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A CROSS-SECTIONAL STUDY TO ASSESS THE PREVALENCE OF ANEMIA IN FIVE TO NINE YEAR OLD CHILDREN AT A TERTIARY CARE CENTRE

Community Medicine

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ABSTRACT

Background: Anemia is a major public health problem in India that affects all age groups but children and women in childbearing age group are the most vulnerable. We aimed to study the prevalence of anemia among 5-9 year old children admitted in Pediatric Department.

Materials and Methods: A total of 472 children aged 5-9 years were enrolled in the study over a period of three months. A complete blood count was obtained for every child and anemia was diagnosed according to the World Health Organization (WHO) standard for the given age. The data was analyzed and interpreted using descriptive and inferential statistics.

Results: Overall prevalence of anemia in the study population was 43%. Severity wise, mild anemia was the commonest (58%), while severe anemia was least common (8.9%). The prevalence of anemia was slightly more among girls compared to boys along with significant association with age.

Conclusion: Anemia is common among the children of Rewa M.P. (India), and affects girls slightly higher than boys. Although mild anemia is very common, it remains asymptomatic and therefore goes unnoticed and untreated.

KEYWORDS

Anemia, Children, India, Prevalence.

INTRODUCTION:

Anemia is a widespread public health problem associated with an increased risk of morbidity and mortality, especially in pregnant women and young children [1]. According to World Health Organization (WHO), globally the highest prevalence of anemia is in preschool children (47.4%). The prevalence of anemia, in preschool children (0 to 4.9 years) in various WHO regions are variable with Africa (67.6%) and Southeast Asia (65.5%) occupying the top of the list. In India 89 million preschool age children suffer from anemia [2]. As per the World Bank data, the prevalence of anemia among under 5 children in India is 59% in 2011 [3]. According to National Family Health Survey (NFHS-4), prevalence among children less than five years of age was reported to be 68.9% in Madhya Pradesh [4].

In developing countries, the most common cause of anemia is nutritional, however other factors like low birth weight, early cord clamping, maternal anemia, high rates of infectious diseases including malaria, Helicobacter pylori or helminthic infection, tuberculosis, genetic factors,poverty, poor access to iron-rich foods and other nutritional deficiencies plays a role.[5-8] The early years of life are one of the most critical stages of human development and any physical or psychological damage causes sustained effects on other stages of human development. Iron deficiency anemia has been found to be negatively associated with cognitive, intellectual and social development of the child. Longitudinal studies consistently indicate that children who were anemic in infancy continue to have poor cognition, school achievement and more behavior problems into middle childhood [8-10]. The prevention as well as timely management of anemia is essential to attain Sustainable Development Goal-3 (SDG) on ensuring healthy lives and promoting wellbeing for all. Further actions are required to reach the World Health Assembly target of a 50% reduction of anemia in women of reproductive age by 2025.

As far as we know, there had been no such hospital based study on prevalence of anemia in Madhya Pradesh, The study was done to know the burden and magnitude of disease in this vulnerable age group, which will help us to create awareness among all the stakeholders for early diagnosis and timely management.

MATERIALS AND METHODS

The present cross sectional study was conducted after obtaining the approval from the Institute Ethical Committee. This study was conducted on children (five year to nine years age group), admitted in IPD of the Department of Pediatrics S.S.Medical College Rewa M.P. over a period of 3 months. The parents of children were informed about the purpose and the method of the study and voluntary nature of participation in the study verbally.

Informed verbal consent was obtained from the parents of each child after the study objective was explained. A structured Hindi questionnaire with both closed and open ended questions was used to collect data. Information of socio-demographic & details regarding social class, family income, occupation, education of the parents, birth order, birth interval and number of siblings and specific information on current health problem, MCV, MCHC, MCH, Hb%, RBC no. & others parameter was collected. The questionnaire was pretested for clarity, validity and reliability. The participants for the pretest did not participate in the actual study. The children below 5 year and above 9 years and extremely ill were excluded from the study along with the parents who didn't give consent.

A total of 472 children's of either sex were included. A complete blood count was measured as per standard criteria. Anemia was diagnosed as per the WHO cut off of Hemoglobin (Hb) level. Hb <11.5g/dL in 5-11 year, It was further classified into mild if Hb-11.0-11.4g/dL, moderate if Hb-8.0-10.9/dL and severe if Hb < 8 g/dL. The data were checked, cleaned and analyzed. In order to study the association between Anemia and various demographic variables; Chi square test was applied whenever applicable and a p- value < 0.05 was considered significant.

RESULTS

In present study 260 (55.1%) children were male and 212 (44.9%) were female. The children were distributed into various age groups as shown in Table.1. A higher proportion of children were in the age group of 5-6 years (44.7%) followed by children in the age group of 6-7 years (35.6%). Out of a total of 203 (43%) children who were anemic, mild anemia was found in 58.1% moderate in 33%, and severe anemia in 8.9% subjects (Table1). Gender wise distribution of degree of anemia revealed a higher percentage of mild (30.7%), moderate (19.8%) and severe (5.2%) anemia in girls as compared to boys (20.4%, 9.6%, & 2.7%) respectively. (Table-2).The association between anemia and the demographic variables is depicted in table 3.

Table-1: Frequency distribution of anemia and demographic variables in the participants

Variables	Groups	Number (%)	
Gender	Male	260 (55.1%)	
	Female	212 (44.9%)	
Age (in years)	5-6	211(44.9%)	
	6-7	168 (35.6%)	
	7-8	71(15.0%)	
	8-9	22 (4.7%)	
Anemia	No Anemia	269 (57%)	
	Anemia	203 (43%)	
		Mild Anemia	118 (58.1%)
		Moderate Anemia	67 (33.0%)
		Severe Anemia	18 (8.9%)
Education of Father	Illiterate	84 (17.8%)	
	Literate	388 (82.2%)	
Education of Mother	Illiterate	128 (27.1%)	
	Literate	344 (72.9%)	

DISCUSSION

The most prevalent conditions in this study were mild and moderate anemia which can be attributed to the fact that mild and moderate anemia is usually asymptomatic, and thus remains undetected and untreated [11]. The various studies on prevalence of anemia in India have shown values ranging from 41% to 66% [12-14]. The variations in the prevalence of anemia in different studies could be due to heterogeneity of the studied population, dietary habits, different nutritional status and incidence of worm infestation in a defined geographical area.

Higher prevalence was seen in girls in comparison to boys and the difference was found to be statistically significant. This was similar to a study by Sudhagandhi B. et al on school children of Kattankulathur, Tamil Nadu, where a higher prevalence of anemia was found in girls (67.77%) in comparison to boys (35.55%) [15]

The highest prevalence of anemia (50.7%) was reported in the 5-6 years age group. There was a significant association of anemia with age P <0.05 (Table3). This corroborates with the WHO report of 47.4% prevalence in preschool children worldwide; while in Africa and Asia, the prevalence is estimated at 64.6% and 47.7%, respectively [2]

Iron deficiency anemia impairs the concentration of adolescent girls and reduces the academic achievement, self-efficacy and physical strength and increases the risk of infections. As per the National Family and Health Survey-4 (NFHS) (conducted during 2015-2016) data, the prevalence of anemia in India; in children aged 6-59 months is 58.4% while in Madhya Pradesh it is 68.9%. The higher prevalence of anemia in preschool children may be attributed to poor maternal iron stores during pregnancy and lactation, rapid growth, delayed initiation of complementary foods and poor dietary intake of iron

Table-2: Frequency of Anemia in participants in the study by gender

Gender	Anemia				Total
	Absent	Mild	Moderate	Severe	
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
Male	175 (67.3)	53 (20.4)	25 (9.6)	07 (2.7)	260 (100)
Female	94 (44.3)	65 (30.7)	42 (19.8)	11 (5.2)	212(100)
Total	269 (57)	118 (25)	67 (14.2)	18 (3.8)	472 (100)

Association between demographic variables and anemia was tested using Chi-square test. The results indicates that gender and age were significantly associated with anemia (p <0.006) . There was a non-significant difference found with reference to education of parents.

Table-3: Association between Demographic Variables and Anemia

Variables		Anemia		Total (n=472)	P-value
		No Anemia (n=269)	Anemia (n=203)		
Gender	Male	175 (65.1%)	85 (41.9 %)	260	0.000
	Female	94 (34.9%)	118 (58.1%)	212	
Age (in years)	5-6	108 (40.1%)	103 (50.7%)	211	0.001
	6-7	115 (42.8%)	53 (26.1%)	168	
	7-8	38 (14.1%)	33 (16.3%)	71	
	8-9	8 (3.0%)	14 (6.9%)	22	
Education of father	Illiterate	45 (16.8%)	39 (19.2%)	84	0.564
	Literate	224(83.2%)	164 (80.8%)	388	
Education of mother	Illiterate	71 (26.4%)	57 (28.2%)	128	0.762
	Literate	198 (73.6%)	146 (71.8%)	344	

This study was limited with the fact that it is a descriptive study which reported the overall prevalence of anemia and its severity in the children who were admitted the Pediatric IPD during the study period and whose parents gave consent for enrolment. Secondly, being a cross sectional study, no causal effect relationship could be established. Chronically ill children were also not included which might have undermined the values. Further studies, to know the etiology of anemia and appropriate interventions including awareness among people about diet rich in iron, folic acid and other micronutrients is needed.

CONCLUSION

Mild and moderate anemia is a major public health problem among the children of Rewa district of M.P. The disease should routinely screened in children of all age groups and appropriate health care delivery steps with focus on interventions at early stages targeting the management of nutritional deficiency and helminthic infections should be initiated. This might reduce the burden of the disease which might help in the improvement of cognition and learning process in children.

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