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Original Research Article

Impact of WIFS with and without intensive health education on weight change in adolescent anemic school girls of Delhi: a comparative study

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ABSTRACT

Background: Iron deficiency anemia is a public health alarm in developing countries. Anemia is an indicator of both poor health and poor nutrition. It has been observed that iron deficiency anemia in children and adolescent leads to growth delay. Weekly iron folic acid (WIFS) with health education can significantly reduce prevalence of nutritional anemia and improve growth among adolescents is seen elsewhere in the World. To confirm these results in India, a study was conducted in Delhi to investigate the effect of WIFS and Health education on growth in adolescent school girls.
Methods: A school based intervention study was conducted in selected government schools of Delhi. Total of 210 adolescent school girls (11th standard) were included in the study, 106 in intervention group and 104 in control group. The intervention group was given weekly iron folic acid supplementation (WIFS) with health education once a month, while a control group was given only WIFS.
Results: A significant weight gain of 2.8 kg was seen in the intervention group, whereas girls in the control group showed 1.8 kg weight gain. The growth increment was greater in the intervention group than control group which was found to be statistically significant ($p<0.01$).
Conclusions: WIFS and health education is recommended for growth promotion among adolescent girls especially who are underweight. Additional programmatic research should be carried out for understanding of the WIFS with health education -growth relationships in adolescence.

Keywords: Adolescent, Anemia, Weight, Iron folic acid, Health education

INTRODUCTION

Iron deficiency anemia is the most common type of malnutrition in the world. The World Health Organization has projected that more than two billion people are affected by iron deficiency anemia.[1] According to the Indian Council of Medical Research (ICMR), the prevalence of anemia in adolescent girls was 90.1% with 7.1% having severe anemia.[2] The prevalence of anemia in girls is high as per the reports of NFHS-3. According NFHS-3, 56% girls in the age group 10-19 years in India are anemic.[3]

Anemia in adolescents has negative impact on growth, increases susceptibility to infection, and also impair mental development and learning.[4,5] Twenty percent of final height of adult is attained during this time and 50% of adult weight.[6-8] In India, the highest prevalence of anemia is reported between the ages 12-13 years, which also coincides with the average age of menarche.[9]

Iron-folic acid (IFA) supplementation has been shown to enhance adolescent growth. In Kenya, primary school children were supplemented with 55 mg elemental iron per day for 14 week and reported a positive effect on growth and appetite that was significantly better than that in children receiving the placebo. The positive effect of iron supplementation on growth of their subjects was likely due to their improved appetite and increased food intake. Since iron does enhance growth, it can be promoted in programs as it is cost effective.[5]

We conducted an intervention study to see the impact of WIFS with and without health education on weight change in anemic adolescent school girls in Indian context.

METHODS

This study was conducted in the North-West district of Delhi from December 2010 to April 2012, which was selected by a simple random sampling method. Two schools were targeted in this district through use of a random number table. In both the schools, an XI (higher secondary) class was randomly selected by a lottery method and students for the study were selected using a random number table. The schools were divided into intervention group and control group by lottery method.

The sample size was calculated using free software G* power version 3.1.2. The combined intervention of IFA and Intensive Health Education should be able increase weight by 2.5 kg as compared supplementation with IFA only was considered significant. Considering confidence interval of 95%, significance level (alpha) at 0.05%, power of the study as 80% and effect size of 0.5, the sample size in each group was 66. The total sample required by two groups combined was 132. Considering the attrition rate, finally 210 students were enrolled in the study. Intervention group included 106 and 104 adolescent school girls in control group.

Interventions

The intervention group received intensive health education and WIFS. For the control group only WIFS was provided. IFA supplementation containing 100 mg of elemental iron as ferrous sulphate and 0.5 mg of folic acid was given. Health education was provided once a month for six months. This education included causes of anemia, emphasis on an iron rich diet, and encouragement of three major and two minor meals. The health education package also included a power point presentation, pamphlets and visual display of iron and vitamin-C rich foods.

In anthropometric examination, weight was recorded using a standardized weighing scale (Krups weighing scale, New Delhi, India) that was kept on a firm horizontal surface. Weight was recorded to the nearest 500 gm. Before the start of measurement day zero error was adjusted. The weight of girls was measured barefoot with minimal clothes and warm clothing, shoes and socks were removed.[10]

Statistical analysis

Data analysis was conducted using SPSS Software Version 17.0. Mean weight change after intervention between the control and Intervention groups were compared using a-'t'- test. Pre and post weight difference between the control and Intervention groups was assessed using a unpaired-'t'-test.

Ethical considerations

Written permission from the Director of the School Health Service Delhi was obtained prior to the study. Principals of the selected schools were contacted, informed about the purpose of the study, and their permission was obtained. Confidentiality was assured and written informed consent was obtained from parents of the students. Health education was provided to the girls in the control group after six months of data collection.

RESULTS

Socio-demographic characteristics of the school girls have been tabulated in Table 1. Majority of the girls belongs to age group of 15-18 years age group. According to modified Kuppuswamy scale majority of the girls in both control and intervention group belongs to lower middle and upper lower group. Table 2 summarizes the effect of the intervention on weight change in the intervention compared with the control group. A significant weight gain of 2.8 kg was seen in the Intervention group, whereas the controls showed 1.8 kg weight gain.

Table 1: Socio-demographic characteristics of the adolescent school girls.

Characteristics	Intervention group No. (%)	Control group No.(%)
Age (in years)		
15-16	61 (57.5)	60 (57.7)
17-18	43 (40.6)	40 (38.5)
>18	2 (1.9)	4 (3.8)
Type of family		
Nuclear	80 (75.5)	87 (83.7)
Joint	26 (24.5)	17 (16.3)
Socio-economic status		
Upper	0 (0)	1 (0.9)
Upper middle	2 (1.8)	4 (3.8)
Lower middle	43 (40.6)	28 (26.9)
Upper lower	55 (51.9)	62 (59.8)
Lower	06 (5.7)	9 (8.6)

Table 2: Difference between pre and post intervention change in weight in adolescent school girls.

Mean weight (kg)	Intervention group (n=106)		Control group (n=104)		P value[a]
	Baseline	Post intervention	Baseline	Post intervention	0.01
	44.4	47.2	42.7	44.5	

a: Comparisons were made using two sided two sample unpaired t-test (two tailed independent t test).

DISCUSSION

This study demonstrated that weekly iron folic acid supplements (WIFS) of 100mg elemental iron and 0.5 mg folic acid with Health education for 6 months improved growth significantly among adolescent girls compared with controls. The mechanism by which iron and folic acid (IFA) supplementation improve growth has not been clearly delineated.[11] Improved appetite and consequent improvement in food intake could be a reason for improved growth.[12]

The intervention group experienced greater increase in weight than did the control group. This was expected because the health education reinforces behavior change regarding preventive measures of anemia.[13,14] IFA supplementation is recommended for girls throughout schools in India, especially for its growth-promoting benefits. IFA has the potential for maximum benefit at minimum cost.[15,16] In addition to improving hematinic status, IFA supplementation to adolescent girls has other added benefits such as improved growth and BMI.[17]

In urban slums of Vadodara, adolescent girls (10–18 yrs) received daily-IFA supplements for three months significantly improved the Hb levels and weight gain when compared to the controls.[6] Growth impact among anemic primary school children (6–11 yrs) has been reported in Kenya receiving sustained release ferrous sulfate (150 mg) tablets daily for 14 weeks.[5]

The strong association between anemia and reproductive health is well known.[18] Considering the large pre-pregnancy iron deficits and the added demands of iron during pregnancy will affect the health of the pregnant mother as well as the outcome of the pregnancy. Adolescent girls should be supplied regularly with IFA supplements so that they can enter pregnancy with no iron deficiency disorder.[19,20]

CONCLUSION

WIFS and health education is recommended for growth promotion among adolescent girls especially who are underweight. Additional programmatic research should be carried out for understanding of the WIFS with health education- growth relationships in adolescence.

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