

Prevalence and causation of anemia among pediatric age group patients

Aditi Gupta¹, Khusbu Gangoli², Pradeep K. Gupta^{3,*}

¹Junior Resident, ²Assistant Professor, ³Professor, Dept. of Pediatrics, Teerathankar Mahavir Medical College Research Centre, Moradabad

***Corresponding Author:**

Email: drgupta_jsr@rediffmail.com

Abstract

Background: Anemia prevalence in all age group children continues to remain in most parts of India and Asia. One of the most common factors in causation of anaemia is malnutrition; iron deficiency making the most of it. While many studies have been conducted to find out the prevalence and causes of anemia, we conducted this study in western UP in a tertiary care hospital with an aim to find out the prevalence and causation of anemia in this part of world and what measures can be taken to curb this problem.

Material & Methods: The prospective observational study was conducted on 150 children in Teerthanker Mahaveer Medical College and Research Centre Hospital in Moradabad, western Uttar Pradesh, India. All children were between 6 months to 18 years of age who visited out-patient department and were admitted in the hospital. Children having acute blood loss, known malignancy, bleeding disorder and chronic renal disease were excluded. A specially designed data entry format was used to enter all the patient's details.

Results: Total number of children enrolled in the study was 150 during the study period (June 2015- July 2016). Out of 150 children, ten did not agree to give consent. The leading cause of anemia in children our study was predominantly diluted milk diet(83%) in children below five years of age with very little complimentary food. Anemia was more common in Hindu children (127 of 140 cases) and pica (76%) was common in all age groups. Girls were more affected than boys.

Introduction

High prevalence of anemia in children of all age group continues to be a major health problem in most parts of India. Anemia in childhood can lead to developmental impairment and lack of awareness of its impact on ability of a child to achieve his/ her full potential makes it a silent contributor to childhood morbidity. Anemia is one of the most common problems among children that affect health, education, economy and productivity indices of the entire nation. One of the most common groups in causation of anaemia is poor nutritional intake and iron deficiency makes most of it.

The numbers are staggering: Approximately two billion people of world's are anemic, mainly due to iron deficiency. In developing countries, implications of this figure are compounded as majority of such cases are from these regions only. The condition is exacerbated by malaria, worm infestation and poor nutritional intake and is an important cause contributing to ill health and death. The effects of anemia on children are more profound because of the impact of anemia on not only physical but also on cognitive and neurological functions.

Many studies had been conducted to find out the prevalence and cause of anemia worldwide but not many from western Uttar Pradesh (UP). We conducted this study in western UP in a tertiary care hospital with an aim to find out the prevalence and causation of anemia and what measures we can take to curb this problem.

Materials and Methods

Study was conducted in the department of pediatrics of Teerthanker Mahaveer Medical College and Research Centre Hospital, Moradabad, UP, India. It was a prospective observational study and a sample size of 150 children was calculated to be adequate. Inclusion criteria were to include children between 6 months to 18 years visiting out-patient department and admitted for any illness other than those specified. Only children with hemoglobin of less than 10.00 gm/dl on venous blood were included in the study. Children having acute blood loss, malignancy, bleeding disorder and chronic renal disease or any other chronic illness that directly contributes to anemia were excluded. A pre-tested designed format was used to enter all the patient's details. Emphasis was to obtain detailed information about dietary intake, age of starting of solid foods, any worm infestations, family size and income. The results were analyzed for various parameters and subjected to standard statistical analysis.

Results

The hematological profiles of 150 children of age groups between 6 months to 18 years were enrolled for analysis during the study period from June 2015-july 2016. Out of these, 10 refused to give consent and were excluded.

Table 1: Correlation with age and sex

Age(Years)	Total children	Males(anemia)	Females(anemia)
6m-<1 yr	22 (12 male, 10 female)	8	8
1-5 yrs	55 (34 male, 21 female)	30	20
6-10 yrs	29 (17 male, 12 female)	13	8
11-18 yrs	34 (20 male, 14 female)	18	14

Out of 140 children 69 males out of 83 (83%) and 50 out of 57 females (88%) were anemic. The maximum anemic children were in between 1-5 years of age (50 out of 119). Similarly, all the girls in adolescent age group were anemic and this was significantly significant. (p value = 0.0260, $\chi^2=9.24$). Girls on an average had higher prevalence of anemia as compared to boys.

Table 2: Correlation with community

Religion	No. of cases	No. of cases (anemic)	No. of cases (not anemic)	P value
Hindu	68	62(91%)	6(9%)	0.04 $X^2=3.96$
Muslim	72	57(79%)	15(21%)	

Among 140 children 68(48%) were Hindu and 72 (51%) were Muslim, 91% of Hindu population and 79% of Muslim out of Muslim community were anemic. The difference was statistically significant. (p value=0.04)

Table 3: Correlation with diet

Diet	Total No. of cases	Anemic	Non Anemic	P value
Non vegetarian	51 (36%)	40 (78%)	11 (22%)	0.033 $X^2=6.78$
Only milk diet	36 (25%)	34 (93.5%)	2 (6.5%)	
Vegetarian	53 (37%)	45 (85%)	8 (15%)	

Out of 140 children, 36 children (25%) were only on milk diet, 53(37%) were vegetarian and 51 (36%) were taking non vegetarian diet as well. Out of these, 93.5% on diluted milk diet and 85% on vegetarian diet were anemic while only 78% of those getting non vegetarian supplements were anemic. Result was statistically significant (p value=0.033) and persistence of feeding with diluted cows or buffalo's milk was an important contributor to anemia.

Table 4: Correlation with pica

Pica	Total No. of cases	Anemia	Non anemic	P value
No	42 (30%)	32 (76%)	10 (24%)	0.05 $X^2=3.65$
Yes	98 (70%)	87 (89%)	11 (11%)	

Out of total 140 children 98 (70%) had pica and of these 89 % were anemic. The difference was statistically significant (p value=0.05).

Table 5: Correlation with worm infestation

Worm infestation	Total	anemic	Non anemic	P value
Yes	28	27 (96%)	1 (4%)	0.044 $X^2=3.59$
No	112	92 (82%)	20 (18%)	

Out of 140 children 28 (20%) had worm infestation of these 27(96%) had anemia. The result was statistically significant. (p value=0.044)

Discussion

The total number of children enrolled in the study was 150 during the study period (June 2015-july 2016). Of these 10 did not give consent and only 140 cases were analyzed.

The leading cause of anemia in children admitted in our set up was diluted cow's or buffalo's milk based diet (83%) with no complimentary feeding in under five children. Pica (76%) was common and Hindu children

(91%) were more affected, probably due to dietary factors in child rearing practices.

The overall prevalence of anemia in our setup was 85%. Kumar et al in 2014 found 80% preschool children to be anemic in Mumbai. Nanjunda in 2014 found 62% of children to be anemic in Karnataka and Amit H Agravat et al in 2014 from Rajkot reported 68% children to be anemic. Parvathi Suresh Jigalur et al found 62.38%

anemic children in Hubballi. Haldar et al in 2011 found 64.4% children to be anemic in West Bengal.

Age was one of the important factors in prevalence of anemia in our study. Maximum cases were found in between 12 months to 60 months of age, that is 50 (42%) out of 119 children who were anemic. This is comparable to the studies done by Rakesh et al who found severe anemia in between 12-17 months of age and moderate anemia in 50% of children between 6-23 months of age. Ewuse et al found maximum children to be anemic (85.1%) in children younger than 24 months of age. Pasricha reported 75.3% children in between 12-23 months of age to be anemic. Arlappa et al in West Bengal in 2002 found 91% children to be anemic in between 12-36 months of age.

Sex was also an important factor associated with increased prevalence of anemia in children in our study. While 83 % boys and 88% girls were anemic, all adolescent girls and 95% in 1-5 years age group were anemic. There have been varying reports from other parts of the country. Sudha gandhi et al (2011) found 67.77% females and 35.55% males to be anemic, Nanjunda (2014) found 48% females and 56% males to be anemic, Siresha et al (2014) found 342 males and 434 females to be anemic in their study. The higher frequency of anemia in females in our study could be a reflection of neglect of girl children in dietary supplementation.

Diet contributed to a major chunk of anaemia in our study. We found 36% children were on diluted milk diet, 25% were vegetarian and most of them were anemic. Willows et al found that while formula-fed infants had the highest hemoglobin concentration and the lowest prevalence of anemia, babies fed cow's milk had a high prevalence of anemia. The early introduction of cow's milk has been associated with a low hemoglobin concentration in both infants and toddlers. Pinhas-Hamiel et al studied whether overweight children and adolescents, who often have poor dietary habits, are at increased risk of iron deficiency (ID). Agravat in 2014 in Rajkot found that continuation of only breastfeeding and no introduction of weaning diet also contributed to anemia. Sahana (2015) found that Improper Weaning techniques, consumption of cow's milk and diluted top-up formula feeding is an important cause of anemia. All this highlights the need to educate the mothers and make them aware of proper infant feeding practices.

On the basis of community, 91% Hindus and 79% Muslims were found to be anemic. Goswami in 2015 reported that Christian population was at lower risk while Scheduled Caste, Scheduled Tribes, and Other Backward Class categories were having higher risk of having anemia.

Conclusion

The study was carried out to understand the current prevalence pattern of anemia in Moradabad with an objective to raise the awareness about it in population of

Moradabad that may help enhance the health status of children by adopting corrective measures in the long run. National guidelines can be followed for the prevention and management of anemia. The current study focuses on the measures that should be immediately taken like and breastfeed should be initiated in time, weaning should be started at the age of 6 months, intake of diluted buffalo or cow milk avoided with introduction of solid foods in hygienic manner.

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