

Prevalence of anaemia in primary school children of rural Vadodara

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Abstract

Introduction: Anaemia is also a major public health problem in developing countries among school children. The prevalence among school age children ranges from 12-60% in the developing world. In school age children result of anaemia leads to resistance to disease, increased susceptibility of infection, poor cognitive development, poor school performance and reduced work capacity with impaired social and economic development of the country

Objectives: The broad objective was to assess the magnitude of Anaemia in primary school children in rural schools of Vadodara.

Materials and Methods: A study was carried out in 4 government primary schools. Total 58 girls and 62 boys who gave written consent for the participation in the study were enrolled for the study. Haemoglobin estimation was carried out through standard method. Anaemia was classified using WHO classification (2011).

Findings: The prevalence of anaemia among children was 56.6 % which was higher in girls (63.7%) as compared to boys (49.9%). It was found that mean haemoglobin levels were higher in elder boys age group (≥ 11.5 years). Result revealed that mean haemoglobin level decreased in elder age girls (≥ 11.5 years).

Conclusion: The prevalence of Iron deficiency anaemia needs to be tackled on priority basis in government primary school children. Implementation of Mid day meal Programme and NIPI needs to strengthen to curtail Anaemia in children for Anaemia Mukh Bharat

Keywords: Prevalence of anemia, Primary school children, Mid day meal programme, Micro nutrient deficiency

Micronutrient Malnutrition

Micronutrient malnutrition has been a persistent problem in India, and as the recent data suggest, some forms of micronutrient malnutrition are reaching their peak in the present century. We are broadly looking at the magnitude of this problem, and the initiatives taken by the government to tackle it and the results obtained with those efforts. Then, an effort is made to consider newer options and commitments required that are available for tackling the problem of micronutrient malnutrition. (Kotecha 2008).

Kotecha reported that every day, more than 6,000 children below the age of five die in India. More than half of these deaths are caused by malnutrition-mainly the lack of Vitamin A, iron, iodine, zinc and folic acid. The consequences of micronutrient malnutrition are unacceptably high morbidity and mortality. Vitamin A, iron and zinc deficiency when combined constitute the second largest risk factor in the global burden of diseases; 330,000 child deaths are precipitated every year in India due to vitamin A deficiency; 22,000 people, mainly pregnant women, die every year in India from severe anaemia; intellectual capacity is reduced by 15 per cent across India due to iodine deficiency; and 200,000 babies are born every year with neural tube defects in India due to folic acid deficiency. (Food Fortification Technique 2011).

Anemia

A condition which results from a reduction in haemoglobin concentration or reduction in red blood cell number or both resulting in lower ability of oxygen delivery to support the body's activities is Anaemia.(Gutema B et al. 2014). A public health problem in developing countries among school-age children is Anaemia. In the developing world,

the highest prevalence of anaemia exists where its causes are multi-factorial. The prevalence among school-age children ranges from 12-60% in the developing world.

For the growth of children the high prevalence of anaemia has serious consequences during childhood and adolescence where several physical changes requiring extra nutritional inputs are occurring. Growth is dependent on adequate nutrition, determined by the availability of food of sufficient quantity, the ability to digest, absorb and utilise food.

Result from poor bioavailability of iron, infections like intestinal parasites, malaria and tuberculosis due to anaemia in children. It is generally assumed that 50% of cases are caused by iron deficiency. In school age children result of anaemia in lowered resistance to disease, increased susceptibility of infection, poor cognitive development, poor school performance and reduced work capacity with impaired social and economic development of the country.

Micronutrient Malnutrition and School Children

Along with undernutrition, there are other micronutrient deficiencies that children suffer from like deficiency of iron, vitamin A, etc. Iron deficiency anemia is highly prevalent in school age children. Micro-nutrients are essential for the proper functioning of every system in the body and are vital for good health. 1 out of 3 people in developing countries are affected by vitamin and mineral deficiencies (World Hunger and Poverty Facts and Statistics, 2013).

Micronutrient deficiencies also pose a threat to the school-age population. These are a sub-category of undernutrition and occur when the body lacks one or more micronutrients (e.g. iron, iodine, zinc, vitamin A or folate). These deficiencies usually affect growth and immunity but some cause specific clinical conditions such as anemia (iron

deficiency), hypothyroidism (iodine deficiency) or xerophthalmia (vitamin A deficiency). (Burgess A & Dr.Danga L. 2008).

Iron

Iron deficiency is a principal cause of anemia. Two billion people—over 30 percent of the world's population—are anemic, mainly due to iron deficiency, and, in developing countries, frequently exacerbated by malaria and worm infections. For children, health consequences include premature birth, low birth weight, infections, and elevated risk of death. Later, physical and cognitive development is impaired, resulting in lowered school performance. For pregnant women, anemia contributes to 20 percent of all maternal deaths (World Hunger and Poverty Facts and Statistics, 2013).

Materials and Methods

The present study was planned with broad aim of assessing prevalence of anaemia in primary school children of rural Vadodara. The study was carried out in government schools of two blocks of Vadodara district.

Selection of Subjects

Two government schools from Vadodara rural and two government schools from Dabhoi was selected randomly. Written consent of all the subject was taken in order to enrol them for the research study. Total 120 children gave the written consent for participation in the study.

Socio-Demographic Profile

Information on the socio- demographic profile of the subject was collected using a pre-tested questionnaire. Information

regarding age, sex, religion, caste, family composition, monthly income, per capita income was collected.

Biochemical Estimation

Haemoglobin Estimation

Haemoglobin Estimation was done by Cyan meth Haemoglobin Method WHO classification was used to find out prevalence of anaemia (Table 1).

Results

Highlights of the Findings

School health programme report highlighted that Over 4.37 lakh school children in Gujarat were suffering from anaemia (School health programme, 2013).

Socio Demographic Profile of Children

A total 120 children were enrolled for the study out of which 63 were boys and 58 were girls. And socio demographic information was collected which is presented in Table: 2

Religion, Caste, Income, Per capita income, Family type of the children was enrolled for the Anthropometric measurements.

Eighty four percent of the children were Hindus. 37% children were in Schedule tribe category 29% were belonged to Schedule Caste category. 89% children had family size of 4-8 members and 57% belonged to nuclear family type. Nearly 60% of the families had monthly family income of three thousand to five thousand rupees eighty five percent of the family have having BPL Card.

Education of Parents

Education of the parents of the children is given in Table 2. Only 3% of the father and 17% of the mother were illiterate.

Table1: Anemia Classification According to new who Standard (2011)

Anemia Classification	Hemoglobin Level (g/dl)	
	5 to 11 years	Above 12 years
Normal	≥11.5 g/dl	≥12 g/dl
Mild Anemia	11-11.4 g/dl	11-11.9 g/dl
Moderate Anemia	10.9-8 g/dl	10.9-8 g/dl
Severe Anemia	<8 g/dl	<8 g/dl

Table 2: Socio Demographic Profile Of The Children (N=120)

Characteristics	N	%
Religion		
Hindu	101	84.1
Muslim	19	15.8
Caste		
General	15	12.5
SC	35	29.1
ST	45	37.5
OBC	6	5
Others	19	15.8
Type of Family		
Nuclear	68	56.6

Extended	11	9.1
Joint	41	34.1
Family Size		
≤4	6	5
4-8	107	89.1
>8	7	5.8
No. of adults		
≤4	86	71.6
4-8	34	28.3
No. Of Children		
≤4	103	85.8
4-8	17	14.1
Income		
<3000	40	33.3
3000-6000	72	60.1
>6000	8	6.6
Category		
APL	18	15.1
BPL	102	85.0
Father's Education		
Illiterate	4	3.3
Primary class 1-7 th	44	36.6
Secondary class 8-10 th	56	46.6
Higher secondary class 11-12 th	16	13.3
Mother's Education		
Illiterate	20	16.6
Primary class 1-7 th	72	60.0
Secondary class 8-10 th	26	21.6
Higher secondary class 11-12 th	2	1.6

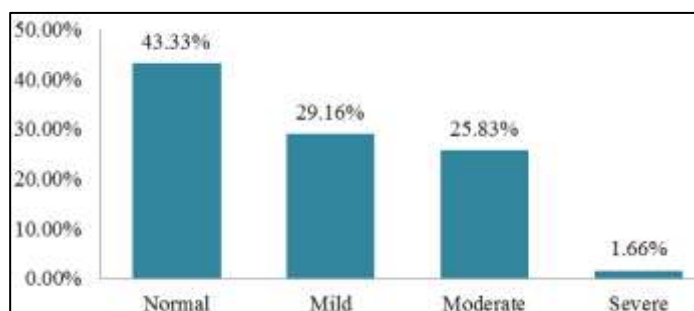


Fig. 1: Prevalence of Anemia in Children

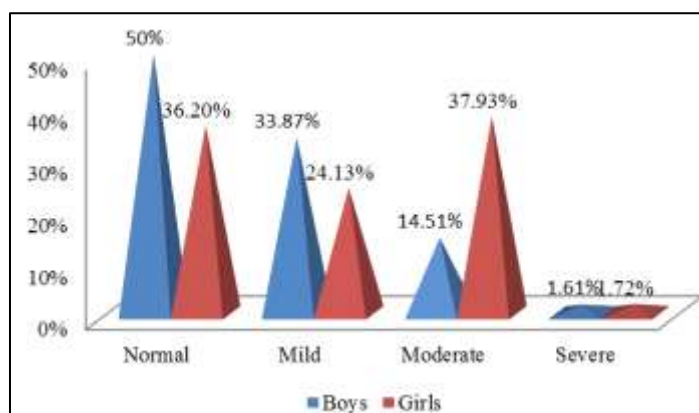


Fig. 2: Prevalence of Anemia in Boys and Girls

Table 3: Prevalence of Anemia Among Childrens

Anemia Classification	Boys N=62	Girls N=58	Total N=120
Normal	31(50)	21(36.20)	52(43.33)
Mild	21(33.87)	14(24.13)	35(29.16)
Moderate	9(14.51)	22(37.93)	31(25.83)
Severe	1(1.61)	1(1.72)	2(1.66)
9-11.4 Years			
	N=11	N=15	N=26
Normal	6(54.54)	8(53.33)	14(53.84)
Mild	2(18.18)	2(13.33)	4(15.38)
Moderate	2(18.18)	5(33.33)	7(26.92)
Severe	1(9.09)	0(0)	1(3.84)
≥11.5 Years			
	N=51	N= 43	N=94
Normal	25(49.01)	13(30.23)	38(40.42)
Mild	19(37.25)	12(27.90)	31(32.97)
Moderate	7(13.72)	17(39.53)	24(25.53)
Severe	0	1(2.32)	1(1.06)

*Values in parenthesis indicates percentage

Table 4: Age wise hemoglobin levels of children and in boys and girls (Mean±SD, G/DL)

Age group	N	MEAN±SD
9-11.4Y	26	11.55±0.96
≥12Y	94	11.61±1.09
Total	120	11.58±1.02
BOYS		
9-11.4Y	11	11.62±1.03
≥12Y	51	11.96±0.99
Total	62	11.79±2.02
GIRLS		
9-11.4Y	15	11.51±0.94
≥12Y	43	11.21±1.5
Total	58	11.36±2.84

Prevalence of Anemia

This study estimated Haemoglobin levels of 120 children. Out of total 120 62 were boys and 58 were girls in the study. The age range of the children 9-15 years of the age. The anaemia was graded according to WHO standard. Table 3: and Fig. 1: Shows the prevalence of anaemia in selected children of Vadodara district. The findings revealed the overall prevalence of anaemia among in the children was 56.6%. The result shows that the prevalence of moderate anaemia was very high in girls as compared to boys in all the age group 9-15.11 years. As seen in Fig 2 and Table 3.

Table 4 when prevalence of anaemia was seen as per the age group, it was found that moderate anaemia was much higher in 9-11.5years group children. That nearly 57% of children suffer from direct categories of anaemia.

Discussion

Anemia continues to be an important public health problem worldwide with prevalence of 43% in the developing countries and of 9% in the developed nations. According to WHO (2012) iron deficiency anemia is among the top five factors leading to Years lost to disability (YLD) among 10-

14 years old children which are a measure to quantify the burden of morbidity.

Nutritional anemia is a common disorder which affects about 20 percent of the world population. India has a very high prevalence of adolescent anemia. Out of the 12.2 Crore adolescents in India (Census 2011 projected population) in the age group of 15 to 19 year, approximately 5.7 Crores are girls out of which 3.2 Crores are anemic. There are 6.5 Crores boys in this age out of which approximately 2 Crores are anemic. Thus it is estimated that more than 5 Crores adolescents in this age group are anaemic (NRHM, 2012). In India, prevalence of anemia among 15-19 years is reported to be as high as 55.8 percent in girls and 30.2 percent in boys (NFHS-3, NNMB 2006).

The present study was carried out among school children (5-17 years) in a rural area of Vadodara district. The overall prevalence of anaemia among the children was 18.1%. The prevalence of moderate anaemia was found to be higher amongst in 9-11.5 years age group of children.. It was observed that children for Non AP served school had low prevalence of anaemia.

Our results are in line with a departmental study done by Gandhi and Patel 2013 No severely anemic boys were

found but prevalence of mild to moderate anemia ranged from 16% to 35%.

Another same as a study done Gandhi and Desai 2014 reported that 52% of the moderate and severely thin younger boys had haemoglobin levels and 48% of the boys came in different categories of anaemia

A study carried out in Tirupati with the aim of to examine the prevalence of anemia among the child beneficiaries of 8 to 10 years of age. The Male and Female children (no: 776) attending the Urban municipal upper primary schools in Tirupati, Andhra Pradesh composed the subjects of the study. The data revealed that 19.6, 40.6 and 0.2% were in mild, moderate and severe anemic states, respectively. About 40% children were in the normal category having Hb values >11.5g/dl. (G. Sireesha, D.L Kusuma 2012)

A cross-sectional study was carried out to assess the prevalence and the severity of anemia among adolescent girls (10-19 years) (n=840) in rural area of Vantamuri, Belgaum showed the prevalence of anemia to be 41.1% (severe anemia- 0.6%, moderate anemia- 6.3% and mild anemia- 34.6%). This study highlighted that the prevalence of anemia was high in late adolescents (15-19 years) as compared to that in the early adolescents (10-14 years). Also, the prevalence of anemia was high in girls who belonged to the low socio-economic status (Biradar et al, 2012).

The study conducted by Iyer and Dhaundhiyal in (2010) in Gandhinagar on 1st-7th standard school children showed the prevalence of anaemia as 72.8% of which 87.3% were mildly anaemic, 11.3% moderately anaemic and only 1.4% were severely anaemic.

Another study by Sharma and Dave in 2009 documented the prevalence of mild anaemia to be 50.9%, 7.5% of moderate anaemia and 0.9% of severe anaemia; it was done on adolescent school children of Vadodara.

Conclusion

Prevalence of moderate anaemia was higher in children. The prevalence of Iron deficiency anaemia needs to be tackled on priority basis in government primary school children. Implementation of Mid day meal Programme and NIPI needs to be strengthened to curtail Anaemia in children for Anaemia Mukh Bharat.

Conflict of Interest: None.

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