

# Iron Deficiency Anemia among Hospitalized Children aged 6-Months to 5 years at a Tertiary Care Hospital of Poonch, Azad Kashmir, Pakistan

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## ABSTRACT

**Objective:** To find out prevalence of iron deficiency anemia among hospitalized children aged 6-months to 5 years at a tertiary care hospital of Poonch, Azad Kashmir, Pakistan.

**Study Design:** A cross-sectional study.

**Place and Duration of the Study:** Department of Pediatrics, Sheikh Khalifa Bin Zayed Al Nahyan Hospital, Rawalakot from July 2020 to December 2020.

**Material and Methods:** A total of 189 admitted children of both genders aged between 6 to 60 months were included. At the time of enrollment, age, gender, area of residence and socioeconomic status of all children were noted. To label IDA, a World Health Organization (WHO) criterion was adopted as hemoglobin below 11 g/dL. Chi square test was used to compare data between IDA and non-IDA children considering p-value < 0.05 as significant.

**Results:** Out of a total of 189 cases, there were 103 (54.5%) male. Overall, mean age was 29.3±6.8 months while 106 (56.1%) children were aged between 6 to 24 months. There were 130 (68.8%) children who belonged to rural areas of residence. Socio-economic status was low in 110 (58.2%) children. Malnourishment was identified in 38 (20.1%) children. Gastrointestinal disorders were the commonest reasons of admission found in 82 (43.4%) children. The prevalence of IDA was noted in 103 (54.5%) children. Table-2 is showing association of anemia with respect to various variables studied. Younger age (p=0.0091), rural area of residence (p=0.0039), low socio-economic status (p=0.0036) and malnourishment (p=0.0001) were observed to have significant association with the prevalence of IDA.

**Conclusion:** The prevalence of IDA was high (54.5%) in admitted children aged between 6 to 60 months. Younger age, rural area of residence, low socio-economic status and malnourishment were observed to have significant association with the prevalence of IDA.

**Keywords:** Iron deficiency anemia, hemoglobin, malnourishment, gastrointestinal disorders.

## INTRODUCTION

Anemia is the commonest manifestation of iron deficiency. Iron deficiency anemia (IDA) is a frequent hematological issue and estimated to affect above 500 million people all over the world.<sup>1</sup> Recent decades have seen reduction in prevalence of IDA in the developed countries but overall prevalence rates of IDA have not significantly changed worldwide.<sup>2</sup>

Term newborns are estimated to have 75 mg per kg of body iron while about 75% of that iron is present in the form of hemoglobin. Age between 6 to 24 months is a time of vigorous brain growth and psychomotor enrichment but this age group is estimated to have the highest proportion of IDA burden among children.<sup>3</sup> Improper psychomotor development and cognitive functioning among preschool children might result in compromised work performance among the same adults.<sup>4</sup> Along with hematological manifestations, non-hematological manifestations of IDA like poor weight gain, anorexia, irritability and decreased attention span are also common among children suffering with IDA.<sup>5,6</sup>

Cross-sectional regional data showed prevalence of IDA among children to be 59.9%<sup>7</sup> while data from a developed country<sup>8</sup> found it to be 4.9%. The huge difference reported between developing and developed countries regarding burden of IDA highlights the need to further study IDA in the regional subsections. As children below 5 years and pregnant women have the higher susceptibility to anemia due to high iron needs because of rapid body growth and expansion of red blood cells, addressing these population are vital to form strategies to reduce the burden of IDA in a developing country like Pakistan. This study was planned to find out prevalence of iron deficiency anemia among hospitalized children aged 6-months to 5 years at a tertiary care hospital of Poonch, Azad Kashmir, Pakistan.

## MATERIAL AND METHODS

This cross-sectional study was conducted at The Department of Pediatrics, Sheikh Khalifa Bin Zayed Al Nahyan Hospital, Rawalakot from July 2020 to December 2020. Approval from "Institutional Ethical Committee" was taken and informed/written consent was sought from

parents/guardians of all study participants. The sample size was calculated to be 189 considering 95% confidence level, 7% margin of error and prevalence of IDA among children as 59.9%.<sup>7</sup>

A total of 189 admitted children of both genders aged between 6 to 60 months were included. Children having congenital heart diseases, chronic liver disease, chronic kidney disease or any kinds of endocrine or immune disorders were excluded. Non-probability, consecutive sampling technique was adopted. At the time of enrollment, age, gender, area of residence and socioeconomic status of all children were noted. Complete blood count including hemoglobin was asked for all children. To label IDA, a World Health Organization (WHO) criterion was adopted as hemoglobin below 11 g/dL.<sup>1,9</sup> All study data was collected on a pre-designed proforma.

Data analysis was performed on SPSS 26.0. Qualitative data was highlighted as frequency and percentages. Quantitative data was shown as mean and standard deviation (SD). Chi square test was used to compare data between IDA and non-IDA children considering p-value < 0.05 as significant.

## RESULTS

Out of a total of 189 cases, there were 103 (54.5%) male. Overall, mean age was 29.3±6.8 months while 106 (56.1%) children were aged between 6 to 24 months. There were 130 (68.8%) children who belonged to rural areas of residence. Socio-economic status was low in 110 (58.2%) children. Malnourishment was identified in 38 (20.1%) children. Gastrointestinal disorders were the commonest reasons of admission found in 82 (43.4%) children. Table-1 is showing characteristics of the children included in this study.

Table-1: Characteristics of Children (n=189)

Characteristics		Number (%)
Gender	Male	103 (54.5%)
	Female	86 (45.5%)
Age Groups (months)	6-24	106 (56.1%)
	25-36	54 (28.6%)
	37-60	29 (15.3%)
Area of Residence	Rural	130 (68.8%)
	Urban	59 (31.2%)
Socio-Economic Status	Low	110 (58.2%)
	Medium	48 (25.4%)
	High	31 (16.4%)
Malnourishment	Yes	38 (20.1%)
	No	151 (79.9%)
Diagnosis	Gastrointestinal Disorders	82 (43.4%)
	Respiratory Diseases	65 (34.4%)
	Cardiac Diseases	18 (9.5%)
	Others	24 (12.7%)

The prevalence of IDA was noted in 103 (54.5%) children. Table-2 is showing association of anemia with respect to various variables studied. Younger age (p=0.0091), rural area of residence (p=0.0039), low socio-economic status (p=0.0036) and malnourishment (p=0.0001) were observed to have significant association with the prevalence of IDA.

Table-2: Association of Anemia with respect to various study variables

Study Variable		Iron Deficiency Anemia		P-Value
		Yes (n=103)	No (n=86)	
Gender	Male	62	41	0.0852
	Female	41	45	
Age Groups (months)	6-24	68	38	0.0091
	25-36	24	30	
	37-60	11	18	
Area of Residence	Rural	80	50	0.0039
	Urban	23	36	
Socio-Economic Status	Low	71	39	0.0036
	Medium	21	27	
	High	11	20	
Malnourishment	Yes	31	7	0.0001
	No	72	79	
Diagnosis	Gastrointestinal Disorders	55	27	0.1027
	Respiratory Diseases	31	34	
	Cardiac Diseases	10	8	
	Others	12	12	

## DISCUSSION

Most of the studies conducted among children to find out the prevalence of IDA are based on general population or among a specific disease group while scarcity of literature exists regarding burden of IDA in admitted children. In this study, the prevalence of IDA was noted to be 54.5% which shows that most of the children enrolled in the present study had IDA. A study by Salzano CA et al reported prevalence of IDA in children aged between 6 to 60 months as 55.1% which is quite close to what we noted.<sup>10</sup> Leal LP and Osório MM revealed very high prevalence (89.1%) of IDA in children but they only examined children who had presented with signs and symptoms relating to anemia.<sup>11</sup> A population based study by Rivera JA and Amor JS among pre-school children showed prevalence of anemia as 55.6%.<sup>12</sup>

We noted younger age, rural areas of residence, low socio-economic status and malnutrition to be significantly associated with IDA. Literature reveals children below 24 months of age to have increased iron needs because of rapid growth, early weaning, low accessibility of iron and dietary monotony.<sup>9</sup> Low socio-economic status makes children more prone to diarrheal and respiratory illnesses which can further compromise food intake and biologic utilization of iron. We did not find any significant association of anemia with gender. Some researchers found that anemia is more frequent in male children.<sup>14,15</sup> Linkage of IDA with male gender could be because of the reasons that male child usually grow faster physically while demand of the iron is not usually fulfilled with only diet. Lack of vitamins and minerals is commonly observed among children with anemia. Children who are malnourished can also have mineral insufficiency/deficiency which can further induce protein deficiency. The findings of this study emphasize the importance of careful assessment of nutritional status in each children coming to healthcare

assistance. Although, we did not evaluate the exact impact of anemia on various disease segments in the present study but to a certain extent, anemia could have contributed to reasons for hospitalizations in the present study. Focus should be put on nutritional education and assessment especially in rural and low-socioeconomic regions. Iron and nutrition supplementation programs could be planned in areas identified to have high prevalence of IDA.

Our study had some limitations as well. As this was a single center study with a relatively small sample size, our findings cannot be generalized. We were unable to evaluate blood cell count or serum ferritin in the present study which would have given us further useful insights. We could not note outcome or duration of hospitalization.

## CONCLUSION

The prevalence of IDA was high (54.5%) in admitted children aged between 6 to 60 months. Younger age, rural area of residence, low socio-economic status and malnourishment were observed to have significant association with the prevalence of IDA.

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