

ORIGINAL ARTICLE

A Study on the effect of iron folic acid supplementation and deworming among college going adolescent girls in urban AgraRatandeep Lamba¹, Sunil Kumar Misra², Ravi Rana³¹Lecturer, Department of SPM, LLRM Meerut, ²Professor & Head, ³Lecturer, ^{2,3}Department of SPM, S.N. Medical College, Agra

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E Mail ID: drrdlamba@gmail.com**Citation**Lamba R, Misra SK, Rana R. A Study on the effect of iron folic acid supplementation and deworming among college going adolescent girls in urban Agra. *Ind J Comm Health*. 2014;26 (2); 160-164**Source of Funding** : Nil, **Conflict of Interest**: None declared**Article Cycle****Date of Submission**: 05/01/2014, **Date of Acceptance**: 24/05/2014, **Date of Publication**: 15/06/2014**Abstract**

Background: Spaced IFA Supplementation is recognized as an efficacious public health program and effective preventive approach in combating anemia in adolescent girls, is cost effective and results in fewer side effects. Aim: To study the effect of: bi-weekly supplementation of IFA with and without Albendazole administration on the status of hemoglobin level in college going adolescent girls. **Material and methods:** An interventional study was conducted among college going girls in Agra in the age group of 16-19 years (n=300) who were randomly selected. Their Hemoglobin levels were estimated before and after intervention by the Cynmeth-hemoglobin method using Drabkin's solution. Three groups [two study A and B and one control] of hundred girls each were randomly constituted. To the study groups, supervised bi-weekly IFA with and without Albendazole were administered respectively for three months. Data collected was analyzed using suitable statistical tools. **Results & Discussion:** The overall prevalence of anemia was 65.3%. The initial prevalence in study group reduced significantly from 80.7% to 35.5% whereas in study group B it reduced from 73.5% to 58.8% and in control it remained almost same 84.3% and 81.2% pre and post intervention respectively. The mean Hemoglobin rise observed in the study group A and B was 2.5gm/dl and 2.3 gm/dl respectively while in control group fall in the mean Hb was observed (0.1gm/dl). **Conclusion:** The prevalence of anemia in adolescent girls is high. Supervised IFA therapy twice a week is an effective strategy to lower the prevalence of anemia either combined or uncombined with Albendazole.

Key Words

Anemia, adolescent; hemoglobin; Drabkin's solution

Introduction

Iron deficiency anemia is the most common malnutrition among the adolescent population. Iron requirements are increased during adolescence, reaching a maximum due to rapid pubertal growth. The prevalence of anemia in the developing countries is found to be three to four times higher than in the developed countries. In studies conducted in developing countries, adolescent anaemia was reported as the greatest nutritional problem. [1,2] Iron requirements are even higher in developing countries because of infectious diseases and parasitic infestations that cause iron loss, and because of low bioavailability of iron from diet.

Iron deficiency anemia leads to, impaired school performance, decreased work productivity and other adverse outcomes like poor pregnancy outcome in the later phase as it attributes to high maternal mortality, high incidence of low birth weight babies, high perinatal mortality and fetal wastage. In this context,

some source of additional iron should be made available to combat the loss. According to Gillespie [3], iron and folic acid supplementation is one of the most important nutritional interventions for adolescent girls. Folic acid is included within the iron supplement to prevent folate deficiency, which is implicated in the etiology of anemia and associated with neural tube defects of the newborn. [4]

Aims & Objectives

To study the effect of bi-weekly supplementation of IFA with and without Albendazole administration on the status of hemoglobin level in college going adolescent girls.

Material and Methods

The present study was an interventional study conducted in an Inter college located in urban Agra, selected purposively for feasible reasons. Before commencing the study, ethical clearance was taken from the ethical Committee of the medical college.

School going adolescent girls of age 16-19 years whose parents or guardians gave voluntary written consent and were ready to participate in the study comprised the study population. This age group was selected as they are would be mothers and may be regarded as more receptive regarding knowledge of anemia and its hazards on their overall health status after they enter the cycle of child birth and lactation. The hemoglobin status of each participant was assessed before & after intervention. Supervised biweekly Iron Folic Acid with & without Albendazole for a period of three months was administered. A minimum of 86 cases of study subjects were required to be studied.

Considering a high number of dropout the sample size was increased to 100 participants in each of the two intervention and one control group. The entire study thus comprised of 300 participants.

There were in all twelve sections 6 in each of eleventh and twelfth standards. The strength in each section was more than hundred students. Out of those, three sections were selected randomly by assigning each section a number. Thereafter by using lottery method all the students of the selected sections comprised the study domain. The three sections thus selected herein after are referred as Group A, Group B and Group C were randomly allocated regime 1, regime 2 and control using lottery method. Thus, the study included: Group A: Supervised IFA supplementation, twice a week for a period of three months (24 doses in all) along with two doses of Albendazole at a fortnight's interval at the initiation of regime 1.

Group B: Supervised IFA supplementation twice a week for a period of three months days (24 doses in all) regime 2

Group C: No medication was given to the control group. After seeking permission from the Head of the institution of Queen Victoria intercollege, for accomplishing the research works. A meeting was held wherein the participants/students were briefed with the help of audio-visual aids the purpose of the study. By the research worker they were briefed about ill effects of anemia, importance of getting their hemoglobin levels tested. The students were not aware that which regime they would follow. The hemoglobin levels were determined by using, Cynmeth-hemoglobin method. With the help of senior lab technician and his team provided by the pathology department of S. N. Medical College Agra, the blood collection was done in the room provided by the girl's college itself. After that the samples were tested in the laboratory of the medical college.

The study group A and group B participants were given IFA tablets under supervision of the investigator with a group of interns, in presence of their teacher post lunch until 24 tablets were administered to them in

twelve weeks. In case of a holiday next working day was considered. Those who consumed 20 tabs or more were considered as completed the regime. The participants who were absent during the duration of the regimen, were given the dose on the next scheduled visit. In an effort to reduce the dropouts, period of intervention was extended to two more weeks. The participants who were absent consecutively for three or more turns were excluded.

Study tool: Two pre-tested semi-structured comprehensive schedules, one socio-demographic interview schedule to be filled by the research worker and other self-administered questionnaire were prepared. The Bio-social schedule included points like age, religion, mother's occupation, mother's education, father's occupation and education, family size, family income, marital status, family type, past history of illness, menstrual history, dietary history and history of any long term medication. Second questionnaire which was self-administered to assess the participant's awareness and knowledge about anemia.

Results

The pre – intervention hemoglobin levels of a total of 300 participants (the two interventions and one control group) were estimated.

The above table shows that majority (62.3%) of the study participants were in age group 16-17 years. Another 34% were 17-18 years and a mere 4.7% were from 18 to 19 years of age.

Majority (89.3%) of the study participants were Hindu by religion, while Muslims were only 9.3%.

About three-fourth (76%) of the girls were from nuclear families and the rest belonged to joint families.

Taking the basis of anemia, in accordance with WHO criteria (hemoglobin less than 12gm/dl), in the present study majority (65.3%) of participants were found suffering from anemia. Of the participants suffering from anemia about three-fourth (71.4%) of them were suffering from mild anemia whereas about one fourth (24.5%) had moderate anemia and 4.1% were severely anemic.

EFFECT OF INTERVENTIONAL REGIMES

Intervention: Group A (IFA Supplementation with Deworming)

Pre-interventional prevalence of anemia was 80.7%, a substantial decrease was observed in the post-interventional prevalence (35.5%) which is significant statistically. In control group however, prevalence of anemia remained almost same.

Mild anemia which was 64.5% before the intervention almost halved in post-intervention (35.5%) whereas all the participants who had moderate and severe anemia achieved almost normal hemoglobin or shifted to mild

anemia whereas in control group mild anemia prevalence remained almost same.

An overall rise of 2.5gm/dl in mean hemoglobin was observed in the participants of study group A. While in control group, an insignificant fall (0.1gm/dl) of mean hemoglobin was observed.

In study group the mean hemoglobin rise was comparatively less, in those who were either not anemic (0.6g/dl) or mildly anemic (0.9g/dl), than the many fold rise observed in moderate (3.3g/dl) and severely anemic (5.1g/dl), which was found statistically significant. On the contrary only 0.3gm/dl and 0.2gm/dl increment was observed in mild and moderate anemic respectively. The hemoglobin level in non- anemic even decreased by 0.8gm/dl in control group.

Intervention: Group B (IFA Supplementation without Deworming)

The prevalence of anemia in the study group B significantly reduced from 73.5% to 58.8% after 12 weeks of intervention. Whereas in control group, prevalence of anemia remained almost same. On further analysis based on the severity of anemia the prevalence of mild anemia increased from pre-interventional 47.1% to 55.8% post interventional. A marked decrease was observed in prevalence of moderate anemia was found as it reduced from 23.5% to 2.9% after the regime and severe anemia completely disappeared.

On the contrary, in control group mild anemia prevalence remained almost same (65.6% vis-à-vis 68.8%).

In the study group B, all the participants showed a rise in mean hemoglobin levels. An overall rise of 2.3gm/dl in mean hemoglobin was observed in the participants of study group B. While in control group, a fall (0.1gm/dl) of mean hemoglobin was observed though statistically insignificant.

Discussion

In the present study, the prevalence of anemia in the participants was found to be 65.3%. The severity-wise prevalence of mild, moderate and severe degree of anemia was found to be 48.6%, 16 % and 2.6% respectively in the present study. Deshmukh PR et al [5], Binay K. Shah et al [6] and Anshu Sharma et al [7] reported almost similar prevalence of anemia i.e. 65.3%, 68.9% and 61.9% respectively. Mittal M. Bhanushali et al [8] observed comparatively lower (26.8%) prevalence of anemia, which may be because their study participants were from the private schools with children from middle and higher socioeconomic status. Jolly Rajaratnam et al [9] reported the prevalence of severe anemia 2.1%, moderate anemia 6.3%, and mild anemia 36.5% which is more or less similar to that of the present study. Overall prevalence

of anemia is found to be positively associated with education of mothers as with increasing education level of mothers, the prevalence declines.

A gradual decrease of the prevalence of anemia was observed in the study participants as their socio-economic status improved. Likewise Chaudhary S et al [10] also reported a statistically significant association of anemia with the socio-economic status of participants.

The prevalence of anemia decreased from 80.7% to 35.3% (45.4%) when biweekly supervised IFA supplementation along with deworming was given. The mean hemoglobin in group A to which above mentioned regime was allocated increased from 9.8gm/dl to 12.3gm/dl i.e. a net increase of 2.5gm/dl. Vir S and Singh N et al [11] reported that overall prevalence of anemia was reduced from 73.3% to 25.4%, (47.9%) wherein they provided supervised weekly iron-folic acid tablets and deworming tablets to adolescent girls.

IFA Supplementation without Deworming

In present study, the prevalence of anemia in the study group B was 73.5% which reduced to 58.8% after 12 weeks of intervention, accounting to a fall of 14.7% in prevalence. An overall rise of 2.3 gm/dl in mean hemoglobin was observed in the participants of study group B who were administered supervised biweekly IFA supplementation for three months. Kotecha et al [12], provided once a week IFA in school going adolescent girls and reported reduction in anaemia prevalence of 21.5 per cent owing to longer duration of intervention (17 months) of their study. In present study, mean hemoglobin rise was 2.3gm/dl. The rise was directly proportional to the severity of anemia i.e. 0.9gm/dl, 3.1gm/dl and 4.8gm/dl in mild, moderate and severe degree of anemia, respectively. Similar observation was made by Kotecha et al [12] in their study.

EFFECT ON ANEMIA IN CONTROL GROUP: In the control group, the prevalence of anemia almost remained the same. Likewise, the prevalence of anemia decreased in control though statistically insignificant in a study by Mittal M Bhanushali et al [8].

Conclusion

As the result of regime 1 (IFA supplementation & deworming), which was administered to Group A, the prevalence of mild anemia grossly decreased from 64.5% to 35.5% after a period of 12 weeks of the intervention. The percentage of no anemia prior to intervention was 19.3%, which leaped up to 64.5%. In Group B, regime 2 (IFA supplementation without deworming) was given for 12 weeks, which resulted in increment of prevalence of mild anemia (from 47.1% to 55.8%). Moderate anemia reduced to a mere 2.9%

from 23.5%.Prevalence of severe anemia reduced to zero after the intervention.

The mean Hemoglobin, of the participants of Group A rose by 2.5 gm/dl whereas the increase was observed nearly same 2.3gm/dl, in Group B. A very marked increase of 5.1gm/dl in hemoglobin levels of those suffering from severe anemia in Group A was observed vis-a- vis 4.8gm/dl rise in participants of Group B. Thus we can conclude that in adolescents if a supplementation must be encouraged as it really works. IFA supplementation along with deworming emerged as the best regime in our study, followed by only IFA supplementation both in comparison to the control group.

Authors Contribution

RL: Concept design, acquisition of data, analysis, interpretation of data and final approval of the version to be published. SKM: Manuscript drafting and revising it critically for important intellectual content. RR: Data Collection, acquisition of data and analysis.

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Tables

TABLE NO. 1 PARTICIPANTS BASED ON PREVALENCE OF ANEMIA BEFORE & AFTER INTERVENTION

VARIABLE	Intervention in group A				Control			
	PRE-INTERVENTION		POST INTERVENTION		PRE-INTERVENTION		POST INTERVENTION	
	n	(%)	n	(%)	n	(%)	n	(%)
NO ANEMIA	12	19.3	40	64.5	10	15.6	12	18.7
MILD ANEMIA	40	64.5	22	35.5	42	65.6	44	68.8
MODERATE ANEMIA	4	6.5	0	0	12	18.8	8	12.5
SEVERE ANEMIA	6	9.7	0	0	0	0	0	0
Total Prevalence	80.7%		35.5%		84.3%		81.2%	
Total	62	100.0	62	100.0	64	100.0	64	100.0

TABLE NO. 2 PARTICIPANTS BASED ON MEAN HEMOGLOBIN STATUS BEFORE & AFTER INTERVENTION

VARIABLE	Mean Hb in Intervention group A			Mean Hb in Control		
	Pre-Intervention (Gm/dl)	Post-Intervention (Gm/dl)	Mean Hb Rise (Gm/dl)	Pre-Intervention (Gm/dl)	Post-Intervention (Gm/dl)	Mean Hb Rise (Gm/dl)
NO ANEMIA	12.5	13.1	0.6	12.9	12.1	-0.8
MILD ANEMIA	11.0	11.9	0.9	10.8	11.04	0.3
MODERATE ANEMIA	9.1	12.4	3.3	9.1	9.3	0.2
SEVERE ANEMIA	6.8	11.9	5.1	0	0	0
Total mean Hb	9.8	12.3	2.5	8.2	8.1	0.1(-)
paired t-test t=4.6; p<.0001			t = 1.13; p=.26			

TABLE NO. 3 PARTICIPANTS BASED ON PREVALENCE OF ANEMIA BEFORE & AFTER INTERVENTION

VARIABLE	Intervention in group B				Control			
	PRE-INTERVENTION		POST INTERVENTION		PRE-INTERVENTION		POST INTERVENTION	
	n	(%)	n	(%)	n	(%)	n	(%)
NO ANEMIA	18	26.4	28	41.1	10	15.6	12	18.8
MILD ANEMIA	32	47.1	38	55.8	42	65.6	44	68.6
MODERATE ANEMIA	16	23.5	2	2.9	12	18.8	8	12.5
SEVERE ANEMIA	2	38.2	0	0	0	0	0	0
Total Prevalence	73.5 %		58.8%		84.3%		81.2%	
Total	68	100.0	68	100.0	64	100.0	64	100.0

TABLE NO. 4 PARTICIPANTS BASED ON HEMOGLOBIN STATUS BEFORE & AFTER INTERVENTION

VARIABLE	Mean Hb in Intervention group B			Mean Hb in Control		
	Pre-Intervention (Gm/dl)	Post- Intervention (Gm/dl)	Mean Hb Rise (Gm/dl)	Pre-Intervention (Gm/dl)	Post- Intervention (Gm/dl)	Mean Hb Rise (Gm/dl)
NO ANEMIA	12.7	13.2	0.5	12.9	12.1	-0.8
MILD ANEMIA	11.2	12.1	0.9	10.8	11.04	0.3
MODERATE ANEMIA	8.6	11.7	3.1	9.1	9.3	0.2
SEVERE ANEMIA	6.8	11.6	4.8	0	0	0
Total Mean Hb	9.8	12.1	2.3	8.2	8.1	0.1 (-)
p< 0.05			t= 1.13 p=.26			