

Study on Effectiveness of Daily/ Weekly Iron, folic Acid Supplementation With or Without Intensive Health Education among Adolescent Anemic School Girls of Varanasi (Uttar Pradesh)

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Abstract: According to estimation by WHO more than two billion people are affected by iron deficiency anemia. Anemia is currently one of the most common and intractable nutritional problems globally. Nutritional anemia in India is common morbidity seen in late adolescent and young female population. There are many conflicting opinions regarding dosage of iron & folic acid supplementation for managing this simple nutritional deficiency disorders. Anemia has been defined as hemoglobin <12 gm% in adolescent girls, with Hemoglobin level between 10 to 11.9 gm%, 7 to 9.9 gm% and <7 gm% are termed as mild, moderate and severe anemia respectively. Hemoglobin estimation was done at the beginning and end of the study. The mean age of study subjects in 'daily iron & folic acid supplementation', 'weekly iron & folic acid supplementation' and 'weekly iron & folic acid supplementation with health education' group was 15.82, 15.79 & 15.70 years respectively. Their mean & Sd pre-intervention Hemoglobin was 10.1±0.13 gm/dl, 10.28±0.15 gm/dl and 9.94±0.13 gm/dl respectively. The mean & Sd post-intervention Hb was 12.32±0.12 gm/dl, 12.39±0.13 gm/dl and 12.75±0.15 gm/dl. The present study shows clearly advantage of weekly iron and folic acid therapy among adolescent school girls of Varanasi district over daily iron therapy. Mean rise of hemoglobin % in daily and weekly groups are almost similar (Table-1) whereas adverse drug reaction percentage is less in weekly supplemented group (Group B & C).

Keywords: Iron, Folic Acid, Hemoglobin and Anemia.

1. Introduction

According to estimation by WHO more than two billion people are affected by iron deficiency anemia. Anemia is currently one of the most common and intractable nutritional problems globally. Nutritional anemia in India is common morbidity seen in late adolescent and young female population. In developing countries particularly in South East Asia and Western Pacific iron deficiency anemia tops the nutritional deficiency disorder,^(1,2) where 20 to 40% of adolescent girls and 40 to 50% of adolescent pregnant girls are anemic.⁽³⁾ The prevalence of anemia is high in adolescent girls in India, with over 70% anemic. Iron-folic acid (IFA) supplements have been shown to enhance adolescent growth elsewhere in the world including India.⁽⁴⁾ Adolescence as per definition by WHO includes period of life between 10-19 years which is the period of major physical and psychological change including changes in social interactions and relationships.⁽⁵⁾ Adolescent period which is very crucial for growth and development has remained largely neglected particularly in adolescent females. Reasons of anemia in this group are multifarious starting from inadequate dietary intake particularly in lower socio economic group, loss due to menstruation, high demand due to growth, infections such as malaria, hookworm and other parasitic infections.⁽³⁾ The physiological growth spurt, with its attendant rise in mean hemoglobin level, and menarche cause an increase in daily iron requirement, which, if not met, can rapidly result in anemia. Diagnosis and treatment of anemia is of particular importance in adolescent girls because they enter the reproductive cycle soon after menarche. Even a marginal iron

deficiency at this stage can precipitate severe anemia later on due to the stress imposed by pregnancy and parturition. Adolescent girls can be easily approached through school-based intervention programs.⁽⁶⁾

2. Objective of the Study

Based on study in rats, it has been suggested that iron supplementation should not be given daily, but rather weekly or twice weekly.⁽⁷⁾ With a daily dose, the intestinal mucosal cells get saturated quickly, and iron absorption stops. Because the turnover rate of these cells is 5 to 6 days, a single weekly dose may be as efficacious and more cost-effective. Compliance might also improve because fewer doses of iron would be needed. This hypothesis has been supported by studies comparing the effectiveness of hemoglobin or hematocrit response, which was found to be similar regardless of whether supplementation was daily, weekly, or twice weekly.^(8,9) To the contrary, Cook and Reddy⁽¹⁰⁾ concluded that there is no significant absorptive advantage in giving iron less often than once daily. Hallberg⁽¹¹⁾ reiterated that there is no evidence that weekly supplementation better prevents iron deficiency because the fundamental argument in its favor, that daily supplementation causes a mucosal block, is not valid. Anemia has been defined as hemoglobin < 12 gm% in adolescent girls with Hb level between 10 to 11.9 gm%, 7 to 9.9 gm% and <7gm% are termed as mild, moderate and severe anemia respectively.⁽¹²⁾ In view of the above we plan to investigate whether daily or weekly iron-folate supplement administered at school would improve hemoglobin concentrations in adolescent girls,

including those with anemia with or without intensive health education.

Design:

The present study was conducted in the Department of Community Medicine & Pathology, Heritage Institute of Medical Science, Varanasi, India during the period from 21st May to August 2015 and design of study being community based trial. The study was conducted in suburban/slum area of Varanasi with three randomly selected Senior Secondary Schools located within the chosen geographical region. The girl students from above schools were selected to participate in the study and inclusion criteria would be as follows:

- *Gender: Female only
- *Age: 13 to 19 years
- *Written parenteral consent were obtained

Exclusion criteria were any active medical disease other than iron deficiency anemia

Out of three schools selected students of one school were given daily iron and folic acid supplementation (group-A), second school children weekly iron and folic acid supplementation(group-B) and third school children were given weekly iron and folic acid supplementation with health education(group-C) for three months.

3. Methodology

Three schools selected were named as school A, B and C respectively. From these schools 25 students each were selected on the above based criteria. Due care was observed be to select anemic girls of the above age group basing clinical pallor of the conjunctiva, palm and nail beds. The student having clinical pallor are usually anemic, though degree of anemia may vary.⁽¹³⁾ Hemoglobin estimation were done at the beginning and end of the study. Tools used for study were weighing machines, non-stretchable tape, Hemcuc analyzer (301). Micro cuvettes, lancet, spirit and iron folic acid tablets containing 100 mg of iron and 0.5 mg of folic acid.

Hemoglobin was estimated by homocue system which consists of disposable microcubettes containing chemicals in dried form. Homocue analyser required a finger prick and few drops of blood were drawn in to microcuvettes. Each microcuvette contained three reagents in dried form which converts the Hb to methaemoglobinazide (HiN3). Other reagents like sodium deoxycholate haemolyses the red cells, sodium nitrite converts Hb (Ferrous:Hb) to methaemoglobin (Ferric:Hi) and sodium azide converts methaemoglobin to methaemoglobinazide(HiN3). After this haemoglobin levels were read immediately by a photometer in the analyser for estimation of hemoglobin concentration. Hem cue method has sensitivity of 89% and specificity of 82% to detect anemia. Intensive health education given to students from school ‘C’ were on causes of iron deficiency anemia, emphasis on iron rich diet, prevention and personal hygiene.⁽¹⁴⁾

4. Results and Discussion

The results from our study shows clearly advantage of weekly iron and folic acid therapy among adolescent school girls of selected schools of Varanasi district over daily iron therapy.

After the study the data’s so obtained were analyzed statistically. Effect of weekly verses daily iron supplementation in improving anemic status of adolescent school going girls were documented in detail as documented in Table (1& 2).

Table1: Mean age of selected students and comparison of mean Hemoglobin level before and after intervention among daily IFA supplementation, weekly IFA and weekly with education:

Groups	Mean age (yrs)	Pre-intervention	intervention	P-value
		Mean Hb (gm%)	Rise of Mean Hb (gm%)	
A: (n=25)	15.82	10.1±0.13	12.32±0.12	<0.0001
B :(n=25)	15.79	10.28±0.15	12.39±0.13	<0.0001
C :(n=25)	15.70	9.94±0.13	12.75±0.15	<0.0001

*statistically significant p-value is <0.0001

Table 2: Adverse drug reactions: n=25

Groups	Nausea & vomiting	Constipation	Abdominal pain	others	%
A	5	1	2	-	32
B	1	2	-	-	12
C	3	-	1	-	16

The results from our study shows clearly advantage of weekly iron and folic acid therapy among adolescent school girls of selected schools of Varanasi district over daily iron therapy. Mean rise of hemoglobin % in daily and weekly groups are almost similar (table A, B and C) whereas adverse drug reaction percentage is less in weekly supplemented group (group B & C). It has been noticed that there is significant improvement in correction of anemia in all the cases. It has been documented that supplementation of iron and folic acid improves nutritional status in adolescent girls.⁽⁴⁾

Since there is paucity of data available in literature pertaining to adolescent school girls in rural India regarding weekly iron folic acid supplementation with health education, our study will definitely throw some light regarding effects of interventions besides iron folic acid therapy in anemic adolescent school going girls of rural India. It was previously documented that efficacy of weekly supplementation of Iron & folic acid tab is remarkable in controlling iron deficiency anemia in adolescent girls.⁽¹⁶⁾ Due to side effects of iron therapy there is reduction in compliance ⁽¹⁵⁾ where as in weekly supplementation side effects are less as shown in our table no-2. Health education is an important component of school education and we tried to impart some knowledge to a group of twenty children (Group C) on iron deficiency anemia with help of literature, group discussion, Nutritional education as our findings Group-C beneficiaries have shown more improvement in correction of anemia status. Few other

studies earlier also stressed the importance of nutritional education in schools to combat anemia.⁽¹⁴⁾

5. Conclusion

These findings suggest that Adolescence is a significant period of human growth and maturation. In school going adolescent girls in slum areas are prone to anemia due to lack of nutrition, menstrual loss and lack of health education. Iron deficiency anemia affects ability to read, write and learn. Our study demonstrates the importance of weekly iron and folic acid supplementation and with health education to combat anemia in these venerable population. Increasing the educational level on nutrition by IEC methodologies and health education in rural schools should be undertaken routinely. This will also ensure safe mother hood to these girls at a later stage.

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