

BRIEF COMMUNICATIONS

Relationship Between Nutrient Intake and Physical Growth of
Boys (6-12 years) in Jammu, Jammu and Kashmir, India

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ABSTRACT The present study aims at finding out the relations between nutrient intake and physical growth. The subjects for the present study are 777 boys in the age group 6-12 years. The nutrient intakes of boys are compared to their heights and weights. It has been found that nutrient intakes and physical growth of the subjects are positively correlated, i.e., boys with higher nutrient intakes have higher anthropometric values than those with lower nutrient intakes.

INTRODUCTION

School children form an important vulnerable segment of the population. The potentialities for growth can not be fully realised without appropriate intakes and other favourable conditions.

Various studies have shown that socio-economic status has an important bearing on the physical growth of children through its effect on food consumption. Saini and Verma (1989) after studying the physical growth of 200 school children belonging to different socio-economic groups observed that growth depends upon socio-economic factors, including diet. Similar conclusions were later obtained from the surveys made by Gupta et al. (1978) and Banik (1980).

MATERIALS AND METHODS

The present study was based on a cross-sectional sample of 777 boys ranging in the age group 6-12 years and residing in the rural areas of Jammu province.

The age group 6-12 years was divided in to 7 age groups with yearly gaps in between. There is an age range for each group, thus age group 6 years includes all the subjects in the age range 5.5 - 6.4999 years, and so on. Under each age group, 111 boys were randomly selected.

The data on anthropometric measurements, and dietary and nutrients intakes were collected with the help of a questionnaire/schedule prepared for this purpose, discussions and personal contacts with the subject and their parents.

Anthropometric measurements of height and weight were recorded. Weight was recorded on a standardized weighing machine in grams. Height was recorded with Harpenden anthropometer in millimetres and later converted into centimetres. The nutritional status of the subjects was determined by weight-for-age (Gomez Classification), height-for-age and weight-for-height (Waterlow's Classification).

The method used for recording the dietary intake was weighment-cum-oral questionnaire method (B.V.S. Thimmayamma) with the help of standardized cups. The amounts of cooked food consumed by the subjects were converted

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Table 1 : Range, mean and median of heights and weights

Age (in years)	Height (cm)			Weight (kg)		
	Range	Mean	Median	Range	Mean	Median
6	92.36-117.26	106.26	106.62	13.50-23.00	17.36	17.00
7	93.67-124.49	112.32	112.85	14.00-24.00	19.21	19.00
8	105.02-130.32	118.08	118.41	15.00-26.00	20.73	20.00
9	111.44-139.75	123.57	123.89	15.00-32.50	22.81	23.00
10	111.44-130.72	129.10	130.72	18.00-35.00	25.56	25.00
11	93.47-148.59	131.24	131.90	17.00-36.00	26.96	27.00
12	127.71-160.14	138.63	139.15	24.50-44.00	31.53	32.00

Table 2 : Average nutrient consumption

Age (in years)	Calories (K.Cal)		Protein (gm)		Calcium (mg)		Iron(mg)	
	Mean	S.D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
6	1318.48	294.46	36.34	11.00	398.46	159.03	11.32	3.94
7	1371.86	245.80	38.10	9.60	272.88	103.62	19.32	4.66
8	1618.32	296.35	44.32	12.36	355.63	184.10	17.36	5.07
9	1610.78	372.67	45.35	20.44	376.69	170.34	17.90	5.61
10	1395.67	304.03	36.94	12.22	317.06	107.66	17.30	8.61
11	1489.51	252.24	40.96	9.41	304.53	102.64	16.81	2.96
12	1606.75	388.06	41.35	12.42	358.43	114.46	18.85	6.55

to raw amounts and then nutritive values were calculated for calories, protein, calcium and iron using food composition tables (Gopalan et al., 1989).

RESULTS AND DISCUSSION

Table 1 depicts the mean height and weight values and their ranges. The means show the average heights and weights of all the age groups. The median values show the values above and below which 50 per cent of the cases in the study lie, e.g. a median value of 106.62 cm height means that there are 50 per cent of height measurements above this value and 50 per cent below this value. The ranges describe the variability in height and weight measurements.

Table 2 presents the averages and standard deviations of calories, proteins, calcium and iron consumptions of subjects.

Table 3 presents the correlation coefficients between calories and height, calories and

weight, proteins and height and proteins and weight. Positive correlations were obtained for more than 80 per cent age levels. A high percentage of positive signs indicates that there is positive relationship among the two variables considered, i.e., the increase in one variable leads to corresponding increase in other variable. All the variables show low to moderate relationships. The highest correlation is observed in calorie and weight followed by calorie and height. The lowest correlation is

Table 3 : Coefficient of correlation between different variables

Age (in years)	Calories- Weight	Calories- Height	Protein- Weight	Protein- Height
6	- 0.042	+ 0.093	+ 0.165	- 0.001
7	- 0.230	- 0.041	- 0.225	- 0.033
8	+ 0.087	+ 0.070	+ 0.104	+ 0.022
9	+ 0.343	+ 0.311	+ 0.213	+ 0.102
10	+ 0.262	+ 0.162	+ 0.237	+ 0.123
11	+ 0.143	- 0.137	+ 0.386	+ 0.060
12	+ 0.046	+ 0.128	- 0.101	+ 0.038

Table 4 : Nutrients as percentage of Recommended Dietary Allowances (RDA)

Nutrient	Age in years					
	5	7	8	9	10	11
Calories	62.40	71.26	84.06	83.67	64.91	69.27
Proteins	117.22	92.92	108.09	110.60	69.69	77.28
Calcium	99.61	68.22	88.90	94.17	52.84	50.78
Iron	62.88	77.28	69.44	71.60	61.78	60.03

observed between protein and height. It can be seen from the table that increase in the consumption of calories possibly leads to increase of the weight and height measurements. An increase in protein consumption also possibly leads to increase of weight and height, but this gain is not as much in magnitude as that observed in the case of calories.

Table 4 displays various nutrients as percentage of recommended dietary allowances. It can be observed that calorie consumption is lesser when compared to protein intake.

The subjects were then categorized into well nourished and malnourished according to Gomez and Waterlow's classifications using Indian standards (NIN standards).

Table 5 presents the nutrients as percentages of RDA in the two nutritional status categories. Differences in nutrient intakes can be clearly observed, the intakes higher in the well nourished category. This confirms that nutrient intakes are positively related to the growth of the subjects which is presented in the table in the form of well nourished and malnourished categories. These data have been confirmed by various studies. The results of a study by Rowlands et al. (1968) showed that mean heights and weights of children increased

significantly with age, urban background and non-vegetarian diet. The children from economically well off families were taller than the poorer ones. Easwaran et al. (1970) reported that girls in the well fed groups were taller and heavier than those in poorly fed groups regardless of income. Another study was conducted to determine the effects of a food supplement providing 300 calories and 3 grams of protein on growth. At the end of six months, the supplemented children had significantly higher gains both in height and weight as compared to those of unsupplemented children. These increments appeared to be as good as those seen in American children of corresponding ages.

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Table 5 : Nutrient percentage of RDA in two types nutritional status

Nutrient	Nutritional Status	
	Well nourished	Malnourished
Energy	76.77	73.18
Protein	92.27	78.82
Calcium	75.91	57.07
Iron	66.70	55.86