

Prevalence of anaemia and under nutrition in peri-pubertal population of rural school children

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Abstract

Background: Anemia is a public health problem affecting people from developed and developing countries. The peri-pubertal child is more prone to acquire abnormal eating habits, more intake of fast foods, decreased physical exercise and menarche occurring in this period children, making them more prone to malnutrition and anaemia. **Aim:** To study the prevalence of anaemia and under nutrition along with the social factor associated in school children of peri-pubertal age group. **Material and Methods:** The study was conducted on 300 children of 7th to 9th standard from government school. All children were in the age group of 12-14 years. Anaemia was assessed clinically and by Sahli's method and Nutritional status was assessed in terms of anthropometric parameters. **Results:** Out of 300 school children, 123 (41%) children were found to be anaemic. Prevalence of anaemia was insignificantly higher in girls (43.13%) than in boys (40.56%). Out of 215 malnourished children, 104 (34.67%) children were anaemic and out of 85 well-nourished children 19 (6.33%) were anaemic. **Conclusion:** Health programme for all school children on a regular basis along with routine testing for hemoglobin estimation of these children is advised. School teachers should give advice to both children and parents regarding advantages of balanced diet.

Key Words: School children, anaemia, nutrition, prevalence.

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INTRODUCTION

Anemia is a public health problem affecting people from developed and developing countries with bad consequences of human health as well as social and economic development.^{1,2} Especially, peri-pubertal population from low income families have a higher risk for developing anemia due to iron deficiency that occurs as a result of high demand for iron during the period of rapid growth.³ In developing countries, the prevalence of

anemia among school age children is 40%, and it is classified as severe public health problem.⁴ A period of transition from childhood to adulthood, during which young people undergo rapid changes in body structure and physiologic functioning, representing a vulnerable and dependent period of human life. The child is more prone to acquire abnormal eating habits, more intake of fast foods, decreased physical exercise along with constitutional growth spurts and menarche occurring in this period children, making them more prone to malnutrition and anaemia. Environmental factors such as family, peer group, school, community characteristics also contribute to adolescent's health and risk behaviours must also be taken into consideration. As the foundations of good health and sound mind are laid during the school age period, the present study was formulated with an objective to study the prevalence of anaemia and under nutrition along with the social factor associated in school children of peri-pubertal age group.

MATERIAL AND METHODS

The study was conducted on 300 children of 7th to 9th standard from government school. All children were in the age group of 12-14 years. Children studying in 7th to 9th standard with age group of <12 years and >14 years were excluded from the study. Ethical clearance from our institutional ethical committee was obtained. Informed consent of parents or guardians was taken by school authorities. Prior intimations were given to school authorities to minimize absenteeism. Efforts were made to include maximum children in to the study by surveying a class twice subsequently. Anaemia was assessed clinically by looking at palpebral conjunctiva, nail bed, tongue and palm. Samples were collected for estimation of hemoglobin by Sahli's method. For hemoglobin estimation, 20 µL capillary blood was collected by finger prick into EDTA tube from all the participating students and measured on the same day. (not included in my study) Pallor is characterized by a lack of colour of the skin and mucous membranes due to a low amount of circulating haemoglobin. It affects the entire body but it is best observed in places where blood vessels are close to the surface, such as the palms, nail beds and mucous membranes. Pallor begins to be apparent to the examiner's eye at haemoglobin levels of below 9 g/dL. Anaemia was assessed clinically by looking at palpebral conjunctiva, nail bed, tongue and palm.) Nutritional status was assessed in terms of anthropometric parameters like height and weight using weight for age, height for age and weight for height. Under nutrition (low weight for age), stunting (low height for age) and wasting (low weight for height) were detected as per Indian Academy of Paediatrics (IAP) classification.

RESULTS

Out of 300 school children, 123 (41%) children were found to be anaemic. Prevalence of anaemia was insignificantly higher in girls (43.13%) than in boys (40.56%).

Table 1: Sex distribution of anaemia in school children

Anaemia	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Present	101	40.56	22	43.13	123	41
Absent	148	59.43	29	56.86	177	59
Total	249	100	51	100	300	100

$\chi^2=0.116$, $df=1$ and p value = 0.36 (Not significant)

No significant association between anaemia and type of diet was observed. Out of 300, anaemia was found 83(27.67%) in vegetarian diet and 40 (13.33%) in mixed diet.

Table 2: Association between anaemia and socioeconomic status

SES	Anaemia	
	Present (%)	Absent (%)
Class I (13)	5(4.06)	8(4.52)
Class II(33)	11(8.94)	22(12.43)
Class III(54)	16(13.01)	38(21.47)
Class IV(152)	65(52.85)	87(49.15)
Class V(48)	26(21.14)	22(12.43)
Total(300)	123(41)	177(59)

$\chi^2=7.358$, $df=4$ and p value =0.11 (not significant)

Out of 300, anaemia was present in 123, in which anaemia was predominant in class IV and class V i.e., 65 (52.85%) and 26 (21.14%). Followed by class III 16 (13.01%), class II 11 (8.94%) and class I 5 (4.06%). Present study found insignificant association between anaemia and SES. Out of 300 children, 133 (44.33%) children were malnourished and 167 (55.67%) were well-nourished. Among boys prevalence of malnutrition was more compared to girls i.e., 115 (46.18%) and among girls 18(35.29%). There was no significant difference in prevalence of malnutrition among both sexes of school children ($p > 0.05$).

Table 3: Grades of malnutrition among school children

Grades of Malnutrition	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Grade I	70	60.86	14	77.77	84	63.16
Grade II	33	28.69	4	22.22	37	27.82
Grade III	12	10.4	00	00	12	9.02
Grade IV	00	00	00	00	00	00
Total	115	100	18	100	133	100

*last three rows are clubbed ($\chi^2=1.92$, $df=1$ and p value 0.08) (Not significant)

Out of 133 malnourished children, 84 (63.16%) children were of grade I malnutrition, 37 (27.82%) of grade II and 12 (9.02%) children were of grade III malnutrition. From above table it was observed that there was no significant difference in distribution of different grades of malnutrition according to sex.

Table 4: Relation between anaemia and nutritional status of school children

Anaemia	Malnourished		Well-nourished		Total	
	No.	%	No.	%	No.	%
Present	104	34.67	19	6.33	123	41
Absent	111	37	66	22	177	59
Total	215	71.67	85	28.33	300	100

$\chi^2=17.05$, $df1$, $p < 0.0001$ (Significant)

Out of 215 malnourished children, 104 (34.67%) children were anaemic and out of 85 well-nourished children 19 (6.33%) were anaemic.

DISCUSSION

Lack of awareness among the mothers about the problem coupled with their low educational status, poor nutritional practices and unhealthy food habits, low iron

bioavailability of the diet, decreased physical activities, malaria and parasitic infestations are additional factors associated with lower hemoglobin (Hb) level in children.⁵ Out of 300 school children 123 (41%) children were found to be anaemic. Prevalence of anaemia was insignificantly higher in girls (43.13%) than in boys (40.56%). Gupta *et al*⁶ reported 80.2% children were suffering from anaemia. They also noted that the prevalence of anaemia was insignificantly higher in girls (86.4%) than in boys (80.9%). Semwal *et al*⁷ reported 28.4% children were suffering from anaemia. They also noted that the prevalence of anaemia was insignificantly higher in girls (30.2%) than in boys (26.0%). Whereas, Basu *et al*⁸ reported that out of 1111 children in the age group 11-18 years the prevalence of overall anaemia was 16.25%. Prevalence of anaemia was significantly higher in girls (25.4%) than boys (7.7%). Sudhagandhi *et al*⁹ studied 900 children of age group 8-16 years. Overall prevalence was found to be 52.88%. Female were found to be more anaemic (i.e., 67.77%) than boys (38%). Jain *et al*¹⁰ out of 400 adolescent boys of age group 10-19 years, anaemia was found to be 43%. Present study is not comparable with above studies as their study age group was higher (above 14 years). As the girl attains menarche by the pre-puberty, so every menses predisposes the child for anaemia. So, higher the age group, more will the prevalence of anaemia. Present study shows no significant association between anaemia and type of diet. Saratha *et al*¹¹ studied the association between anaemia and type of diet. Prevalence of anaemia was found more in mixed 73.43%, compared to veg 56.8%. George *et al*¹² studied anaemia and nutritional status of pre-school children. Anaemia was reported among both vegetarians and non-vegetarians. Anaemia was found significant higher in non-vegetarian than compared to vegetarian. Varma *et al*¹³ studied the prevalence of anaemia among urban school children of age 5-15 years. Out of 2000, compared to non-vegetarians (38%), more vegetarians (65.9%) were anaemic. Present study is comparable with George *et al*.¹² In present study, anaemia was predominant in class IV and class V. Present study found insignificant association between anaemia and SES. Sharma *et al*¹⁴ observed that children belonging to low socio-economic status were more anaemic (35.71%) than children from higher socio-economic group (2.59%). So, present study observation is comparable to above study. In present study out of 300 children, 133 (44.33%) children were malnourished and 167 (55.67%) were well-nourished. Among boys prevalence of malnutrition was more compared to girls i.e 115 (46.18%) and among girls 18(35.29%). There was no significant difference in prevalence of malnutrition among both sexes of school children ($p > 0.05$). Izharul *et al*¹⁵ studied school children

of 5-14 years for malnutrition. They revealed that the overall prevalence of malnutrition in school children was 52% (260 out of 500), with no significant difference in prevalence of malnutrition among boys and girls i.e. 53.85% in boys and 49.25% in girls. Saluja *et al*¹⁶ reported that out of 800 school children, 396 (49.5%) children were malnourished. They also revealed that there was no significant difference in prevalence of malnutrition among boys and girls i.e., 48.82% in boys and 50.26% in girls. Bose *et al*¹⁷ reported the overall prevalence of underweight among 549 children was 53.4% (boys = 54.6%; girls = 51.9%). Semwal *et al*⁷ reported the prevalence of malnutrition among 930 children was 52.6%. With no significant difference of prevalence of malnutrition between boys and girls. Panda P *et al*¹⁸ reported 52.2%, prevalence of malnutrition among 776 school children. Also they reported prevalence of malnutrition among both boys and girls were almost equal i.e., 52.8% in boys and 51.2% in girls. In present study, out of 133 malnourished children, 84 (63.16%) children were of grade I malnutrition, 37 (27.82%) of grade II and 12 (9.02%) children were of grade III malnutrition. Saluja *et al*¹⁶ who noted 49.5% children were malnourished, grade I malnutrition was most common (71.71%), followed by grade II (22.98%) and grade III (5.30%) malnutrition. Panda *et al*¹⁸ reported out of 776 children, 405 (52.2%) were malnourished. Out of these 405 malnourished children, 220 (54.32%) showed mild malnutrition, 132 (32.59%) moderate malnutrition and 53 (13.09%) children were suffering from severe malnutrition. Shakya *et al*¹⁹ reported out of 61% of malnourished children 49.50% were of grade I, 37.83% of grade II, 10.46% of grade III and 2.21% of children were from grade IV malnutrition. Kumari K²⁰ found prevalence of malnutrition was 75.85%, out of this 48.02% children were of grade I, 40.67% were of grade II and 11.29% children were of grade III malnutrition. Out of 215 malnourished children, 104 (34.67%) children were anaemic and out of 85 well-nourished children 19 (6.33%) were anaemic. Chi-square test revealed significant association between anaemia and nutritional status of school children ($p < 0.0001$). It may be due to poor nutritional intake in general and low intake of iron containing food in specific in malnourished children, which may be due to unacceptability, ignorance or unavailability of such food. To conclude, a higher percentage of children from government school were found to be anemic. Health programme for all school children on a regular basis along with routine testing for hemoglobin estimation of these children is advised. School teachers should give advice to both children and parents regarding advantages of balanced diet. They should be advised for improvement in dietary habits

regarding consumption of green leafy vegetables should be included in diet plan.

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