



WEEKLY IRON SUPPLEMENTATION – EFFECTIVE IN IMPROVING HAEMATOLOGICAL PARAMETERS THERE BY REDUCING ANAEMIA AMONG CHILDREN

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ABSTRACT **Background:** Anaemia reduction through weekly Iron supplementation is less studied area. This study was done with an objective to find out effect of weekly Iron supplementation in improving Haematological parameters among children(<12 years).

Methodology: A longitudinal study was conducted among children between 6 months to 12 years of age with mild to moderate anaemia. After obtaining parental consent, complete hemogram along with other necessary investigations was done for the study population. Descriptive details and inferential statistical methods were used to find any significant association.

Result: Significant increase was found for Haemoglobin level, RBC, PCV, MCV, MCH, MCHC, Serum Iron, Reticulocyte count after intervention. Significant decrease in Total Iron Binding Capacity after intervention was found. There was no significant difference in the Total White Blood Cell and platelet count after intervention.

Conclusion: Weekly Iron supplementation is an upcoming treatment modality for fast reduction of anaemia with improved adherence.

KEYWORDS : Anaemia, Children, weekly iron supplementation.

INTRODUCTION

Anaemia is defined as reduction in the red blood cell volume or haemoglobin concentration below the normal range of values occurring in healthy population. Anaemia was defined according to World Health Organization cut – offs as Haemoglobin level < 11g/dl for girls and < 12 g/dl for boys under 15 years of age, mild anaemia was defined as Haemoglobin level of 10 – 12.9 g/dl in males and 10 – 11.9 g/dl in females, moderate anaemia as defined as haemoglobin of < 7 – 9.9 g/dl and severe anaemia as Haemoglobin < 7 g/dl.(1)

The global prevalence of anaemia among children between 0 to 5 years is 41.7%. (2) The prevalence of anaemia among children between 0 to 5 years in India is 58.6%.(3) and the prevalence in Tamil Nadu is 50.7%. (4) Iron Deficiency is the commonest cause of anemia, affecting for nearly 25% of all cases (18-32%).(5)

Modification of diet for improving the iron reserves may be difficult owing to inadequate availability of essential food items. Intermittent oral iron supplements have been found to be more effective intervention than the conventional daily supplementation strategy for preventing IDA in community health programmes.(6) So an approach that also emphasises changes in the behaviour of the families especially parents and their off springs are needed to address the problem.

There has been an increasing amount of evidence in the literature that a weekly approach to iron supplementation may be a safe, effective and cost efficient way to prevent and alleviate IDA among vulnerable groups. Many Studies have shown that a dose of iron given once a week to those with mild to moderate IDA will result in a useful improvement in haemoglobin concentration. Advantages of weekly administration are safety, presence of few side effects than daily doses, effective and increased adherence and better compliance.(7) Effectiveness of weekly Iron supplementation is well studied among pregnant and adolescent women.(8,9) This study was done with an objective to find out effect of weekly Iron supplementation in improving Haematological parameters among children(<12 years).

MATERIALS AND METHODS

A longitudinal study was conducted among children between 6 months to 12 years of age getting admitted to the paediatrics department at SRM Medical College and Research Institute Kattankulathur, Kancheepuram District, Tamilnadu. The patients were selected by convenient sampling. The study was conducted for a period of one year (March 2017 to February 2018).

The sample size was calculated based on the previous observations where the change in haemoglobin value after iron supplementation was 0.74 gm/dl.(10) The minimum sample size calculated after a non response rate of 20% was 50. We included children between 6 months to 12 yrs age group with mild to moderate anaemia. Children with severe anaemia (<7 mg/dl in 0-4 yrs age, <8 mg/dl five yrs and above), Anaemia due to acute blood loss secondary to trauma, children with malignancies, hemolytic anaemia's, leukaemia's, other nutritional anaemia and aplastic anaemia were excluded.

After obtaining parental consent, complete hemogram along with other necessary investigations was done for the study population. Detailed clinical history and examination of all the cases of anaemia were done as per Proforma.

Following investigations were done in addition: Peripheral smear examination by Leishman's stain, Reticulocyte count by new methylene blue staining, Serum Iron, Total Iron-binding Capacity. The study population were administered with 3mg/kg of ferrous sulphate once a week (only Sundays). After three months, Hematological parameters were repeated to see the difference.

Data was entered in Micro Soft Excel and analyzed using statistical software. Descriptive details were presented as frequencies, means, medians, interquartile range and standard deviations after checking the normal distribution. Inferential statistical methods were used to find any significant association. P value less than 0.05 was considered as significant.

RESULTS

Table 1: Descriptive Statistics (N= 60)

Variable	Category	Frequency (%)
Age(years)	<1	17(28.3%)
	1-5.	31(51.7%)
	6-12	12(20%)
Gender	Male	33(55%)
	Female	27(45%)

The mean age of study population was 3.44 years with a standard deviation of 2.88. The minimum age was 6 months and maximum 12 years. Median age was 2.75 with InterQuartile Range 1-5. About 51.7% of study population belonged 1-5 years. Majority (55%) was males. (Table 1)

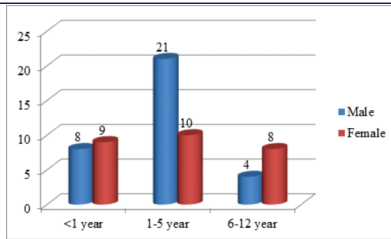


Figure 1 Age-Gender distribution of study subjects.

Majority 31(51.7%) of study subjects belonged to 1-5 year and in that 21 were males and 10 were females.

Table 2: Comparison haematological parameters before and after Iron supplementation

Hematological parameters	Before intervention Mean \pm SD	After intervention Mean \pm SD	p value
Hemoglobin	9.55 \pm .60	11.57 \pm .41	<0.001*
Red Blood Cell(RBC) count	3.92 \pm .62	4.51 \pm .41	
PCV	28 \pm 2.80	32.5 \pm 2.48	
Mean Corpuscular Volume (MCV)	67 \pm 7.06	76.87 \pm 5.72	
Mean Corpuscular Hemoglobin(MCH)	22.22 \pm 3.01	25.2 \pm 1.83	
Mean Corpuscular Hemoglobin Concentration(MCHC)	31.60 \pm 1.87	32.80 \pm 1.17	
Serum Iron	25.4 \pm 5.94	52 \pm 10.61	
Total Iron Binding Capacity	360.07 \pm 42.24	301.5 \pm 42.29	
Reticulocyte Count	0.73 \pm 0.31	1.15 \pm .24	

*paired t test p value < 0.001 highly significant

Significant increase was found for Haemoglobin level, RBC, PCV, MCV, MCH, MCHC, Serum Iron, Reticulocyte count after intervention. Significant decrease in Total Iron Binding Capacity after intervention was found. (Table 2)

There was no significant difference in the Total White Blood Cell and platelet count after intervention.

DISCUSSION

Quarter of anaemia burden in world is due to Iron Deficiency making it one among the major public health problems in developing and under developed nations. This study was done with an objective to find out effect of weekly Iron supplementation in improving Haematological parameters among children (<12 years).

For anaemia, haemoglobin concentrations were consistently increased in iron-supplemented children who were anaemic or had iron-deficient anaemia at baseline. Improvements or increases in iron status indicators were also found in this study. Iron supplementation may have had some positive effects on a number of developmental outcomes, mainly motor skill development among preschool-aged children. Treatment at lower doses for 2–12 month appeared to be more beneficial than very short courses of supplementation. Iron supplementation has a beneficial effect on weight, height, effect on morbidity and mortality outcome in infectious diseases. (11) The key strategy in the management of IDA involves identification and eradication of the cause leading to ID and Iron supplementation. Daily oral supplementation with medicinal iron is considered an effective strategy for reducing the incidence of IDA but non-compliance is a major problem with this strategy. This study has identified weekly iron supplementation as effective as daily supplementation which is cost effective and has higher compliance.

CONCLUSION

The mean age of study population was 3.44 years with a standard deviation of 2.88. Majority (55%) was males. Majority 31(51.7%) of study subjects belonged to 1-5 year and in that 21 were males and 10 were females. Significant increase was found for Haemoglobin level, RBC, PCV, MCV, MCH, MCHC, Serum Iron, Reticulocyte count after intervention. Significant decrease in Total Iron Binding Capacity after intervention was found. There was no significant difference in the Total

White Blood Cell and platelet count after intervention.

The final goal of achieving improvement in haematological parameters there by reducing anaemia as quickly as possible with low cost and without adverse outcomes is done by the weekly Iron supplementation.

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