Nutritional Anemia amongst Under Privileged Urban Children - A Study in a Mother and Child Health Centre in Dhaka City

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Introduction

Anemia continues to be the most common public health problem and a cause of high children morbidity in the world, especially in developing countries[1,2] Iron deficiency constitutes a common cause of anemia in developing as well as in socially advantaged countries.[3,5] There are more than 500 million people throughout the world with anemia.[6] It is now clear that the prevalence of nutritional anemia is particularly high amongst young children as well as in pregnant women.[7,8,9] For young children, rapid growth imposes large iron needs and the iron stores laid down in prenatal life are progressively consumed.[10] In addition to that, dietary source of absorbable iron is inadequate during weaning. So collectively as a group, infants and pre-school children are at greatest risk for the development of iron deficiency anemia. Furthermore, children from low income group are more likely to suffer from iron deficiency anemia.[11] Nutrition Survey of Rural Bangladesh (1981-82) indicates that 82% of our children (0-4 yrs.) are anemic. In Bangladesh, widely prevalence of nutritional anemia has been reported, inspite of an adequate intake of dietary iron, while intake of other hematologically important micro nutrients such as vitamin C, vitamin A has been reported to be very low.[12] Amongst several possible factors, the high prevalence of anemia in Bangladeshi children may be attributed to low bioavailability of dietary iron, low intake of micronutrients as well as high worm load.

Since children from under privileged section of the society are more affected, the present study has been undertaken to investigate (i) the prevalence of anemia among children from under privileged section. (ii) the effect of worm infestation on hemoglobin level and (iii) relationship between hemoglobin level and growth achievement.

Materials and Methods

The study was conducted in Radda Barnen, a maternal and child health

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centre of Dhaka city. Mothers from under privileged section usually visit the centre for their child care and they were especially requested to participate in the study. For this purpose, 250 children were randomly selected. Out of them, 198 children participated in this study. Height and weight of the children were recorded by standard method[13]. Blood sample for the estimation of hemoglobin was collected from finger tips. Hemoglobin was estimated by cyanmethhemoglobin method[14]. Nutritional status of the children was determined by weight for age (Wt./Age) criteria using Gomez Classification. Statistical analysis was performed by using SPSS package programme. (SPSS/PC+ Version 3.0 : SPSS Inc. Chicago).

Table 1. Distribution of children according to age group.

Age group (Months)	Number of Children	Percentage
6-11	83	41.9
12-23	73	36.9
24-35	18	9.1
36-59	24	12.1

Table 2. Distribution of children according to nutritional status.

Nutritional Status (% of standard wt. /age)	Number of children	Percentage
Normal (≥90%)	29	14.6
Grade 1(75-89%)	96	48.6
Grade 2(60-74%)	67	33.8
Grade 3(<60%)	6	3.0

Table 3. Prevalence of anemia and mean hemoglobin level of the children according to age group.

Age group (months)	Number of children	Percent prevalence of anemia	Hemoglobin level (g/dl)
6-11	76	67.1(51)	10.27 ± 1.15^a
12-23	72	69.4(50)	10.01 ± 1.56^a
24-35	18	38.9(7)	10.94 ± 1.35^b
36-59	23	34.8(8)	11.58 ± 1.34^b
6-59	189	64.4(116)	10.40 ± 1.45

Values of Hb are mean ± SD. Number in the parentheses indicates the number of cases. Values of Hb in the same column not sharing common superscript are significantly different ($P<0.05$).

Table 4. Prevalence of anemia and mean hemoglobin level according to nutritional status.

Nutritional status (%of standard wt./age)	Number of children	Hemoglobin level (g/dl)	% prevalence of anemia
Normal (≥90%)	27	$11.11^a \pm 1.16$	37.0 (10)
Grade 1 (75-89%)	93	$10.34^b \pm 1.32$	65.6 (61)
Grade 2 (60-74%)	63	$10.28^b \pm 1.61$	61.9 (39)
Grade 3 (<60%)	6	$9.3^b \pm 1.59$	100 (6)

Hb values are mean ± S.D. Hb values in the same column not bearing common superscript are significantly ($P< 0.05$) different.

Table 5. Prevalence of worm infestation and mean hemoglobin level among the children under study.

Type of worm infestation	Number of cases	%	Hemoglobin level (g/dl)
Al	49	32.51	10.58 ± 1.66
TT	6	4.22	9.58 ± 1.73
Giardia	5	3.52	9.64 ± 1.33
Non-infested	82	57.75	10.40 ± 1.28

Results

Table-1 shows the distribution of children according to age group. The age of total population ranged from 6 to 59 months. Eighty three (41.9%) of the children belonged to age group 6—11 months and seventy three (36.9%) were in the age group 12—23 months. Eighteen (9.1%) of them belonged to age group, 24-35 months while twenty four (12.1%) were in age group 36-59 months. Majority of the children were below one year, while 36.9% were below two years.

Table-2 shows the distribution of children according to nutritional status. Prevalence of malnutrition among the study population was quite high. One hundred and sixty nine (85.4%) children suffered from various degrees of malnutrition. Only twenty nine (14.6%) children were normal according to their weight for age (Gomez Classification). About half of the population (48.6%) suffered from first degree malnutrition, while 33.8% children suffered from second degree malnutrition. Six children (3%) were severely malnourished.

Table-3 represents the prevalence of anemia according to age group. Among the total number of children 61.4% were anemic. Hemoglobin level below 11 g/dl was considered as the criteria for anemia. Mean hemoglobin level was low (10.40 ± 1.45g/dl). The most affected group was the group of 12-23 months, with a high prevalence rate (69.4%) of anemia. The rate was also high (67.1%) for 6-11 months. Whereas the rate was comparatively low for the children of ≥24 months. Similar picture was reflected in case of mean hemoglobin level of children in different age group. Children of age group-<24 months had significantly ($P<0.05$) lower level of hemoglobin than the children of age group>24 months.

Distribution of anemic children according to different nutritional status is presented in Table 4. Anemia was associated with nutritional status. All the children (100%) who were third degree malnourished were anemic. Simultaneously, 65.6% of first degree malnourished children and 61.9% second degree malnourished children were anemic. On the other hand, 37% of well nourished children were anemic.

Notably well nourished children had significantly higher hemoglobin level (11.11 ± 1.16) g/dl as compared to the levels of malnourished children.

Table-5 shows the prevalence of worm infestation and the levels of Hb amongst the children under study. Eighty two (57.75%) children were free from worm infestation. Their

mean Hb level was (10.40 ± 1.28) g/dl. Forty nine (32.51%) children were infested with Al, six (4.22%) were infested with TT, the rest five (3.52%) were infested with Giardia and their corresponding Hb levels were (10.58 ± 1.66), (9.98 ± 1.73), and (9.64 ± 1. 33) g/dl respectively. Their Hb levels did not vary significantly for the variations in the kinds of worm infestation. Though not significantly children infested with TT and Giardia had lower Hb level as compared to noninfested ones.

Discussion

In present study, prevalence of malnutrition amongst the children was quite high. Majority of them (85.4%) suffered from various degrees of malnutrition as assessed by weight for age. Only 14.6% of children were found to be normal. Nutrition Survey of Rural Bangladesh (1981-82) revealed that 90 percent of rural children of age group (0-59) months were malnourished. But nutritional Status of these urban children is better than the rural children. This better situation may reflect the effect of nutritional knowledge that the mothers received in the present Child Health Care Centre (Radda Barnen).

Prevalence of anemia among the study population was also quite high. Anemia prevalence was 61.4 percent. The most affected age group was 12-23 months, with a higher prevalence of 69.4 percent. Nutrition Survey of Rural Bangladesh (1981-82) revealed that 82 percent of rural children (o-4yrs) are anemic. In present study, prevalence rate is lower than this national value. It may be due to the difference in social status of rural and urban children. The samples are from urban families, who are likely to be more conscious about nutrition and general health care as compared to rural ones. Higher prevalence of anemia in age group 12-23 months is consistent with the fact that iron deficiency anemia is most likely to occur between 6 months and 2 to 3 years of age when iron stores are likely to become depleted[15]. Subsequently, the demand for iron decreases as the rate of growth decreases. Since iron store is depleted children's iron status becomes more dependent on dietary intake. Moreover, this period is the transitional period between weaning food and usual family-food. Many of the children do not get well adapted to solid family food which ultimately results in low dietary intake of nutrients even in the face of higher physiological demand. Notably dietary intake of iron is adequate for rural population, still 82 percent of our children are anemic.[12] This

anemia has been implicated to the poor availability of iron from cereal based diet as well as to the lower intake of micronutrients such as riboflavin, vitamin C and vitamin A which are known to be necessary for absorption and utilization of dietary iron.[16-19]

Though not significantly, children infested with TT and Giardia had comparatively lower Hb level than non-infested ones. It is in agreement with the previous studies. Saha et al[20] reported negative correlation between Hb level and worm infestation.[21]

Prevalence of anemia among malnourished children was higher than in well nourished children. All of the children (100%) who were third degree malnourishd were anemic. It is quite natural that third degree malnourishd children would suffer from iron deficiency in association with the deficiencies of other nutrients.

In conclusion, present findings would stress that prevalence of anemia is quite high amongst the under priviliged urban children.

Summary

One hundred and ninety eight (198) underpriviliged urban children (age 6-59 months) were studied for nutritional status (weight for age), nutritional anemia and parasitic infestation. One hundred and sixty nine (85.4%) children suffered from various degrees of malnutrition (assessed by weight for age). About half of them (48.6%) suffered from 1st degree, 33.8 percent suffered from 2nd degree and 3 percent suffered from 3rd degree malnutrition. Prevalence of anemia was quite hight with 61.4 percent children being anemic. Children of age group < 24 months had significantly ($P<0.05$) lower Hb level than those of age group ≥ 24 months. All (100%) 3rd degree malnourished children were anemic, while 65.6 percent of 1st degree malnourished, 61.9 percent of 2nd degree malnourished and 37 percent of normal children were anemic. Anemia was more prevalent in malnourished children. Though not significantly, children infested with TT and Giardia had lower level of Hb as compared to non-infested one. Thus nutritional anemia is associated with nutritional status as well as with worm infestation.

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