

Prevalence of Anaemia in Tribal School Children

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ABSTRACT Tribal population is about 13 per cent of total population of Rajasthan and it is the most unprivileged section of society. Therefore, tribal schools children aged 6-12 years from government schools of villages covered by *Kun* Primary Health Centre (PHC), Dhariyawad block of Udaipur region, Rajasthan were studied to assess the prevalence of anaemia. A total of 206 children from five schools were examined for clinical signs and symptoms of anaemia. Blood haemoglobin level of clinically anaemic children was analysed using digital haemoglobinometer by cyanmethaemoglobin method. Dietary intake was also noted by 24 hours recall method using food models and standardised bowls set. Nutrient intake was calculated by food composition tables and then compared with RDA (ICMR, 1990). SES was assessed by SES scale of Pareek and Trivedi (1963). Results revealed that 61 per cent children were from low socio-economic status families and remaining 39 per cent from low middle class. Clinical examination showed that 95.1 per cent children were clinically anaemic. Clinical signs such as pale conjunctiva (77.6 %), flat and plate nails (24.3 %), atrophic lingual papillae (12.4 %) and koilonychia (44.3 %) were observed among the school children. Blood haemoglobin revealed that more than half (60.2 %) of these children were moderately anaemic (7-10 g/dl), 32.9 per cent were severely anaemic (<7 g/dl) and 0.6 per cent mildly anaemic (10-11.5 g/dl). On the whole, 93.7 per cent children were suffering from different forms of anaemia. The results show high prevalence of anaemia in the tribal school children of Udaipur region suggesting that an intervention to cure and prevent anaemia may be started for school children also.

INTRODUCTION

Tribal population is about 13 per cent of total population of Rajasthan and it is the most underprivileged section of society (Census, 1991). There are very few studies on tribal population especially on school children although it has been found that 53 per cent of school children in developing countries are suffering from iron deficiency anaemia (ACC/SCN, 2000). Global anaemia prevalence when examined for each physiological group using the WHO global database on anaemia reports that most affected groups are pregnant women (48%) and 5-12 years old children (46%). In developing countries most highly affected population groups are pregnant women (56%), school age children (53%), non-pregnant women (44%) and pre-school children (42%). On the whole, iron deficiency and its anaemia affects 3.5 billion people in the developing world (ACC/SCN, 2000). Surveys conducted under the aegis of ICMR in different parts of India have revealed that a large segment of the population approximately 50 per cent suffer from nutritional anaemia (NIN, 1998). National Family Health Survey II

(2000) also reported that overall 52 per cent of married women and 74 per cent of children aged 6-35 months are anaemic in India, out of which majority are moderately anaemic. In Rajasthan, the highest prevalence of anaemia i.e. 82.3 per cent in pre-school children has been reported, but there is no nation-wide or state-wide data available for prevalence of anaemia in school age children. Therefore, the present investigation was carried out to find out the prevalence of anaemia among tribal school age children.

MATERIALS AND METHODS

The present study was conducted on tribal school children of five villages covered by Primary Health Centre (PHC) at *Kun* village, Dhariyawad block, Udaipur region, Rajasthan. *Kun* is the first tribal PHC in the north-east direction of Udaipur, about 100 km from the city and caters the needs of seven gram panchayats. Five government schools having more than 50 per cent tribal children were selected from the villages namely, Kun, Kuniyon ka phala, Bedasota and Pratapgarh ki Bhagal from Kun Gram Panchayat and Kelva from Manpuriyon ka Guda Gram Panchayat.

In all 206 children enrolled in different schools were clinically examined for anaemia as well as for any major illness with the help of

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PHC Medical officer using a pretested proforma. The information about the family including socio-economic status for these children was assessed by SES scale (Pareek and Trivedi, 1963). Blood haemoglobin of the children having clinical signs of anaemia was estimated by cyanmet-haemoglobin method (Balasubramaniam et al., 1992) to verify the results of clinical examination. Children having haemoglobin level less than 11.5g per cent (ACC/SCN, 2000) were considered as anaemic. Iron and vitamin C intakes were calculated from their food intake which was assessed by 24 hours recall method with the help of models and standardised set of bowls.

RESULTS

All the children were Hindu of Meena tribe and from nuclear families. The socio-economic status of the families was low as 61 per cent belonged to lower class with SES scores less than 13. Remaining 39 per cent were of low middle class with SES scores between 13 to 23. The poor socio-economic status of these families was due to the employment of majority of the heads of families as labourers, possessing 1-2 acres non-irrigated land and only a few draught animals and inhabiting in *kutcha* houses. None of the families had either bullock cart or improved agricultural implements.

The results of clinical examination depicted that only 4.9 per cent children were normal and

Table 1: Prevalence of clinical signs of anaemia in children

S. No.	Clinical signs	% (n=206)
A.	Clinical signs absent	4.9 (10)
B.	Clinical Signs Present	95.1 (191)
1.	Pale conjunctiva only (a)	21.4 (43)
2.	Atrophic Lingual Papillae only (b)	0.0 (0)
3.	Pale and flat nails only (c)	0.0 (0)
4.	Koilonychia only (d)	16.9 (34)
5.	a + b	5.0 (10)
6.	a + c	18.9 (38)
7.	a + d	25.4 (51)
8.	b + c	0.5 (1)
9.	a + b + c	5.0 (10)
10.	a + b + d	2.0 (4)
11.	Total children with clinical signs of:	
	(i) Pale conjunctiva	77.6 (156)
	(ii) Atrophic lingual papillae	12.4 (25)
	(iii) Pale and flat nails	24.3 (49)
	(iv) Koilonychia	44.3 (89)
C.	Not examined (absent)	2.4 (5)

Values in parenthesis denote the number of children.

Table 2: Prevalence of different grades of anaemia in clinically anaemic children

Haemoglobin levels# (g/dl)	Grade of anaemia	% (n=176)
< 7	Severe Anaemia	32.9 (58)
7 - 10	Moderate anaemia	60.2 (106)
10 - 11.5	Mild anaemia	0.6 (1)
> 11.5	Normal	6.2 (11)

(ACC/SCN, 2000; DeMaeyer, 1989).

Values in parenthesis denote the number of children.

remaining 95.1 per cent were anaemic having one or more clinical signs (Table 1). The pale conjunctiva was present in the majority (77.6%) of the children either alone (21.4%) or along with other clinical signs such as atrophic lingual papillae (5%), pale and flat nails (18.9%) and koilonychia (25.4%). DeMaeyer (1989) suggested that laboratory tests should be used to diagnose anaemia and to determine its severity as the clinical detection of anaemia is influenced by many variables. At times, the signs of anaemia are non-specific and sometimes difficult to detect. Therefore, in the present study haemoglobin level was estimated for those children who were found clinically anaemic (191) and were willing to give blood (176). It was found that 93.5 per cent children were anaemic having haemoglobin level below 11.5g per cent. The grades of anaemia assessed by using classification suggested by DeMaeyer (1989) revealed that 60.2 per cent children were suffering from moderate, 32.9 per cent severe and 0.06 per cent from mild form of anaemia (Table 2). A study by Sidhu and Uppal (2003), revealed 92.4 per cent prevalence in scheduled caste pre-school children. In a study by Park et al. (2003) 52.8 per cent Korean pre-school children were found anaemic. An in-depth survey of 2,998 children aged 8-9 and 12-13 years in Ghana and Tanzania revealed that 77 per cent of children in Tanzania and 41 per cent of children in Ghana were suffering from iron deficiency anaemia (Partnership for child development, 1998). These results show high prevalence of anaemia in children.

Of all the causes of anaemia, iron deficiency is a problem of serious concern (Dubey, 1994), therefore, the food intake of each child was calculated and mean intake was derived by age groups. Cereals and milk were consumed by all the children whereas the consumption of pulses, roots & tubers and other vegetables was by 3.6 per cent, 14 per cent and 8.5 per cent children, respectively.

Consumption of fat and oils (13.3%) and sugar and jaggery (3%) was also by very few children. None of the child consumed green leafy vegetables and fruits.

Calculation of nutrient intake using food composition tables (ICMR, 1990) revealed that iron intake was only 38.8 per cent, protein 81.2 per cent and vitamin C 8.2 per cent of RDA. The low intakes of nutrients which are required for haemoglobin formation is due to inadequate intakes of green leafy vegetables, fruits and pulses which in turn resulted in high prevalence of anaemia among the children.

The above results show a high prevalence of anaemia among tribal school children by clinical as well as biochemical examination suggesting that in the field studies clinical examination method can be used to assess anaemia as it requires less time, money and energy. Anaemia in turn affects work capacity and mental capabilities hence an intervention to cure and prevent anaemia be started for school age tribal children.

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