



Prevalence of anemia and its association with various socio demographic variables among preschool tribal children in Kerala

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Abstract

Objectives: *To study the prevalence of anemia among pre-school tribal children, to compare with the non-tribal children and to identify its association with selected socio demographic variables in Kerala.*

Methods: *Mananthavady ICDS block in Wayanad district of Kerala, which has the largest tribal population in the state was selected and a Descriptive Cross Sectional Study was conducted from December 2014 to June 2015, spanning 40 days in 20 randomly selected anganawadis. 469 children participated in the study. Hemoglobin levels were measured using standardized instruments and peripheral blood smears were examined. Socio demographic data were collected using structured questionnaire. Anemia was classified based on the hemoglobin levels, as per World Health Organization (WHO) standards. Percentages, means and associations were determined using PASW software.*

Results: *469 children (228 tribal and 241 non-tribal) were analyzed. 88% of the tribal children and 47% of non-tribal children were detected to have anemia. Among children with anemia, 51% had microcytic hypochromic blood picture suggestive of iron deficiency anemia. Significant correlation was seen between anemia and prematurity, low birth weight, duration of breast feeding, overcrowding and educational status of mother.*

Conclusion: *A large proportion of preschool children in the region are having nutritional anemia owing to the inadequacy of essential micronutrients in their diet. The prevalence of anemia among the tribal preschool children is almost double compared to the non-tribal groups, which points towards the existing disparity in their standard of living. There is scope for further interventions especially among tribal population and we must ensure that necessary strategies are made based on the study to make health care services sensitive to the needs of the tribals.*

Keywords: *Anemia; Tribal; Pre-school; Wayanad; socio-demographic variables.*

Introduction

Historically the tribal population of India is considered to be the most socioeconomically backward group in the society. It is for this reason

that the Govt. of India has implemented several schemes and programmes targeting this particular group, for their socio economic empowerment. Even after 40 years of implementing the ICDS

programme, the nutritional status of the preschool tribal children have not reached a satisfactory level.

Among nutritional deficiencies, anemia is one of the major problem and it contributes a large proportion to childhood mortality and morbidity¹. The prevalence of anemia in young children continues to remain over 70% in India and most parts of Asia despite the policies and programmes being in place for a long time². The major risk factors for anemia in developing countries include micronutrient deficiencies like iron, vitamin A, folate, vitamin B-12; infections such as intestinal parasites, schistosomiasis, malaria, human immunodeficiency virus [HIV] and inherited red blood cell disorders like sickle cell anemia and thalassemia³.

Iron deficiency is the most widespread and common nutritional disorder in the world⁴. Iron plays a major role in delivering oxygen to tissues. It contributes to the regulation of the immune function. Iron Deficiency Anaemia (IDA) can cause extreme fatigue and depression. Iron deficiency has non hematologic systemic effects. IDA impacts cognitive development and productivity⁵. The most concerning effects in infants and adolescents are impaired intellectual and motor functions that can occur early in iron deficiency before anemia develops. There is evidence that these changes might not be completely reversible after treatment with iron, increasing the importance of prevention.

Anemia is classified based on the hemoglobin levels, as per World Health Organization (WHO) standards⁶.

Table 1. Hemoglobin levels to diagnose anemia at sea level (g/dl)

Population	Non- Anaemia*	Anaemia*		
		Mild	Moderate	Severe
Children 6-59 months of age	110 or higher	100 – 109	70-99	lower than 70
Children 5- 11 years of age	115 or higher	110 – 114	80 – 109	lower than 80
Children 12 – 14 years of age	120 or higher	110 – 119	80 – 109	lower than 80
Non pregnant women (15 years of age and above)	120 or higher	110 – 119	80 – 109	lower than 80
Pregnant woman	110 or higher	100 – 109	70 -99	lower than 70
Men (15 years of age and above)	130 or higher	110 – 129	80 – 109	lower than 80

Aims and Objectives

1. To study the prevalence of anemia among pre-school tribal children.
2. To compare with the non-tribal children of the same age group residing in the same area.
3. To identify the association between anemia among preschool tribal children and selected socio demographic variables in Kerala.

Materials and Methods

Research design: Descriptive cross sectional study

Setting of the study: Mananthavady ICDS block in Wayanad district was chosen for the study as it has one of the highest populations of tribal communities in the state.

Study period: Anganawadis were visited from December 2014 to June 2015, spanning 40 days.

Study population: Children falling within the age group of 3-6 years attending anganawadi constituted the study population.

Selection of anganawadi centers: 20 anganawadis were randomly selected using a random number generator, out of the total 131 anganawadi centers in Mananthavady ICDS block. Each centers were then given serial numbers and were visited in that order.

Sample size: Sample size was calculated by the formula $n = \frac{4pq}{d^2}$, after taking estimated prevalence as 30% [NFHS Kerala], precision level as 6%, design effect 1.5%. The estimated sample size was 330, which was increased to 400 for accounting for nonresponse.

Inclusion criteria: All children attending the anganawadi aged between 3 and 6 years were included for the study.

Exclusion criteria: Children who were previously diagnosed as sickle cell anemia were not included for peripheral smear examination.

Data collection: The study was completed in 40 days crossed over a time of 1 year. Two days were

allocated for each anganawadi center. The arbitrarily chosen 20 anganawadis were visited with the assistance of CDPO, in the vehicle organized by them. Information were gathered by anganawadi visits with the assistance of the anganawadi workers, interviewing mothers and by relevant clinical examination.

469 children took part in the study. HemoCue® Hb 201 + System was used for hemoglobin estimation which has an accuracy of ± 0.6 g/dl. Peripheral blood smears of children who are anemic, prepared from the anganawadis were studied and report issued with the help of Pathology Department, Govt. Medical College, Kozhikode.

Data analysis: The collected data were analyzed using Microsoft Excel and PASW Statistics 18 software for windows. Calculation of means and proportions of the outcome against major dependent variables were done for preliminary analysis. Chi squared test was used to explore statistical significance wherever appropriate.

Results

Study sample characteristics

Characteristics	Frequency	Percentage
Caste		
Tribal	228	49
Non-tribal	241	51
Gender		
Boy	259 (Tribal 130)	55 (Tribal 57)
Girl	210 (Tribal 98)	45 (Tribal 43)

Distribution of sample based on hemoglobin level. (n=469)

Characteristic	Tribal	%	Non-Tribal	%
No anemia	28	12.3	127	52.7
Mild anemia	95	41.7	62	25.7
Moderate anemia	105	46	49	20.3
Severe anemia	0	0	3	1.3

Peripheral smear report

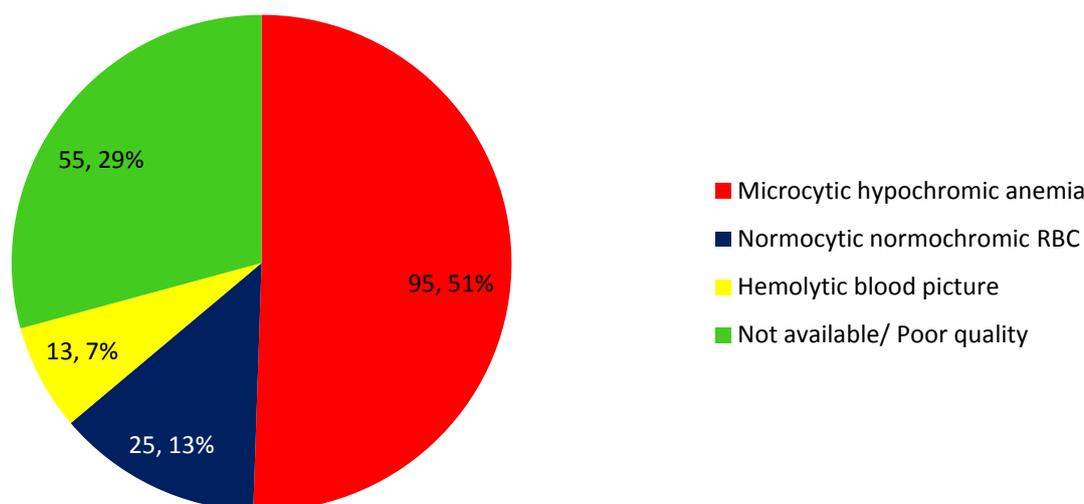


Table 4 Association of anemia and various socio demographic variables

FACTORS	chi-square test	Df	p value
Term	12.263	3	0.007**
Birth weight	71.012	3	<0.001***
Past illnesses	11.153	6	0.084
Duration of breast feeding	55.416	6	<0.001***
Time of initiation of CF	5.639	3	0.131
Number of family members	14.87	3	0.002**
Educational status of mother	98.721	9	<0.001***
Parental Habits (Tobacco smoking/ alcohol)			<0.001***

*significant at 0.05 level, **significant at 0.01 level and *** significant at 0.001 level.

469 children of age group 3-6 years were included in the study, of whom, 49% belonged to tribal community. 87.7% of the tribal children had anemia while only 47.3% among non-tribal children were detected to be anemic. Among tribal population with anemia, 47.5% were mild and 52.5% were having moderate to severe anemia. Peripheral smear report showed that of the total tribal children with anemia, 51% had a microcytic hypochromic blood picture, 13% had normocytic normochromic RBCs and 7% children were having polychromasia/ target cells suggestive of hemolytic anemias. Significant correlation was seen between anemia and prematurity, low birth weight, duration of breast feeding, overcrowding and educational status of mother.

Discussion

Majority of the tribal children in Mananthavady are anemic. It is significantly high (88%) compared to the national prevalence of 72% in rural India, while it is similar to studies conducted in different states among tribal population.

It is clear that the chief cause of anemia is hypochromic microcytic due to iron deficiency as evidenced by the peripheral smear examination. Since complete hemogram was not available, we had to depend on morphologically detected microcytosis and hypochromia for diagnosis of iron deficiency.

Sickle cell disease was a problem faced by the tribal community. Many studies on sickle cell anemia have been conducted on the tribal

population in Wayanad district. Out of the 228 tribal children, 12 were already diagnosed to have sickle cell anemia, which accounts to 5.2%. Among non tribals, none were diagnosed to have sickle cell anemia. . In addition 7% of tribal children in our study were having evidence of hemolysis in peripheral smear. This could be due to sickle cell anemia, thalassemia, combination of both or even other types of anemia, which was extremely difficult to distinguish due to the unavailability of modern laboratory tests like HPLC. Early detection and proper treatment is required to reduce long term morbidity and mortality. If this serious health problem is not tackled immediately, the tribal populations would suffer from severe complications associated with hemoglobinopathies and with marriages within the communities the incidence can grow at a rapid pace.

Despite the efforts of ministry of health and medical education of the state in implementing free iron supplements for infants and for girls, the prevalence of iron deficiency and resultant anemia is considerable. Further interventions to increase use of supplements when they are provided and special programs for non-covered groups including boys under six are in great need. Our duty does not end with providing supplementary nutrition to the children through anganawadis, but we have to make sure than they consume the given food and further educate the parents regarding the importance of diet in the overall growth and development of the child.

Furthermore, improvement in socio demographic factors like prematurity, low birth weight, overcrowding households and lack of maternal education must to promptly tackled. This can be achieved by improving adolescent health and nutrition, proper antenatal services and maternal education. These arrangements must be long term, tending to their issues which would be monetary and social strengthening through resource exchange, training and work in the legislature and nongovernmental segments.

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