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Prevalance of Anaemia among Children of Bangalore Rural

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Abstract
Objective: *To assess the prevalence of anemia among rural children of Bangalore.*
Design: *Cross sectional study. Setting: pediatric oot patient department, Rajarajeswari medical college and Hospital Subjects: 200 children of 6mo-60mo age.*
Methods: *Relevant history was taken and a complete physical examination done in all the children. Hemoglobin was estimated using cymnethemoglobin method and peripheral blood smears were also examined. Anemia was diagnosed when hemoglobin was less than 11 g/dl for children of 6mo-60mo age.*
Results: *Overall prevalence of anemia was 51.5%. Girls had a significantly higher prevalence of anemia. The prevalence of anaemia was high (38%) even in higher socioeconomic groups. Nearly half (47.6%) of well nourished children were anemic. The mean Hb also was lower than expected normal values in both nutritional groups. Compared to non-vegetarians (38%), more vegetarians (65.9%) were anemic. The commonest blood picture seen was microcytic hypochromic (55.4%).*
Conclusions: *The present study revealed a high prevalence of anemia among healthy rural children of higher socio- economic classes. Vegetarians and girls, were more at risk to develop anemia.*
Key words: *Anemia, Children, Iron deficiency, Prevalence.*

Introduction

ANEMIA in children, especially iron deficiency, is the commonest health problem in many developing countries with an estimated prevalence of 43% [(1)]. There is convincing evidence that iron deficiency causes impaired growth, developmental delay, behavioral abnormalities and impairs cognitive function and school performance. It has also been associated with functional abnormalities of lymphocytes and neutrophils [(1-3)]. Although school children constitute 25% of the total population in India, few studies have been done to evaluate their hematological profile. These studies have shown a wide range for prevalence of anemia (0.5-94%) as the methodology as well as criteria for diagnosing anemia have been variable [(2,4-9)]. Also most of the studies have been focused on the children belonging to lower socio-economic status.

Bangalore is an economically advanced and physically robust city of our country. It is the Garden city of the country. There have been no recent reports from this part on the health status of children. The present study was carried out to assess the prevalence of anemia among the children in Bangalore rural area.

Subjects and Methods

The study was conducted on 200 children aged less than 5 years attending the outpatient department of Rajarajeswari Medical College and Hospital. The children were selected randomly thus comprised of different socio-economic groups. Data regarding socio-economic status was obtained through a proforma given to the children and completed by their parents/ guardians. The proforma also included information on the known medical problems of the child if any. Modified Kuppuswamy socio-economic scale was used for classification into various socio-economic groups [(10)].

All children were weighed and taken as under nourished if their weight was less than 80% ofstandards. The children were examined for pallor as seen from palpebral conjunctiva, lips, tongue, skin and nail beds. In addition a complete clinical examination was also done. Blood was drawn by venepuncture in EDT A vials. Hemoglobin (Hb) estimation was done using cynmethemoglobin method [(11)]. Twenty micro litre of anticoagulated blood was added to 5 ml of freshly made stan- dardized Drabkin's solution in a vial. This was inverted several times to mix the solution. It was allowed to stand for 10 minutes. The solution was read in spectro-photometer at 540 nm and values were compared with a standard table. All observations were made by a single person to prevent inter-observer bias. Anemia was diagnosed when hemoglobin was less than 11 g/dl for children below 6 years of age (WHO standard) [(1)]. Peripheral blood film was prepared and stained (Leishman's stain) by the standard technique. The RBC morphology was studied to know the type of anemia. Statistical analysis was done using Chi-square test.

Results

Out of 200 children studied, 51.5% were found to be anemic. The mean Hb according to age in both sexes is shown in *Table I.* A significantly higher number (p <0.01) of girls were anemic at all ages. Whereas prevalance of anaemia was less in boys compared to girls.even in children less than 1year of age was found to anaemic.

The mean Hb according to age in both sexes is shown in *Table I.*

Table I Correlation of Age with Mean Hemoglobin (g/dl)

Age	Sex	Total no	Hb(g/dl) Mean±SD	Pvalue
6mo-1yr	Boys Girls	16 18	11.05±0.95 10.65±1.05	<0.01
1-2yr	Boys Girls	27 19	11.23±0.89 10.87±0.75	<0.02
2-3yr	Boys Girls	24 26	10.95±1.40 10.56±0.98	<0.02
3-4yr	Boys Girls	17 12	10.80±1.05 10.72±0.95	<0.001
4-5yr	Boys Girls	22 19	11.26±1.10 10.88±0.95	<0.01

At almost all ages significantly (p <0.001) more (65.9%) vegetarian children were anemic. As seen from *Table II,* the mean Hb showed a rising trend with improved socio-economic status. Most of the children belonging to lower socio-economic groups were anemic. The striking finding was that 38% of children of upper and upper middle class had anemia. The prevalence of anaemiawas high (71.5%) in the under nourished children but among well nourished group also nearly half (47.6%) were anemic. Even the mean Hb of both

these groups was lower than the WHO standards for the age.

Clinical pallor could be detected in 44% of total children while 51.5% were anemic as per hemoglobin estimation. The commonest blood picture was microcytic hypochromic seen in 55.4% followed by normocytic, normochronic in 37.5% and dimorphic picture in 1.7% only. Microcytic hypochromic anemia was noted to be more in younger age groups.

TABLE II *Mean Hb and Prevaletlce of Anemia According to Various Socio-Economic Groups*

Groups	Total no	Hb(g/dl) Mean±SD	Prevalance of anaemia(%)
Socio Economic Group			
Upper	28	12.12±1.32	14
Upper Middle	41	11.65±0.97	39.4
Lower Middle	36	10.88±1.16	69.6
Upper Lower	40	10.01±2.25	93.2
Lower	55	9.30±1.22	87.5
Well Nourished	86	11.68±1.05	47.6
Under Nourished	114	9.72±1.15	71.6

Discussion

Occurrence of anemia in undernourished children and those belonging to poor socio-economic status is a well documented fact [12-16]. The present study revealed a startlingly high prevalence of anemia among school children of upper and middle socio-economic classes. More than half (51.5%) of the total children studied were anemic. Among upper and upper middle class, 38% of the children had anemia although the mean Hb did show a rising trend with higher socio-economic status. We also found that 47.6% of well nourished children were anemic and their mean Hb was also below the expected normal values. Thavraj and Reddy had also noted iron deficiency among 20% of healthy, non-anemic, high income group children[7]. In view of these findings it is evident that a significant proportion of the apparently healthy children belonging to the higher socio-economic classes suffer from overt anemia and may have latent iron deficiency even if not anemic. The possible reason for this could be the poor bio-availability of iron in the Indian diets [16]. The rising trend of consuming snacks and junk foods which supply empty calories is also responsible for so called 'healthy' but anemic children. This fad is fast spreading to the lower socio-economic status as well. The higher prevalence of anemia among vegetarian children in the present study further adds to the already existing evidence indicating that vegetarian diets are a poor source of iron [17,18].

The prevalence of anemia was much higher in the present report ranging from 25-100%, among children aged 5-15 years. Previously a high prevalence has been noted by others in studies among children of rural and free urban schools, *i.e.,* mainly belonging to economically weaker sections [2,6]. The present study included a fair percentage of children from lower strata of society and still found to be anemic. We found that diligent observation for pallor correlates well with the Hb estimation as only 7.5% of the anemic children were not detected clinically.

In conclusion, the present study highlights that anemia is a major health problem among well-nourished school children belonging to better socio-economic classes. Routine iron supplementation for all groups of children would be of benefit in decreasing the wide prevalence of this problem.

References

1. Demaeyer EM. Preventing and Controlling Iron Deficiency Anemia Through Primary

Health Care. Geneva, World Health Organization, 1989.
2. Malhotra AK, Srivastava RN. A study on impact of socia-economic status on hemoglobin levels of rural school children of district Wardha. Indian J Prev Sac Med 1982; 13: 95-99.
3. Vijayaraghavan K, Brahman GNV, Nair KM, Akbar D, Rao NP. Evaluation of National Nutritional Anemia Prophylaxis Programme.Indian J Pediatr 1990; 57: 183-190.
4. Sundaram VM, Sankaranaraynan VS, Rajendran S, Varalakshmi, Sarasa.Health profile of school children in Madras City.Indian Pediatr 1978; 15: 725-586.
5. Khanduja PC, Aggarwal KN, Taneja PN. Hematological values of school children in different socio-economic groups. Indian Pediatr 1969; 6: 577-586.
6. Gopaldas T, Kale M. Prophylactic Iron supplementation for underprivileged school boys. Indian Pediatr 1985; 22: 731-743.'
7. Thavraj VK, Reddy V. Serum Ferritin in healthy school children.Indian Pedlatr 1985; 22: 51-57.
8. Goyal RC, Chavan VA. Health status of school children in Ahmednagar City.In-dian J Maternal and Child Health 1993; 4: 81-83.
9. Aggarwal KN, Khanduja PC, Aggarwal PK, Madhavan S, Tarkar AD. Normal hematological levels for school children (5-16 years).Indian Pediatr 1972; 9: 785-795.
10. Kuppuswamy B. Manual of Socio-Economic Status Scale. New Delhi, Manasayen, 1991.
11. Gopaldas T, Seshadri S. Method for determination of blood hemoglobin. *In:* Nutrition. Monitoring and Assessment.Eds. Gopaldas T, Seshadari S. Delhi, Oxford University Press, 1987; p 205.
12. Gupta VM, Shukla KK. Epidemiology of anemia in preschool children from a rural and a slum community, Varanasi. Indian J Prev Sac Med 1985; 15: 85-89.
13. Mann GS, Stones RW. Nutritional anemia in the urban poor; A community based study of under fives in an Indian slum. J Trop Pediatr 1988; 34: 257-259.
14. Aggarwal DK, Bhardwaj B, Singla PN, Tripathi AM, Aggarwal KN. Etiology of maternal and early childhood deficiency anemia. Indian J Pediatr 1986; 53: 389-396.
15. Sharma A, Sharma SK, Grover AK, Tewari AD, Abrol P. Anemia in protein energy malnutrition. Indian Pediatr 1985; 22: 841-843.
16. Desai N, Chaudhry VP. Nutritional anemia in protein energy malnutrition.Indian Pediatr 1993; 30: 1471-1483.
17. Christoffel K. A pediatric perspective on vegetarian nutrition.ClinPediatr 1981; 20: 632-643.
18. Dagnelie PC, Staveran WA, Vergote FJ, DingJan PG, Berg H, Hautvast JG. Increased risk of vitamin BIZ and iron deficiency in infants on macrobiotic diets.Am J ClinNutr 1989; 50: 818-824.