

Effects of Nutrition on School Performance in a Primary School in Dhaka, Bangladesh

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Introduction

Malnutrition is widespread in Bangladesh and children are generally very adversely affected^(1,2). In Bangladesh 56% of the children aged 6-71 months suffer from chronic protein-energy malnutrition (stunted) and 8% suffer from acute protein-energy malnutrition (wasted)⁽³⁾. About 75% of the children suffer from iron deficiency anaemia⁽²⁾. One million out of the 23 million children in the country suffer from Vitamin A deficiency, 30,000 of whom become blind every year with one-half of the blinded children dying within one year of blindness⁽⁴⁾.

The relationship between nutritional status and mental performance has been studied by several authors⁽⁵⁾. Most of the studies related to infants and their mental performance in set intelligence tests. The main intentions of the studies were to examine if severe protein-energy malnutrition in early ages affects intellect by producing damage to central nervous system, and to study the neurointegrative adequacy of malnourished children.

In this paper an attempt is made to analyse the relationship between the

nutritional status of school going children and their academic performance. It is hoped that the study would be useful in understanding the role of nutrition on the school performance of children, and increase our awareness of the need of children's nutrition for accomplishing their academic achievements.

Materials and Methods

The study was conducted in Nilkhet primary school which is a government free primary school located in a low income residential area of Dhaka. The data were collected from 193 male children of grade 1 to 4. The selection of children was made on the basis of availability and willingness of the children to participate in the research project. However, not all data were available for the 193 children, so the sample size differed in different analysis. Actual sample size in each analysis is mentioned in the analytical tables.

Nutritional status of the children were assessed on the basis of weight for age and weight for height measures using the US National Center for Health

Statistics (NCHS) reference data⁽⁶⁾ and Waterlow classifications⁽⁷⁾. Weights were measured without shoes and with minimum clothes using a Detecto Scale (Brooklyn, N.Y.) and the measurements were recorded to the nearest 0.1 kg. Heights were measured using a microtoise (Stanley, France) and the measurements were recorded to the nearest 0.1 cm. Before starting weight measurements every day the scale was standardized using known standard weights. Height measurements were also calibrated every day using standard measuring tapes made of steel. The age of the children were estimated on the basis of their date of birth as recorded in the school admission register.

School performance of the children were measured using two variables, percentage of absence from school and percentage of marks obtained in the last annual examination. The data were collected from the attendance records and examination records of students maintained by the school.

The data collection for the study was conducted during January and February 1991.

Results and Discussions

Examination performance and weight for Age:

Table 1 shows the examination performance of the children classified by their weight for age nutritional status as defined by the NCHS criteria⁽⁶⁾. The table shows a higher level of

performance by the nutritionally normal children compared to the malnourished children, and existence of a relationship between the examination performance of the children and their nutritional status. The average marks obtained by the nutritionally normal children was 62% and by the malnourished children was 57%. The difference is significant at the probability less than 0.025. About 5% of the nutritionally normal children obtained less than 40% marks compared to 17% of the malnourished children, and 23% of the nutritionally normal children obtained 80% or more marks compared to 9% of the malnourished children. The relationship is not however, so prominent in the mid-marks level. About 38% of both the normal and malnourished children obtained 40-59% marks, and 33% of the normal children and 35% of the malnourished children obtained 60-79% marks. The Chi-square test indicates a significant relationship between the nutritional status of the children and their examination performance at the probability less than 0.01.

Examination Performance and Weight for Height

Table 2 shows the examination performance of the children classified by their weight for height nutritional status as defined by the Waterlow criteria⁽⁷⁾. Likewise the classification by

the NCHS criteria the table shows a higher level of performance by the nutritionally normal children compared to the malnourished (stunted, wasted as well as both stunted and wasted grouped together) children, and existence of a relationship between the examination performance of the children and their nutritional status. The average marks obtained by the nutritionally normal children was 62% and by the malnourished children was 56%. The difference is significant at the probability less than 0.005. About 7% of the nutritionally normal children obtained less than 40% marks compared to 16% of the malnourished children, and 22% of the nutritionally normal children obtained 80% or more marks compared to 7% of the malnourished children. The relationship at the mid-marks level is relatively more pronounced here than in the classification by the NCHS criteria. About 37% of the normal children and 41% of the malnourished children received 40-59% marks, and 34% of the normal children and 36% of the malnourished children received 60-79% marks. The Chi-square test indicates a significant relationship between the nutritional status of the children and their examination performance at the probability less than 0.01.

Absenteeism and Weight for Age

Table 3 shows the absenteeism of the children classified by their weight for

age nutritional status as defined by the NCHS criteria⁶. Although it is indicative, the table shows no conclusive evidence of a relationship between the nutritional status of the children and their absenteeism from school. The average absence rate of the nutritionally normal children was 27% of the working days and of the malnourished children was 32% of the working days. The difference is not significant even at the probability of 0.1. The distribution of the normal and the malnourished children by the duration of absence from school indicates that 17% of the normal children remained absent from school for 50% or more working days compared to 21% of the malnourished children, and 35% of the normal children remained absent from school for less than 20% of the working days compared to 32% of the malnourished children. About 47% of both the normal and malnourished children remained absent from school for 20-49% of the working days. The Chi-square test indicates no significant relationship between the nutritional status of the children and their school attendance even at the probability of 0.01.

Absenteeism and Weight for Height

Table 4 shows the absenteeism of the children classified by their weight for height nutritional status as defined by

the Waterlow criteria⁷. Likewise in the classification by the NCHS criteria the results are indicative but show no conclusive evidence of a relationship between the nutritional status of the children and their absenteeism from school. The average absence rate of the nutritionally normal children was 28% of the working days and of the malnourished children was 33% of the working days. The difference is not significant even at the probability of 0.1. The distribution of the normal and the malnourished children by the duration

of absence from school indicates that 16% of the normal children remained absent from school for 50% or more working days compared to 21% of the malnourished children, and 35% of the normal children remained absent from school for less than 20% of the working days compared to 31% of the malnourished children. About 49% of both the normal and malnourished children remained absent from school for 20-49% of the working days. The Chi-square test indicates no significant

Table 1. Examination Performance of the School children by Weight for age.

Nutritional status	No. of children	Percentage of children received marks				Average marks obtained% (mean± S.D)
		Upto 39%	40-59%	60-70%	80% or more	
Normal	78	5.1	38.5	33.3	23.1	62.5 ±17.0
Malnourished*	111	17.1	38.8	35.1	9.0	57.2 ±15.7
All	189	12.2	38.6	34.4	14.8	59.4 ±16.4

* Children weighing 80% or more of the reference median weight for age were classified as nutritionally normal otherwise they were classified as malnourished.

Table 2. Examination Performance of the School children by Weight for Height.

Nutritional status	No. of children	Percentage of children received marks				Average marks obtained% (mean+ S.D)
		Upto 39%	40-59%	60-70%	80% or more	
Normal	98	7.2	36.7	33.7	22.4	62.5±16.7
Malnourished*	91	16.5	40.6	36.3	6.6	56.1±15.6
All	189	11.7	38.6	34.9	14.8	59.4±16.4

* Stunted, wasted and both stunted and wasted together⁷.

Table 3. Absentecism of the School Children by Weight for age.

Nutritional status	No.of Children	Percentage of children remained absent			Average non-attendance,% of working days (mean \pm S.D)
		Less than 20% working days	20-49% working days	50% or more working days	
Normal	80	35.0	47.5	17.5	27.4 \pm 16.2
Malnourished*	113	31.9	46.9	21.2	32.5 \pm 17.8
All	193	33.2	47.1	19.7	30.4 \pm 16.7

* As in Table 1.

Table 4. Absentecism of the School Children by Weight for Height

Nutritional status	No.of Children	Percentage of children remained absent			Average non-attendance,% of working days (mean \pm S.D)
		Less than 20% working days	20-49% working days	50 or more working days	
Normal	96	35.4	49.0	15.6	28.0 \pm 16.1
Malnourished*	97	30.9	48.5	20.6	32.7 \pm 17.1
All	193	33.2	48.7	18.1	30.4 \pm 16.7

* Stunted, wasted and both stunted and wasted together⁷.

relationship between the nutritional status of the children and their school attendance even at the probability of 0.1.

Summary

A study of 193 male children studying in class 1 to 4 in a government free primary school located in a low income residential area of Dhaka indicated that the nutritionally normal children scored higher marks in school examinations compared to the malnourished children

(probability less than 0.025). More of the nutritionally normal children received higher marks compared to the malnourished children and the examination performance of the children was related to their nutritional status (probability less than 0.01). The contentions were true for the nutritional status measured by both the weight for age and weight for height indicators. There are indications that the average absenteeism is higher among the

malnourished children than the normal children, and fewer normal children remained absent from school for longer duration than the malnourished children but the results are not conclusive for the nutritional status measured by any indicator (probability greater than 0.1).

The results support common findings in this area that an association exists between the nutritional status of children and their educational performance⁽⁵⁾. A malnourished child is generally mentally and physically fatigued. He lacks in curiosity and he is unresponsive to environmental stimulation. As a result he is inattentive in class and performs less well than his well nourished counterparts in the examination. It is also argued that a malnourished child is frequently attacked by bouts of illnesses leading to higher absenteeism which may be an additional cause for poorer performance of the malnourished children⁽⁵⁾. Our results show that a malnourished child

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falls behind his well nourished classmates in the examination no matter he remains absent from school for longer duration or not. The implications of this are far reaching. The findings suggest that if a child is malnourished to start with, his performance in the examination cannot be improved reasonably by improving school attendance or by extra coaching at least upto the primary level. Thus instruction levels in schools must be lowered to accommodate the scope of comprehension of the dull students.

This means drainage of investment in education and low returns to educational expenditures. Thus improved nutrition of children remains a priority to achieve the full potential of investments made in children's educational facilities.

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