

ANAEMIA ERADICATION IN ADOLESCENTS- A NEW HOPE WITH WEEKLY IRON FOLIC ACID SUPPLEMENTATION (WIFS) (PILOT STUDY)

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ABSTRACT

BACKGROUND

Anaemia is perceived to be a major public health problem especially among adolescent females. Findings from National Family Health Survey NFHS (2005-06) indicate that 56% of the adolescent girls in India are anaemic and, of these 17% suffer from moderate to severe anaemia. The prevalence of anaemia in female adolescent age group is still an understudied subject.

The aims of this study were to evaluate the recently initiated WIFS program for government school girls with respect to implementation and impact on trends in prevalence of Anaemia among adolescent girls in a Bengaluru rural school.

MATERIALS AND METHODS

Cross-sectional, descriptive exploratory research study was used. The choice of the school was based on commitment to administration of weekly iron-folic acid supplements (WIFS) programme. All the girl students from class 6th to 10th of Government High and Senior Secondary school (age group, 11-19 years) who were a part of WIFS were enrolled as study participants. Qualitative data on anaemia awareness and diet history, compliance, side effects were taken from these girls. General information on age, height, weight were collected and BMI calculated. Hb estimation was done by Haemocue method. Statistical Analysis- Analysis were prepared by IBM SPSS Statistics version 22.

RESULTS

Out of the 95 girls in the school, there were 81 girls (85.26%) reported to consume one tablet of Iron folic acid (IFA) weekly in the past 1 year, with no major side effects. The girls had knowledge about symptoms of anaemia and iron-rich diet. Hb estimates indicated 79.01% non anaemic, prevalence of anaemia was 20.99%; none of the girls had severe anaemia, 1.2% had moderate anaemia and the remaining 19.8% belonged to mild anaemia category, indicating a significant decline. The mean BMI of the study sample was 17.53 kg/m² with 67.9% underweight and 6.2% overweight.

CONCLUSION

Overall, in this school, the WIFS program was found to be well implemented with good compliance. The study indicates a positive impact of WIFS programme with a decline in anaemia prevalence, compared to previous national estimates. WIFS seems to be an impactful strategy to prepare adolescents for the reproductive age group with adequate iron stores. However, the general nutritional status could be further improved to improve the BMI.

KEYWORDS

Anaemia, Adolescent Girls, Haemoglobin, IFA Tablets, Nutritional Status, WIFS Programme.

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BACKGROUND

Anaemia is perceived to be a major public health problem especially among adolescent females. It can result in diminished physical growth and cognitive development, performance in school and at work, and affect reproduction.

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The world's adolescent population is facing a series of serious nutritional challenges which are not only affecting their growth and development but also their livelihood as adults. Yet, adolescents remain a largely neglected, difficult-to-measure and hard-to-reach population, in which the needs of adolescent girls in particular, are often ignored.¹ Adolescents, especially girls, between the ages of 12–15 years are at high risk of iron deficiency and anaemia due to accelerated increase in requirements for iron, poor dietary intake of iron, high rate of infection and worm infestation precipitated with the social norm of early marriage and adolescent pregnancy.² Adolescents also have erratic eating habits, and dislike foods which are rich in iron. They may also ingest phytates/tannins which inhibit iron absorption in

food.³ The prevalence of anaemia in female adolescent age group is still an understudied subject. A recent report from UNICEF says more than half of adolescent girls in India are anaemic. 21% of India's 1.2 billion population consists of adolescents.⁴ Findings from National Family Health Survey (NFHS-3) in 2005-06, indicate that 56% of the adolescent girls in India are anaemic. Of these 17% suffer from moderate to severe anaemia. A study which was conducted in the rural areas of Tamilnadu revealed that the prevalence of anaemia among the adolescent girls was 44.8%.⁵ Another study which was conducted among the girls, who belonged to the low income families in Vadodara, revealed that 67% of the adolescent girls were anaemic.⁶ It is critical to address this problem, which has health implications for long term problems for a large section of Indian population - directly linked to new born, child and maternal morbidity and mortality. The sheer magnitude of the problem mandates greater efforts to develop and implement programs, both for short term and long term benefits.

To meet the challenge of high prevalence and incidence of anaemia amongst adolescent girls and boys, the Ministry of Health and Family Welfare has launched the Weekly Iron and Folic Acid Supplementation (WIFS) Programme. This study was undertaken with the objective of determining recent trends in prevalence of Anaemia among adolescent girls in schools of Bengaluru rural, as a proxy indicator of the impact of WIFS programme. The results point towards a decline in the prevalence of anaemia in adolescents with improved compliance and improved understanding. This may mark the beginning of a new era which will start to witness educated and empowered adolescents, taking charge of their own health, in preparedness for their reproductive phase.

MATERIALS AND METHODS

Study Design

With a pilot sample of 95 adolescent girls Government school under Bengaluru rural north block, Cross-sectional, descriptive, pilot exploratory research study was used.

Inclusion Criteria

The choice of the school was based on commitment to administration of weekly iron-folic acid supplements (WIFS) programme. All the girl students from class 6th to 10th of Government High and Senior Secondary school (age group, 11-19 years) who were a part of WIFS were enrolled as study participants. Under this programme Iron folic acid tablets (IFA tablet) containing 100 mg elemental iron and 500ug Folic acid were administered in the school for 52 weeks in a year, on a fixed day. Biannual Albendazole (400 mg), six months apart, was administered for control of worm infestation. Information and counselling for improving dietary intake was provided to the girls via parents and teachers who were briefed under the WIFS initiative.

Exclusion Criteria

14 girls were excluded due to non-compliance.

Data Collection

Qualitative data on anaemia awareness and diet history were taken. General information includes name, age, height and weight of the girls was noted. Body mass index were calculated by using anthropometric measurements. A brief, relevant clinical examination was also done.

Haemoglobin Estimation

Capillary blood sample was collected from index finger with cutting needle using aseptic measures and haemoglobin estimation was done by using Haemocue method.

Statistical Methods

For descriptive statistics, the number of patients, mean, standard deviation (SD), minimum, median and maximum values were calculated for continuous variables, and the case number and percentage were computed for categorical values.

Body Mass Index (BMI) was calculated using the weight in kilograms divided by the square of the height in meters (kg/m²). A value of BMI was categorized as follows:

<18.5 kg/m ² (underweight)	18.5-24.9 kg/m ² (normal)
25.0-29.9 kg/m ² (overweight)	>=30.0 kg/m ² (obese)

To assess anaemia prevalence status, Haemoglobin % were categorized as follows:

Non-anaemic >12.0 gm/dl mild anaemic; 10.00 gm/dl–11.9 gm/dl

Moderate anaemia 7.00 grams/dl– 9.9 gm/dl severe anaemic <7.0 gm/dl

Analysis were prepared by IBM SPSS Statistics version 22.

RESULTS

Out of 95 girls, fourteen girls were excluded, three of them had side effects (3.1%) ten were reported to take tablets irregularly (10.5%) and one student had not been dewormed.

Total of 81 out of 95 girls were included and were compliant (85.2 %).

Of the total enrolled 81 girls enrolled in the study 56 girls (69.1%), were in the age group of 14-15 years (Table 1.1 and Figure 1.1)

79% of the girls were categorized as non-anaemic, based on Hb estimation being greater than 12 gm/dl. Total of 17 girls (21%) were anaemic. (Table 1.2 and Figure 1.2)

None of the girls had severe anaemia, 1.2% had moderate anaemia and the rest 19.8 % had mild anaemia (Table 2.1 and Figure 2.1)

The girls in the age group of 14 -15 years, there were 11 girls out of 56 girls who had anaemia, indicating that the most number girls with anaemia belonged to this age group. (Figure 2.2).

BMI values were categorized as per the 4 categories mentioned. above. The mean BMI of the study sample was 17.53 kg/m². (Table 3.1)

21 of the 81 girls enrolled, had normal BMI (25.9%). 55 girls were underweight with low BMI (67.9%) and remaining 5 girls were overweight (6.2 %) (Table 4.1 Figure 4.1).

In the group of 55 girls with low BMI, 11 girls (64.70 %) had anaemia (Table 5.1 Figure 5.1). This indicates that most girls with anaemia were also underweight.

Age Groups	N	Percent
11-13 years	15	18.5 %
14-15 years	56	69.1 %
16-18 years	10	12.3 %
Total	81	100 %

Table 1.1. Enrolled Girls- Age group Distribution

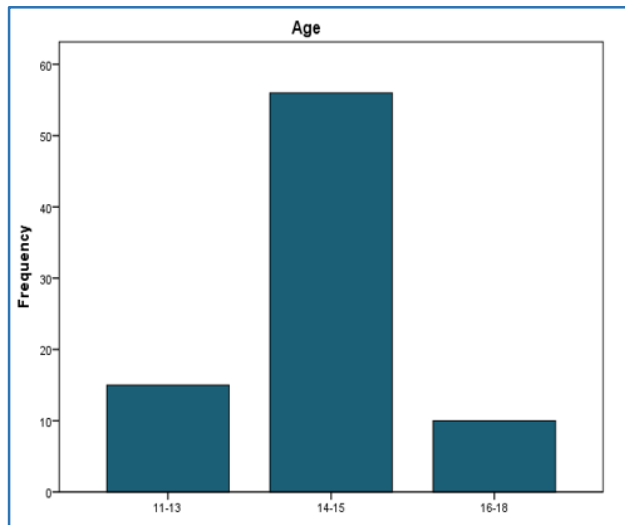


Figure 1.1. Age Group Distribution of Adolescent Girls

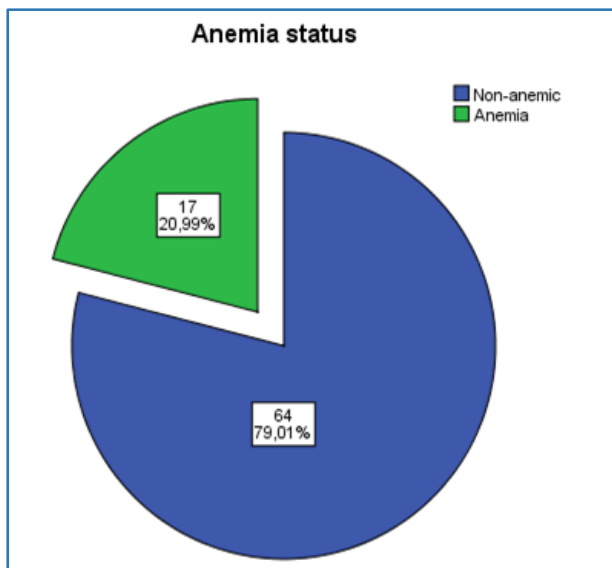


Figure 1.2. Anaemia Prevalence in the Girls Recruited for Assessment

Anaemia Status	N	Percent
Non-anaemic	64	79.01 %
Anaemic	17	20.99 %

Total	81	100 %
Table 1.2. Overall Prevalence Anaemia		

Anaemia Status	N	Percent
Non-anaemic 12.0 gm/dl	64	79.0 %
Mild anaemic 10.00 gm/dl – 11.9 gm/dl	16	19.8 %
Moderate anaemia 7.00 grams/dl – 9.9 gm/dl	1	1.2 %
Severe anaemia < 7.0 gm/dl	0	0.0 %
Total	81	100 %

Table 2.1 Anaemia Status as per Hb Categories

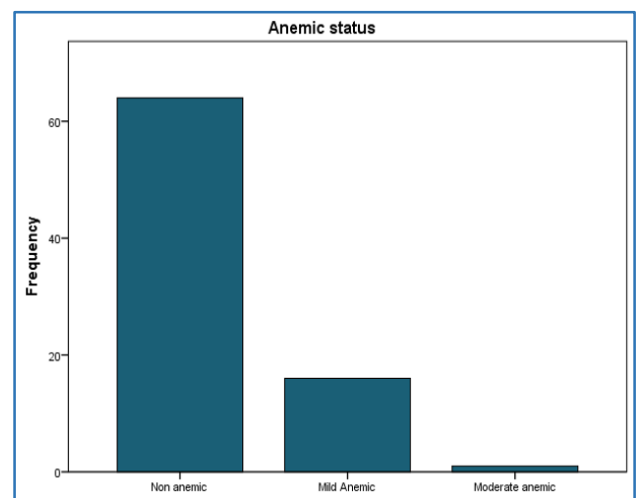


Figure 2.1. Anaemia Prevalence of Mild, Moderate and Severe Categories

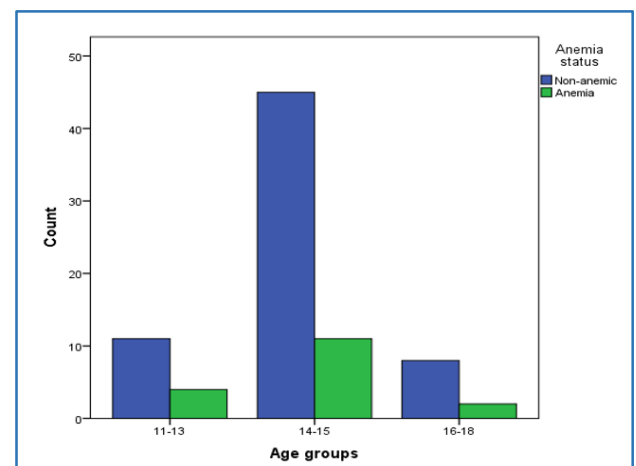


Figure 2.2. Anaemia Distribution as per Age

Group	N	Mean	95 % CI	Median	SD	Minimum	Maximum
BMI	81	17.53	16.66 – 18.40	16.77	3.934	6.12	29.67

Table 3.1. BMI Descriptive Statistics

BMI Categories	N	PERCENT
Underweight	55	67.9 %
Normal	21	25.9 %
Overweight	5	6.2 %
Obese	0	0.0 %
Total	81	100 %

Table 4.1 BMI Categories

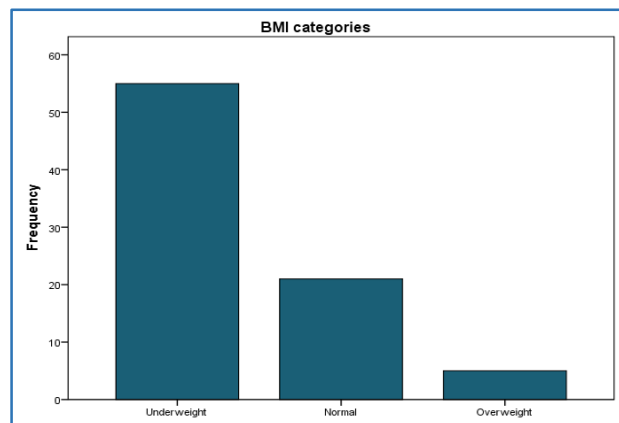


Figure 4.1. BMI Categories in the Study Population

BMI Groups	Non-anaemic		Mild Anaemic		Moderate Anaemic		Severe Anaemic		Total	
	N	%	N	%	N	%	N	%	N	%
Underweight	44	68.8 %	10	62.5 %	1	100.0 %	0	0.0 %	55	67.9 %
Normal	16	25.0 %	5	31.3 %	0	0.0 %	0	0.0 %	21	25.9 %
Overweight	4	6.3 %	1	6.3 %	0	0.0 %	0	0.0 %	5	6.2 %
Obese	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %	0	0.0 %
Total	64	100 %	16	100.0 %	1	0.0 %	0	0.0 %	81	100 %

Table 5.1. Anaemia Status by BMI Categories

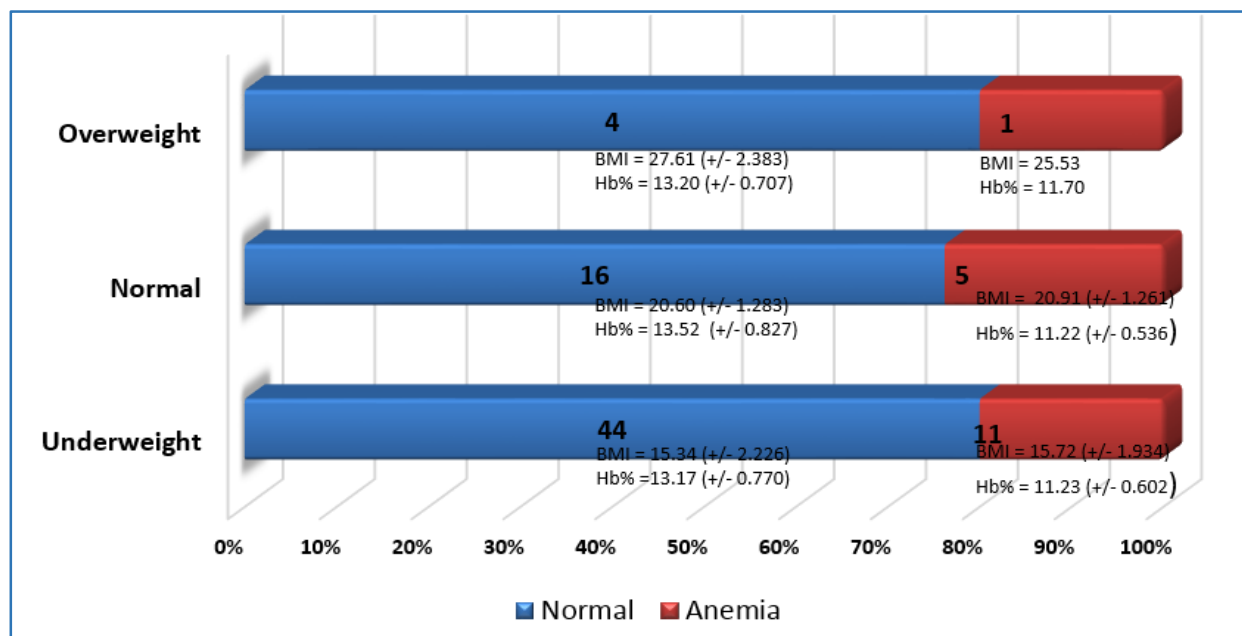


Figure 5.1. Anaemia Status by BMI Groups

DISCUSSION

Adolescence (between 10-19 years) is an important phase of life and marks the beginning of the menstrual cycle or reproduction. There is ever-increasing evidence that the control of anaemia in pregnant women can be more easily achieved if a satisfactory iron status can be ensured during

adolescence.^{7,8} There have been numerous studies conducted to determine the prevalence of anaemia in adolescents. In a study which was conducted in rural Tamilnadu, the prevalence of severe anaemia was found to be 2%, that of moderate anaemia was 6.3% and that of mild anaemia was 36.5%.⁵ Another study which was conducted

in rural Wardha showed the prevalence of severe, moderate and mild anaemia found to be 0.6%, 20.8% and 38.4% respectively.⁷ A study which was conducted among school going adolescents in Ahmedabad revealed that 0.6% were severely anaemic, 44.9% were moderately anaemic and 55.2% adolescents were mildly anaemic.⁹ Yet another group conducted a study in college going youths in rural blocks of a dist. of northern India found that prevalence of severe anaemia was found to be 3.58%, that of moderate anaemia was 11.16% and that of mild anaemia was 29%.¹⁰

Considering the alarming situation, the government has been initiated the Weekly Iron and Folic Acid (IFA) Supplementation (WIFS) programme since January 2013, under the National Rural Health Mission (NRHM) in government/ aided and municipal schools nationwide. The WIFS is evidence based programmatic response to the prevailing anaemia situation amongst adolescent girls and boys. Iron supplementation has successfully proved to be a short term strategy to combat anaemia. But daily iron folic acid (IFA) supplementation has shown to have certain limitations like rapid decline in iron absorption due to high dose and gastrointestinal side effects. On the other hand weekly iron supplementation has advantage over daily iron supplementation like – lower side effects, cost effectiveness and improved compliance.¹¹ Weekly regime is as effective as daily or biweekly regime in improving haemoglobin levels in children. Moreover, it has better compliance, lesser side effects and cost of therapy. Studies in literature have shown a significant increase in haemoglobin levels on weekly supplementation to different age group thus showing it to have a comparable effect on haemoglobin levels.

A study conducted in Andhra Pradesh.¹² to assess the effect of daily versus weekly iron supplementation on 244 girls (13-15 yrs.) with different degrees of anaemia, showed that rise in haemoglobin levels observed increased with the severity of anaemia in both the groups. The study revealed, 35% and 43% reduction in anaemia among the daily and weekly group respectively. A study in North-East Delhi on 2210 girls aged 10-17 years assessed the effect of supplementing 100mg elemental iron and 500 mcg folic acid. The haemoglobin levels significantly increased from pre to post, 11.7 to 12.2 g/dl in daily group and 11.7 to 12.1 g/dl in weekly group.¹³

Our objective was to evaluate the recently initiated WIFS program for government school girls with respect to implementation and impact on trends in prevalence of Anaemia among adolescent girls in a Bengaluru rural schools. This pilot study undertaken in one such school where the teachers and parents were ensuring robust implementation of WIFS. Out of the 95 girls in the school, there were 81 girls (85.26%) were compliant for deworming and intake of one tablet of Iron folic acid (IFA) weekly over the past one year. There were no major issues with respect to side effects like gastric irritation or constipation Major positive factors for the compliance was ensuring regular supply of tablets and the motivation and health education by teachers and parents. 56 girls (69.1%), were in the age group of 14-15 years, all of them had attained menarche.

The girls had knowledge about symptoms of anaemia and iron-rich diet, due to the health education initiatives by teachers and parents. Training program organized to make teachers and parents aware about importance of iron for adolescents, seems to have a definite role to play. This seemed to help to increase the iron in the food of adolescents for long term in a sustainable manner. Sensitised and motivated the teachers and parents to pay attention to diet, deworming and weekly iron supplements seemed to play an important role in implementation and compliance Counseling is being done to empower adolescents to make understand the importance of precaution measures to avoid anaemia in adulthood. Implementation was feasible for WIFS in a robust manner with co-operation of all stake holders; this emphasises the role of communication between all concerned, for the success of WIFS. Limitation of this study is that detailed nutritional history was not taken.

The girls in the age group of 14-15 years, there were 11 girls out of 56 girls who had anaemia, indicating that the most number girls with anaemia belonged to this age group. And this is the target age group for WIFS.

The study on impact of Hb%, revealed that total prevalence of anaemia was 21%. This is significantly less than those reported in the above studies (40 to 50%) which were undertaken before the launch of WIFS programme. In studies done before the launch of WIFS programme, overall, severe anaemia prevalence ranged between 0.6 to 3.5% whereas, in our study, none of the girls had severe anaemia; the moderate anaemia ranging 4 to 40% in the previous studies, compared to only 1.2% moderate anaemia in our study. Incidence of mild anaemia was reported between 35 to 50% in the studies done earlier compared to 19.8% mild anaemia in the present study.

The adolescent phase of life is also important due to the ever-increasing evidence that the control of and anaemia in pregnant women can be more easily achieved if a satisfactory iron status can be ensured during adolescence.⁷ The deficiency has consequences even when no anaemia is clinically apparent and term "mild anaemia" is a misnomer as iron deficiency is already advanced by the time anaemia is detected.¹⁴ Also anaemic girls have lower prepregnancy stores of iron and pregnancy is too short a period to build iron stores to meet the requirements of the growing fetus increases the risk of preterm and low birth weight babies, leading to intergenerational cycle of malnutrition.¹⁵ Very often, in India, girls get married and pregnant even before the growth period is over, thus doubling the risk for anaemia About 43% of the adolescent deaths are related to pregnancy. Pregnancy during adolescence deprives the girls from achieving their full growth according to their genetic potential.¹⁶ This indicates the importance of including adolescents in the risk group to improve their iron status and the need for planning intervention programs that would increase the haemoglobin levels among the adolescents age group through prophylaxis treatment, dietary modification and helminth control, even if they have mild anaemia.

This study indicates the impact WIFS as a part of the RMNCH A+ programme, which improves the iron deficiency anaemia in adolescents. The long term goal is to break the intergenerational cycle of anaemia, the short term benefits is of a nutritionally improved human capital. Adolescents gain 30% of their adult weight and more than 20% of their adult height between 10-19 years, which we call as growth spurt.⁸ Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life and beyond.¹⁷ Our study showed Mean height and weight of respondent of different age groups is less in comparison to NCHS values The mean BMI of the sample was 17, 53 kg/m². Of the total of 81 girls enrolled, only 21 had normal BMI (25.9%) 55 girls were underweight with low BMI (67.9%) and remaining 5 girls were overweight (6.2%) (Table 4.1; Figure 4.1).

In the group of 55 girls with low BMI, 11 girls (64.70%) had anaemia (Table 5.1 and Figure 5.1). This indicates that most girls with anaemia were also underweight. We recognize that besides iron, the overall nutrition plays an important role. Nutritional anaemia in adolescent girls attributes to the high maternal mortality rate, the high incidence of low birth weight babies, high perinatal mortality and the consequent high fertility rates. Therefore, nutrition support by ICDS to give enhanced ration to adolescent girls and Kishore Shakti Yojana, the Nutrition program for underweight adolescent girls and similar newer innovative initiatives should also be strengthened.

CONCLUSION

As indicated by this pilot study, the impact of WIFS programme is beginning to show a significant decline in anaemia prevalence in adolescents, with improved compliance. Implementation of WIFS initiative needs to include all stakeholders, inclusive of parents and teachers, as responsible partners to make it robust. Prevalence of anaemia in adolescents can certainly be lowered by intensive nutrition education not only by health care providers, but also parents and teachers. Encouraging girls to take IFA tablets once a week and deworming combined with coordinated nutrition education in schools, will empower the adolescents to take charge of their health Reorientation of primary health care functionaries to strengthen 12 by 12 initiative (every adolescent should have at least 12 gm% Hb by 12 years of age) by providing weekly iron folic acid supplementation and deworming as in the WIFS programme and emphasizing the need for nutrition education with the help of ICDS workers can bring down the prevalence of the anaemia in adolescent girls.

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