance) as explained by the following linear regression equation :

E = 159.92 – 0.486 B

SE (162.893) (8.561),

Where, E = Academic Status of the study group, B = BMI of the study group and SE = standard error of estimate.

II. A strong negative correlation between Fat intake and academic status of the study group(R square value 0 .725 at 0.005 level of significance) is observed as explained with the help of the following linear regression equation :

E = 36.607 - 0.852 F

SE (2.586) (0.033),

Where, E = Academic Status of the study group, F = Fat intake of the study group and SE = standard error of estimate.

III. Vitamin-C intake and academic status of the study group has strong positive correlation(R square value 0 .582 at 0.005 level of significance) as shown by the following linear regression equation :

E = 8.299 + 0.763 VC

SE (24.134) (0.335),

Where, E = Academic Status of the study group, VC = Vitamin-A intake of the study group and SE = standard error of estimate.

CONCLUSION

The above study shows that that the tribal students have lower BMI values than their nontribal counterparts which may be due to dietary differences – tribal students have less access to convenience foods and as such may have less consumption of these type of empty calorie containing foods. These dietary differences are reflected in the academic achievements of tribal students which are a little lower than their nontribal counterparts. This relationship becomes well established with the help of the regression equations developed whereby a negative correlation between BMI and academic achievement is observed.

Thus from the above study and analysis of the data generated, we can conclude that nutritional status of a college student has definite relationship with his/her academic achievement.

REFERENCE

1. Pollitt, E.; "Nutrition and Educational Achievement." Nutritional Education Series, 1984; Issue 9. ED-84/WS/66. UNESCO, Paris
2. Popkin BM, Lim-Ybanez M. 1982. Nutrition and school achievement.SocSci Med. 16: 53–61.
3. Jamison DT. Child malnutrition and school performance in China.J Dev Econ 1986; 20: 299–309.
4. Moock PR, Leslie J. 1986. Childhood malnutrition and schooling in the Terai region of Nepal. J Dev Econ.20: 33–52.
5. Johnston FE, Low SM, Baessa YD, MacVean RB. 1987. Interaction of nutritional and socioeconomic status as determinants of cognitive development in disadvantaged urban Guatemalan children. Am J PhyAnthropol. 73: 501–506.
6. Sigman M, Neumann C. 1989. Cognitive abilities of Kenyan children in relation to nutrition, family characteristics and education. Child Dev. 60: 1463–1474.

7. Pollit E, Watkins WE, Husaini MA. 1997. Three month nutritional supplementation in Indonesia infants and toddlers, benefit child memory function 8years later. Am. J. Clin. Nutr. 66: 1357-1363.
8. Lisa MS. 1998.The correlation between eating breakfast and school performance. Am .J. Clin Nutr. 65: 7795-9845.
9. World Health Organization, Young people's health. A challenge for society; report of a WHO Study Group on Young People and Health for All by the Year 2000. Geneva: World Health Organization. Technical Report, 1986; Series No. 731, 1-117.
10. Matsuhashi Y. 2000. Thinness: drives and results. J. Adolesc. Health. 27: 149-150.
11. Ryan YM, Gibney MJ, Flynn MA. 1998. The pursuit of thinness: a study of Dublin schoolgirls aged 15 y. Int. J. Obes. Relat. Metab. Disord..22:485-487.
12. Thompson AM, Chad KE. 2003. The relationship of social physique anxiety to risk for developing an eating disorder in young females. J. Adolesc. Health. 31: 183-189.;
13. Jones JM, Bennett S, Olmsted MP, Lawson ML, Rodin G. 2001. Disordered eating attitudes and behaviours in teenaged girls: a school-based study. Can. Med. Assoc. J. 165: 547-552.;
14. Weinshenker. 2002. Adolescence and body image. School Nurse News. 19:12-16.
15. Taras H. 2005. Nutrition and student performance at school. J Sch Health. 75:199-213.
16. Galal O, Hulett J. 2003. The relationship between nutrition and children's educational performance: a focus on the United Arab Emirates. Nutr Bull. 28:11-20.
17. Kretchmer N, Beard JL, Carlson S. 1996. The role of nutrition in the development of normal cognition. Am J Clin Nutr.63(suppl 1):997-1001.
18. Meyers AF, Sampson AE, Weitzman M. 1991. Nutrition and academic performance in school children. Clin Appl Nutr. 1:13-25.
19. Kleinman RE, Hall S, Green H, et al. 2002. Diet, breakfast and academic performance in children. Ann Nutr Metab. 46(suppl 1):24-30.
20. Rampersaud GC, Pereira MA, Girard BL, et al. 2005. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 105:743-760.
21. Pollitt P, Matthews R. 1998. Breakfast and cognition: an integrative summary. Am J Clin Nutr.67(suppl 1):804-813.
22. Kim HY, Frongillo EA, Han SS, et al. 2003 Academic performance of Korean children is associated with dietary behaviours and physical status. Asia Pac J Clin Nutr. 12(2):186-192.
23. Wardle J, Steptoe A. 1991. The European Health and Behaviour Survey: Rationale, Methods and Initial Results for the United Kingdom. Soc. Sci. Med. 33:925–936.
24. Al-Kandari F, Vidal VL. 2007. Correlation of the Health-Promoting Lifestyle, Enrollment Level, and Academic Performance of College of Nursing Students in Kuwait. Nurs. Health Sciences. 9:112–119.
25. Hoskins SL, Newstead SE, Dennis I. 1997. Degree Performance as a Function of Age, Gender, Prior

Qualifications and Discipline Studied. Assess. Eval. Higher Educ. 22:317–328.
26. Elias MJ, Gara MA, Schuyler TF, Branden-Muller LR, Sayette MA. 1991. The Promotion of Social Competence: Longitudinal Study of a Preventive School-Based Program. Am. J. Orthopsychiatr. 61:409–417.
27. McCord MT, Klein JD, Foy JM, Fothergill K. 1993. School-Based Clinic Use and School Performance. J. Adolesc. Health. 14:91–98.
28. Eggert LL, Thompson EA, Herting JR, Nicholas LJ, Dicker BG. 1994. Preventing Adolescent Drug Abuse and High School Dropout through an Intensive School-Based Social Network Development Program. Am. J. Health Promot. 8:202–215.
29. Keeley TJH, Fox KR. 2009. The Impact of Physical Activity and Fitness on Academic Achievement and Cognitive Performance in Children. Int. Rev. Sport Exerc. Psychol. 2:198–214.
30. Felner RD, Jackson AW, Kasak D, Mulhall P, Brand S, Flowers N. 1997. The Impact of School Reform for the Middle Years. Phi Delta Kappan. 78:528–532.
31. Meyers AF, Sampson AE, Weitzman M, Rogers BL, Kayne H. 1989. School Breakfast Program and School Performance. Am. J. Dis. Child. 143:1234–1239.
32. Gall G, Pagano ME, Desmond MS, Perrin JM, Murphy JM. 2000. Utility of Psychosocial Screening at a School-Based Health Center. J. School Health. 70:292–298.
33. Flay B, Allred CG, Ordway C. 2001. Effects of the Positive Action Program on Achievement and Discipline: Two Matched-Control Comparisons. Prev. Sci. 2:71–89.
34. Ivanovic D, Marambio M. 1989. Nutrition and education. I. Educational achievement and anthropometric parameters of Chilean elementary and high school graduates. Nutr Rep Intl. 39: 983–993.
35. Keeley TJH, Fox KR. 2009. The Impact of Physical Activity and Fitness on Academic Achievement and Cognitive Performance in Children. Int. Rev. Sport Exerc. Psychol. 2:198–214.
36. Kolbe LJ. 2002. Education Reform and the Goals of Modern School Health Programs. Educ. Stand. 3:4–11.
37. Gardner JM, Grantham-McGregor S. 1998. Activity levels and maternal child behavior in under nutrition: Studies in Jamaica. In: Pan American Health Organization Nutrition, Health and Child Development Scientific Publication. No 566. Washington, DC PAHO, 32–42.
38. Taras H. 2005. Nutrition and student performance at school. J Sch Health. 75:199-213.
39. Galal O, Hulett J. 2003. The relationship between nutrition and children's educational performance: a focus on the United Arab Emirates. Nutr Bull. 28:11-20.
40. Kretchmer N, Beard JL, Carlson S. 1996. The role of nutrition in the development of normal cognition. Am J ClinNutr. 63(suppl 1):997-1001.
41. Gerber M. 2001. The comprehensive approach to diet: a critical review. J Nutr. 131(suppl 11):3051-3055.
42. Kant AK. 1996. Indexes of overall diet quality: a review. J Am Diet Assoc. 96:785-791.
43. Patterson RE, Haines PS, Popkin BM. 1994. Diet quality index:

capturing a multidimensional behaviour. J Am Diet Assoc. 94:57-64.
44. Ross CE, Wu C. 1995. The links between education and health. Am Sociol Rev. 60:719-745.
45. Veugelers PJ, Fitzgerald AL. 2005. Dietary intake and risk factors for poor diet quality among children in Nova Scotia. Can J Public Health. 96:212-216.
46. Kant AK. 2000; Consumption of energy-dense, nutrient-poor foods by adult Americans: nutritional and health implications: the third national health and nutrition examination survey, 1988-1994.Am J Clin Nutr. 72:929-936.
47. Turrell G, Hewitt B, Patterson C, et al. 2003. Measuring socio-economic position in dietary research: is choice of socio-economic indicator important? Public Health Nutr. 6:191-200.
48. Baranowski T, Mendlein J, Resnicow K, et al. 2000. Physical activity and nutrition in children and youth: an overview of obesity prevention. Prev Med. 31(suppl 1):1-10.
49. Considine G, Zappala G. 2002. The influence of social and economic disadvantage in the academic performance of school students in Australia.J Sociol. 38:129-148.
50. Grace, T.W., 1997. Health problems of college students. Worsened after joining the university. J. Am. College Health, 45: 243-250.
51. Lohman, T G, Roche A F, Martorell R, Anthropometric Standardization Reference Manual, Human Kinetics Books, Chicago, 1998, 75.
52. World Health Organization. Measuring change in nutritional status. Geneva: World Health Organization, 1983, 64.
53. Hartman A. M, Block G. Dietary assessment methods for macronutrients. In: Micozzi MS, Moon TE, Eds. Macronutrients Investigating their Role in Cancer. New York Marcel Dekker, Inc. 1992; 87-124.
54. Block G. 1982. A review of validations of dietary assessment methods. Am J Epidemiol 115: 492-505.
55. Gopalan C, B V Ramasastri, S C Balasubramaniam, Nutritive value of Indian Foods, Hyderabad, 2004.

How to cite this article: Ghosh S. The role of adequate nutrition on academic performance of college students in north Tripura. Int J Health Sci Res. 2013;3(8):56-63.

****