A Study on the Relationship between Nutrition Status and Physical Fitness of School Boys.

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Abstract: *Nutritional status during school age is a major determinant of nutritional and health status in adult life. Many studies showed that under nutrition and anaemia had an adverse impact on performance and consequently led to reduction in wages for persons employed in manual labour.*
The past three decades have witnessed the emergence of over nutrition as a problem in school-age children in developed countries and in affluent urban segments in developing countries. The main determinants of performance are physical fitness and skill. Longitudinal studies have shown that the lifestyle and physical fitness during childhood and adolescence were major determinants of lifestyle, physical fitness and freedom from non-communicable diseases in adult life.
According to the knowledge gathered from available literature it was somehow clear that numerous studies have been conducted to determine the relationship between body composition and body type on motor performance, but research in the area directly concerned with determining the relationship between nutrition status and physical fitness components is rare so the author strived to ponder on the fact how physical performance gets affected by the nutrition status and thus selected the problem "A STUDY ON THE REALATIONSHIP BETWEEN NUTRITION STATUS AND PHYSICAL FITNESS OF SCHOOL BOYS".
PURPOSE OF THE STUDY: The main purpose of the study is to find out if there is any relationship between Nutrition status and Physical fitness of school going boys.A total of 44 boys within the age group of 8-9 years were selected from the Puratan Pitamberpur Primary School and Chapra Primary School. The subjects were selected randomly with the help of drawing lots for the present study. The subjects were selected from rural areas of West Bengal. The rural area subjects The life style including food habits, made of transport, nature of recreation and amusement were also considered.
AAHPERD youth fitness battery was used for assessment of motor performance and weight for age was adopted as the measure of nutrition status. Mean SD. were computed to determine descriptive statistics and further ANOVA was worked out for analysis of variance. From data analysis it appears that there was no. significant difference between the different nutrition status groups with respect to motor performance variables except the variable sit up which shows significant difference at 0.02 level. Though in the cases of 50 mt dash, and 600 mts. run the F values are near to significant.
From the data analysis it can also be inferred that the motor performance variables like 50 mts. dash, 600 mts. run & walk, and sit up are influenced by the nutrition status of an individual to the greater extent or in other way it can be deduced that the fitness variable like sit up, 50 mts. dash and 600 mts. run are determinants of nutrition status of an individual.
Key words: *Nutrition Status, Physical Fitness, School Boys.*

I. Introduction

Nutritional status during school age is a major determinant of nutritional and health status in adult life. Globally, including in India, health hazards associated with under nutrition and micronutrient deficiencies remain major public health problems. In the second half of the previous century, the adverse effects of under nutrition and anaemia on physical performance were extensively investigated in adults. Many studies showed that under nutrition and anaemia had an adverse impact on performance and consequently led to reduction in wages for persons employed in manual labour.

The past three decades have witnessed the emergence of over nutrition as a problem in school-age children in developed countries and in affluent urban segments in developing countries. In developed countries, the consumption of high-calorie food and the increasingly sedentary lifestyle have been implicated as the major factors responsible for the rising obesity rates. In India there has not been a substantial increase in energy intake among children except those in urban affluent families. The increasing obesity rates in children are attributable mainly to the substantial reduction in physical activity in the form of household chores, methods of commuting (the use of mortised conveyances instead of walking or cycling) and methods of recreation (with computer games and TV watching having replaced physical play) over the past two decades. Overweight children are at

higher risk of becoming over nourished adults and thereby incurring a higher risk of developing non-communicable diseases.

Physical performance is defined as the ability to perform a physical task or sport at a desired level

The main determinants of performance are physical fitness and skill. Longitudinal studies have shown that the lifestyle and physical fitness during childhood and adolescence were major determinants of lifestyle, physical fitness and freedom from non-communicable diseases in adult life.

According to the knowledge gathered from available literature it was somehow clear that several research studies have been conducted on the relationship between BMI and physical fitness components. Numerous studies have been conducted to determine the relationship between body composition and body type on motor performance, but research in the area directly concerned with determining the relationship between nutrition status and physical fitness components is rare so the author strived to ponder on the fact how physical performance gets affected by the nutrition status and thus selected the problem "A STUDY ON THE REALATIONSHIP BETWEEN NUTRITION STATUS AND PHYSICAL FITNESS OF SCHOOL BOYS".

PURPOSE OF THE STUDY: The main purpose of the study is to find out if there is any relationship between Nutrition status and Physical fitness of school going boys. To identify the health related fitness components. To find out the influence of different nutrition status on the various motor quality variables.

Present study was conducted to know the status of relationship between nutrition status and selected motor performance variables for primary school boys.

A total of 44 boys within the age group of 8-9 years. The subjects were selected randomly with the help of drawing lots for the present study. The subjects were selected from rural areas of West Bengal. The rural area subjects were selected from the Puratan Pitamberpur Primary School and Chapra Primary School. The life style including food habits, made of transport, nature of recreation and amusement were also considered.

Data were taken from a single school in a day and the total time taken were near about 3-4 hours daily within 10 days total data were collected. It was collected in the late winter season (March – April) and $30^0C – 35^0C$ (Maxi) humidity was very low.

AAHPERD youth fitness battery was used for assessment of motor performance and weight for age was adopted as the measure of nutrition status. Mean SD. were computed to determine descriptive statistics and further ANOVA was worked out for analysis of variance. From data analysis it appears that There was no. significant difference between the different nutrition status groups with respect to motor performance variables except the variable sit up which shows significant difference at 0.02 level. though in the cases of 50 mt dash, and 600 mts. run the F values are near to significant.

From the data analysis it can also be inferred that the motor performance variables like 50 mts. dash, 600 mts. run & walk, and sit up are influenced by the nutrition status of an individual to the greater extent or in other way it can be deduced that the fitness variable like sit up, 50 mts. dash and 600 mts. run are determinants of nutrition status of an individual.

II.   Gomez' Classification

Gomez' classification is based on weight retardation which was used to categorize the children on the basis of nutrition status. It locates the child on the basis of his or her weight in comparison with a normal child of the same age.

Formula for weight percentage calculation:

$$\text{Weight for age (\%)} = \frac{\text{weight of the child}}{\text{weight of a normal child of same age}} \times 100$$

Grade	Weight-for-age
Normal nutritional status	Between 90 & 110%
1st*,mild malnutrition	Between 75 and 89%
2nd*,moderate malnutrition	Between 60 and 74%
3rd*,severe malnutrition	Under 60%

First of all the investigator like to mention that according to the nature of the study the subjects were categorized into three different groups Mild, Moderate and Normal, on the basis of their Nutrition Status i.e. weight for age. The formula and the norms of which has been presented if chapter III earlier.

Table-1. Shows the Mean and S.D. of height and weight.

	Nutrition Status	N	Mean	Std. Dev
HEIGHT (cm)	Mild	24	126.46	6.318
	Moderate	12	122.58	5.551
	Normal	18	133.67	3.498
	Total	54	128.00	6.802
WEIGHT(kg)	Mild	24	21.67	2.057
	Moderate	12	19.25	1.055
	Normal	18	28.00	4.446
	Total	54	23.24	4.564

According to the table the mean height of the three different Nutrition Status categories of boys i.e. Mild, Moderate, and Normal are 126.46, 122.58 and 133.67 cms. And S.D. are 6.318, 5.551, and 3.498 cms. The mean weight for the same three groups is 21.67, 19.25 and 28.00. K.G. and their S.D. are 2.057, 1.055 and 4.446. The mean for 50 mt. dash are 9.757, 9.359 and 9.140 secs. And S.D.'s are 1.188, .6101 and .3742. Mean scores for shuttle run are 12.54, 12.32, 12.54 and their corresponding S.D.'s are .852, .603 and .593. The mean scores for pull up are 4.50, 6.17, and 3.67 and the S.D.'s are 2.94, 4.06 and 1.74. The mean scores for the fitness test sit up are 17.13, 22.67, 26.00 and the S.D.'s are 9.76, 9.83 and 10.18. The mean scores for Standing Broad Jump are 1.29, 1.33, and 1.35 and their S.D.'s are .164, .170 and .170. The Mean scores for 600 mts. Run and walk are 175.63, 173.75 and 168.33 and their corresponding S.D.'s are 11.72, 11.16 and 6.30 respectively.

III.   With Respect To Height And Weight:
From the table it appears that in both the cases of height and body weight the children with normal nutrition status are better that their mild malnutrition counterpart and similarly the children with mild malnutrition are better in comparison to the children with moderate malnutrition. The table also depicts some differences with respect to motor performance variables scores and for which ANOVA was computed to locate the degree of difference between the means and further multiple comparison was also executed to find out the inter difference between the groups.

Table 2. Shows the mean and S.D for the motor performance variables.

50m(sec)	Mild	24	9.757	1.1883
	Moderate	12	9.359	.6101
	Normal	18	9.140	.3742
	Total	54	9.463	.9011
SHUTTLE RUN(sec)	Mild	24	12.5408	.85292
	Moderate	12	12.3233	.60343
	Normal	18	12.5433	.59375
	Total	54	12.4933	.71607
PULL UP	Mild	24	4.50	2.949
	Moderate	12	6.17	4.064
	Normal	18	3.67	1.749
	Total	54	4.59	3.006
SIT UP	Mild	24	17.13	9.768
	Moderate	12	22.67	9.838
	Normal	18	26.00	10.186
	Total	54	21.31	10.517
S.B.J(m)	Mild	24	1.295	.1642
	Moderate	12	1.335	.1848
	Normal	18	1.357	.1706
	Total	54	1.324	.1700
600mts	Mild	24	175.63	11.728
	Moderate	12	173.75	11.169
	Normal	18	168.33	6.306
	Total	54	172.78	10.437

With respect to motor performance variables: According to table no.2.The mean value in 50 mt. is lowest for boys with normal nutrition, lower for boys with mild malnutrition and highest for boys with moderate malnutrition. Similarly from the table value it appears that the mean value in case of 600 mts. run and walk performance of the boys with normal nutrition status is lower than those of the boys with mild and moderate nutrition status. The result is same incase of

Standing broad jump and sit up i.e. in both of these cases the means values for the boys with normal nutrition are higher than those of the boys with mild malnutrition and values are higher for boys with mild malnutrition than those of the boys with moderate malnutrition. The scenario is somehow different in case of the variables shuttle run and pull up. In case of pull up the mean value for boys with moderate malnutrition shows highest value in comparison to those of mild and normal nutrition status. While in case of shuttle run the mean value are nearly equal for boys with mild and normal nutrition but for boys with moderate malnutrition the value is lower.

Table 3. shows the analysis of variance for motor performance variables.

		Sum of Squares	Df	Mean Square	F	Sig.
50m(sec)	Between Groups	4.077	2	2.039	2.669	0.079
	Within Groups	38.955	51	0.764		
	Total	43.032	53			
Shuttle Run (sec)	Between Groups	0.446	2	0.223	0.425	0.656
	Within Groups	26.730	51	0.524		
	Total	27.176	53			
PULL UP nos	Between Groups	45.370	2	22.685	2.668	0.079
	Within Groups	433.667	51	8.503		
	Total	479.037	53			
SIT UP nos.	Between Groups	838.356	2	419.178	4.256	0.020*
	Within Groups	5023.292	51	98.496		
	Total	5861.648	53			
S.B.J. cms.	Between Groups	0.041	2	0.020	0.698	0.502
	Within Groups	1.491	51	0.029		
	Total	1.532	53			
600mts run&walk	Between Groups	561.458	2	280.729	2.747	0.074
	Within Groups	5211.875	51	102.194		
	Total	5773.333	53			

The F scores presented in table no.3 reveals that there was no. significant difference between the different nutrition status groups with respect to motor performance variables except the variable sit up which shows significant difference at 0.02 levels. Though in the cases of 50 mt dash, and 600 mts. run the F values are near to significant.

In this regard the following research findings may be cited.

Sarah et al. (2003) reached to the conclusion in his study on adolescent boys that on several measures underweight boys were less likely to be physically active that boys of normal weight.

Taylor et al. (1991) investigate in a sample of 93 high adiposity and 93 low adiposity children ages 8 to 13 with cardiovascular fitness as the dependent variable, relationships with habitual level of physical activity, age gender and body mass index (BMI). For the high adiposity sample, physical activity score, age, BMI were significant and the overall model was significant (P, less than 0.001). In the low adiposity sample they were significantly related to cardiovascular fitness but the overall model was not significant (P, less that 0.35) physical activity score thus was a significant predictor of cardiovascular fitness among the high adiposity children but not the low adiposity children.

Thus it may be inferred that the findings of the present study are in close proximity with the findings of some leading researchers

Further multiple comparisons (presented in table no. 4)were computed to find inter group difference. The result presented in the table shows significant difference between mild and normal nutritional status boys in 50 mts. dash. In sit up performance significant difference was established between boys of mild and normal nutrition status. Significant difference was also established between boys of mild and normal nutrition status with respect to performance in 600 mts. run& walk.

Table. 4. Multiple comparisons between various groups.

Dependent Variable	(I) NS	(J) NS	Mean Difference (I-J)	Std. Error	Sig.
50 m(sec)	Mild	Moderate	.3975	.3090	0.204
	Mild	Normal	.6167(*)	.2725	0.028
	Moderate	Normal	.2192	.3257	0.504
SHUTTLE RUN(sec)	Mild	Moderate	.21750	.25596	0.399
	Mild	Normal	-.00250	.22574	0.991
	Moderate	Normal	-.22000	.26981	0.419
PULL UP	Mild	Moderate	-1.667	1.031	0.112
	Mild	Normal	.833	.909	0.364
	Moderate	Normal	2.500(*)	1.087	0.026
SIT UP	Mild	Moderate	-5.542	3.509	0.120
	Mild	Normal	-8.875(*)	3.095	0.006
	Moderate	Normal	-3.333	3.699	0.372
S.B.J(m)	Mild	Moderate	-.0400	.0604	0.511
	Mild	Normal	-.0617	.0533	0.253
	Moderate	Normal	-.0217	.0637	0.735
600mts	Mild	Moderate	1.875	3.574	.602
	Mild	Normal	7.292(*)	3.152	.025
	Moderate	Normal	5.417	3.767	.157

* The mean difference is significant at the .05 level.

From the data analysis it can also be inferred that the motor performance variables like 50 mts. dash, 600 mts. run & walk, and sit up are influenced by the nutrition status of an individual to the greater extent or in other way it can be deduced that the fitness variable like sit up, 50 mts. dash and 600 mts. run are determinants of nutrition status of an individual.

IV.   Conclusion

The findings of the present study lead to the following conclusions:

There was no. significant difference between the different nutrition status groups with respect to motor performance variables except the variable sit up which shows significant difference at 0.02 level. though in the cases of 50 mt dash, and 600 mts. run the F values are near to significant.

From the data analysis it can also be inferred that the motor performance variables like 50 mts. dash, 600 mts. run & walk, and sit up are influenced by the nutrition status of an individual to the greater extent or in other way it can be deduced that the fitness variable like sit up, 50 mts. dash and 600 mts. run are determinants of nutrition status of an individual.

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