PREVALENCE OF ANAEMIA IN CHILDREN OF 6 MONTHS TO 59 MONTHS IN NARAYANGANJ, BANGLADESH

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Abstract:

***Objective**: To determine the prevalence of anaemia in children of 6 to 59 months old in Narayanganj, Bangladesh to help policy makers to formulate health and nutrition policies in national level.*

***Methods:** In 2009, a representative sample of 767 young children (age ranging from 6 to 59 months) had their haemoglobin concentration measured. The sampling process was in three stages: at first, 5 Upazila hospitals, 1 District hospital and a 200 bedded specialized hospital were randomly selected to represent the whole district and its 5 geographic urban and rural areas. Next, using census lists, 15 census sectors were randomly chosen. Finally, 767 children of 6-59 months were selected. Blood was collected by vein puncture and haemoglobin concentration was measured with a haemoglobin meter. Data were analysed to determine prevalence of anaemia.*

***Results**: The prevalence of anemia among the children of 5-59 months old was 40.9% for the district as a whole. Prevalence in the municipal region of Narayanganj was 40.9%. The rural areas had the highest prevalence of 66.9%. Prevalence was almost two times higher in children of 6-23 months in comparison to children of 24-59 months i.e. 61.8% and 31.0% respectively. The mean haemoglobin concentrations in the younger and older age groups were 10.4(±1.5) g/dl and 11.4(±1.4) g/dl respectively. There is no difference found between the sexes.*

***Conclusion**: This is the first assessment of anaemia prevalence among young children in Narayangaj, Bangladesh. As there is very high prevalence of anaemia among the children studied in Fatulla upazila, especially those in the age group 6-23 months, public health interventions are needed here most.*

***Key words:** Anaemia, iron deficiency anaemia, haemoglobin, child heath, Bangladesh.*

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Introduction:

It is reported that 2170 million people are affected worldwide by nutritional anaemia. Out of these, 90% live in developing countries, and the countries of South Asian region have the highest prevalence of anaemia[1]. Iron deficiency anaemia is a public health problem in both developing and industrialized countries and more than 2 billion people around the world are estimated to have anaemia[2]. Prevalence of iron deficiency anaemia in developing countries as a whole is 36%, and only 8% in developed countries[3]. The prevalence of anemia is high in women in reproductive age, 47% across the developing country and it worsens to 57% during pregnancy[4]. Most of the people of Narayanganj District of Bangladesh are lower middleclass and low income group and thus expected to have a high prevalence. This study was conducted to determine the prevalence of anaemia in Narayanganj and its 5 geographic areas. The study was focused on the prevalence of anaemia in a representative sample of children of 6-59 months.

Materials and Methods:

Narayanganj has an area of approximately 800 Sq. kilometer and a population of 2.7 million, of whom 10% are children under 5 years of age[5]. The population of Narayanganj is predominantly urban. On the east, there is the Shitalaksha river and on the west and south, the Buriganga river. By the sides of the rivers, there are many small industries and many

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workers are living there with their families. Living condition is very poor, wages are low and amenities are few. In the towns, small industries and business centres provide employment. In Narayanganj, there are considerable differences in the quality of life within the district. The rural areas have the worst health and nutrition indices.

Study design and data collection:

The data were collected from January to June, 2010. The survey was cross sectional and sample was representative of the district and its 5 (five) geographic areas-the municipal regions, the urban and the rural interior. Sampling was carried out by systematic random sampling, permission of the mother and other custodian was first sought for blood collection. Venous blood was collected from an antecubital vein by trained pathology technician. The haemoglobin concentration was measured with portable haemoglobin meter by Sahli's method.

Date analysis:

Anemia was defined as a haemoglobin concentration <11 g/dl. They are grouped as follows: severe anaemia, if <7.0 g/dl; moderate anaemia, if 7.0 g/dl to 8.9 gl/dl and mild anaemia, if 9.0 to 10.9 g/dl[6]. We divided the age range of 6-59 months into five subgroups and weighed the overall prevalence for the district. In the statistical analysis, differences for categorical variables were assessed by the chi-square (X^2) test, and the X^2 trend was used for linear trend.

Results:

Prevalence of Anaemia:

Table-I shows the prevalence of anaemia by age, sex and geographic area. Over all 40.9% of children studied were anaemic. The highest prevalence was in the rural area (51.4%). This was substantially higher (X^2= 13.77, P<0.001) than in the municipal region (39.6%) and urban interior (35.9%). The prevalence of anaemia in children of 6-23 months old was twice as high as children of age 24-59 months old i.e. 61.8% and 31.0% respectively. Anaemia prevalence was similar in boys and girls.

Hemoglobin concentration:

Table-II shows the mean haemoglobin concentrations by age, sex and geographic area. The over all mean value in children age 6-59 months was 10.9 gl/dl. The mean value in rural area was 10.6 gl/dl, compared with 11.0 gl/dl for the municipal area Narayanganj and 11.2 gl/dl for urban area. The over all mean

Table-I

Prevalence of anaemia by age group and sex for the district as a whole and for geographic areas of Narayanganj

Age group (month)	Children in sub group-No	Anemia prevalence (%)	Children in sub group (No)	Anemia Prevalence (%)	Children Sub group (No)	Anemia prevalence (%)	Children in sub group (%)	Anemia prevalence (%)
6-11	46	71.7	46	54.3	43	79.1	135	67.3
12-23	79.4	58.2	78.2	55.1	84.4	66.7	231	58.8
24-35	49	44.9	43	23.3	56	57.1	148	38.8
36-47	59	23.7	44	22.7	32	21.9	135	22.9
48-59	45	13.3	35	34.3	38	34.2	118	25.8
Total	274	39.6	244	35.9%	249	51.4	767	40.9
Sex								
Male	140	43.3	130	38.9	120	56.1	390	45.8
Female	134	43.8	114	42.6	129	56.2	767	47.6

a. For age and geographic area, prevalence were weighted according to the actual population distribution in Narayanganj district as shown in data of BBS[5] .

b. Statistical difference between geographical areas: X^2=B·77, P<0.001

Table-II

Mean haemoglobin concentration (g/dl) and standard deviation (SD) by age group and sex for District as a whole and for geographic areas of Narayanganj

	Municipal area (274 children) Mean±SD	Urban area (244 children) Mean±SD	Rural area (249 children) Mean±SD	Over all District (767 children) Mean±SD
Age group				
6-11	10.0±1.3	10.8±1.2	9.6±1.5	10.1±1.4
12-23	10.8±1.5	10.6±1.4	10.1±1.6	10.5±1.5
24-35	10.7±1.8	11.6±1.0	10.8±1.2	11.0±1.5
36-47	11.7±1.3	11.8±1.5	11.7±1.2	11.7±1.4
46-59	12.0±1.1	11.6±1.5	11.5±1.2	11.7±1.3
	F= 15.55 P<0.001	F=8.61 P<0.001	F=17.02 P<0.001	F=35.4 P<0.001
Total	11.0, 1.6,	11.2, 1.4,	10.6, 1.6,	10.9, 1.6
Sex				
Male	11.1, 1.7,	11.2, 1.6,	10.6, 1.5,	11.0, 1.6
Female	11.0, 1.5,	11.2, 1.3,	10.5, 1.6,	10.9, 1.5
	t= 0.57 P= 0.57	t= 0.11 P= 0.96	t= 0.45 P= 0.75	t= 0.88 P= 0.38

haemoglobin concentration was 1.0 gl/dl higher in children aged 24-59 months than it was among the young children in the study. The trend test by age was highly significant (t= 11.55, P<0.001).

Discussion:

The over all anaemia prevalence that we found among the children of Narayanganj district is 40.9%, indeed a public health concern. Particularly to be noted, the prevalence was 51.4% in the rural interior, 39.6% in the municipal region and 35.9% in the urban areas of Narayanganj. The main reasons for the differences we found between rural and urban areas are likely to be as lower consumption of iron in rural areas due to poverty, ignorance, illiteracy, low socio-economic condition, inappropriate family planning, poor sanitation and unsafe drinking water in rural area. Moreover, higher rates of parasitic diseases, leading to iron loss are also expected there[6,7]. Anaemia prevalence was twice as high in children 6-23 months old compared to those aged 24-59 months and similar findings have been reported by others[8,9]. Iron requirements are related to growth velocity and so requirement per kg of body weight decreases with age. Therefore, there may be a physiological explanation for the fall in anaemia prevalence with age. Iron intake is also likely to improve with age as a result of a more varied diet, including the introduction of meat and other iron containing foods. Infections depress iron absorption[10] and the prevalence of infection is less in older children[11]. Thus, the significant decline in anaemia prevalence with age in population of Narayanganj is highly credible. Whether a single cut off of 11g/dl is appropriate for all age groups is debatable and some investigators have called age specific cut off [12]. "In normal" population, in which deficiency of iron, foliate and vitamin B_{12} have either been excluded or are unlikely, measurements of haemoglobin concentration give medium values for young children are about 12.5g/dl and a lower limit of normality of about 11.0 g/dl[12,13]. Studies, however, also revealed a slow but gradual rise in haemoglobin concentration, starting from the age of 3 months. Dallman and Siimes[13] reported that at 6 months of age, the lower level of normality of 11.1g/dl, increasing to 11.3g/dl at 59 months. We used a cut off of 11.2g/dl (instead of 11g/dl) for the age group of 24-59 months, the prevalence of anemia in this age group would

be 33.3% rather than the 31.0% reported in table-I. This is a relatively small effect. A difference of 0.2g/dl between the two age groups, however, may be conservative, as larger changes with age were found by Brault et al.[14]. Sherriff et al.[15] have recently suggested 10.0g/dl as the cut off for anemia in children aged 12-18 months based on the fifth centile for a large cohort study of children in the capital of United Kingdom. Their sample however, did not exclude iron-deficient children and the data may be unrepresentative of normal nonanaemic population[12]. Limitation of this study was some anemic individuals have hemoglobin concentration in the normal range and not been diagnosed, whereas, some normal individuals will be misclassified as anemia[16]. For these reasons, additional indicators of deficiency have been advocated, such as Serum ferritin, transferin saturation, erythrocyte protoporphyrin and Hb-electrophoresis[17,18]. Multiple indicators however, are unusual in large population surveys[17]. Despite the difficulties in assessing anemia, we feel confident that the high prevalence of anaemia in Narayanganj district is evident and thus, interventions are warranted, and particularly needed for rural children and those of 6-24 months old. A potential intervention may be to use iron, vitamins and antihelminthic drugs. The national assistance program for malnourished pregnant women and children, educational interventions have the potential of being cost effective approaches for improving the health of young children. The aim would be to increase the varities of foods consumed, particularity foods rich in iron as well as the foods containing vitamin C at every meal [18,19]. Worms' burdens among those under 5 children are well known. Common parasites are *Ascaris lumbricoids*, *Ankylostoma deudonalea* and *Trichuris trichura*. These parasites cause blood loss in the stool and contribute to develop anaemia. Research to determine the prevalence of intestinal parasites among the children in urban and rural areas of Narayagnaj district is needed. Besides, interventions should be implemented, particularly deworming the children, supply of safe drinking water and proper disposal of human excreta.

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