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Acceptability and Compliance of Weekly Iron-Folic Acid Supplementation Among Young Collegiate Girls (17-18 Years) Under Free Living Conditions

KEYWORDS: Anaemia, weekly iron-folic acid supplementation, compliance.

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ABSTRACT *Anaemia is a major public health concern inflicting both developed and developing countries. According to NFHS-3, the prevalence of anaemia is 55.8% among ever-married women aged 15-19 years. The present study was undertaken to assess the acceptability and compliance of weekly iron-folic acid supplementation (WIFS) among 111 young collegiate girls aged 17-18 years under free living conditions and to assess their haematological status. Overall prevalence of anaemia was 49.5%, whereas serum ferritin and vitamin B_{12} deficiency was 45% and 63.3% respectively. IEC sessions were conducted to explain about anaemia, the importance and benefits of consumption of WIFS. Focus group discussions (FGDs) were conducted to elicit information on the attitudes and perceptions with respect to WIFS. Amongst 111 collegiate girls, only 45 girls volunteered to consume the supplements. Compliance with IFA supplementation was studied over a period of 5 weeks and very few side effects were reported. Efficacious counselling and supervision helps in reaching higher rate of compliance.*

Introduction

Anaemia is a major public health issue inflicting both developed and developing countries (WHO, 2008a). Worldwide, the most salient contributor for the outset of anaemia is iron deficiency (WHO, 2008a). Physical and psychological behaviours can be adversely affected by anaemia. Mild forms of anaemia can inflict the work capacity, resistance to fatigue and also exasperates other disorders (WHO, 1992). Women of reproductive age and young children are grievously affected by anaemia (WHO, 2009). The multicentric study undertaken in 16 Districts of the country indicated the prevalence of anaemia among adolescent girls to be 90.1% (Toteja et al, 2006).

Among adolescent girls, the physical and physiological changes that occur place a colossal demand on their nutritional requirements and make them more prone to nutritional deficiencies (UNICEF, 2011). Anaemia is known to be am ajor nutritional problem among adolescents (WHO, 2005). It is important to address the problem of anaemia especially in adolescent girls, since they are in period of growth and are the future mothers.

In 2013, Ministry of Health and Family Welfare, Government of India, proposed National Iron Plus Initiative, to address the problem of anaemia across all life stages inclusive of adolescents and women in reproductive age. The Government has recommended supervised administration of weekly iron-folic acid supplementation containing 100 mg elemental iron and 500 mcg of folic acid as a preventive strategy to combat anaemia among adolescents aged 10-19 years (MOHFW, 2013). Therefore, the present study was undertaken to assess the acceptability and compliance of weekly iron folic acid supplementation among young collegiate girls (17-18 years) under free living conditions and to assess their haematological status.

Methods

The present study was conducted on 111 young collegiate girls aged 17-18 years attending Lady Irwin College, University of Delhi. Collegiate girls who volunteered to give their assent and their parents/guardian(s) consent were enrolled for the study. The data collection was initiated in the month of November, 2013 and completed in the month of March, 2014. Ethics approval prior to the initiation of work was obtained from the Institutional Ethics Committee, Lady Irwin College, University of Delhi.

Information regarding demographic profile and menstrual cycle status was collected using pretested structured questionnaires and dietary information was collected using one day 24 hour recall and qualitative food frequency questionnaire.

Biochemical analysis was done for haemoglobin, serum ferritin and serum vitamin. B_{12}. All the biochemical analysis was done at NABL accredited laboratory at "Centre for Promotion of Nutrition Research and Training with special focus on North-East, Tribal and Inaccessible population (Indian Council of Medical Research)", New Delhi.

Sample collection- 5mL of venous blood was drawn using a disposable syringe from the young collegiate girls. Approximately 1mL of the sample was pipetted in EDTA vial

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and kept aside for Hb estimation. The rest of the blood was pipetted in other vial and kept for 20 minutes at room temperature. Following this, centrifugation was done at 2000rpm for 5 minutes and serum was separated. Samples collected were stored in the deep freezer at -80°C until analysis. Estimation of haemoglobin was done using cyanmethemoglobin method. Estimation of serum ferritin and vitamin B_{12} was analyzed using Immulite 1000 (Immunoassay system- Immulite Chemiluminescent Analyzer).

IEC sessions were imparted among young collegiate girls whose biochemical status was analyzed. Two IEC sessions were conducted in small groups by showing PowerPoint presentation. KABP was assessed before and after the IEC session regarding anaemia using pretested structured questionnaires. During the session, biochemical reports were distributed among the young college girls and they were explained about anaemia, the importance and benefits of consuming weekly iron-folic acid supplements (100 mg elemental iron and 500 mcg folic acid) as a preventive strategy to combat anaemia.

IFA supplements (100 mg elemental iron and 500 mcg folic acid) and deworming tablets (Albendazole 400mg) required in the study were supplied free of cost by Government of NCT of Delhi, Directorate of Health Services, School Health Scheme, DGD Complex, Karkardooma, New Delhi. Deworming tablets and IFA supplements were made freely available in the college medical room to make it easily accessible among girls and it was on voluntary based approach. A register was kept in the medical room and complete records of the side effects reported by the young collegiate girls were maintained. Since, it was a time bound study the compliance with IFA supplementation was studied over a period of 5 weeks.

Focus group discussions (FGDs) were conducted among young collegiate girls at the end of the study to elicit the information on their attitudes and perceptions with respect to weekly iron-folic acid supplementation under free living conditions.

Data was entered in Microsoft Excel 2013 and was transported to IBM SPSS Statistics 20.0 package. Mean, Standard Deviation, Median, 95th Confidence Interval, Independent't' test and Paired't' test was calculated. Mean intake of nutrients was calculated using 'NSI Diet Calculator' software developed in Microsoft Access 2010. The focus group discussion was analysed using ATLAS.ti Version 7.

Results and Discussion

General profile of young college girls

Amongst 111 young collegiate girls covered in the study, the mean age was found to be 17.9±0.46 years. A total of 89 collegiate girls (80.2%) belonged to nuclear families. Majority of families (88.3%) were Hindus. Majority of young collegiate girls (55%) were found to be vegetarian. The mean age of menarche was 13.0±1.4 years.

Biochemical status of young collegiate girls

Prevalence of anaemia

The study has revealed that the mean haemoglobin level among anaemic girls and non-anaemic girls was 106.3±11.7g/L and 125.3±4.7g/L respectively. Out of 111 young collegiate girls who participated in the study, (49.5%) were found to be anaemic (Hb<120g/L). The Table 1 depicts the overall prevalence of anaemia among the collegiate girls (n=111).

Table 1: Overall prevalence of anaemia among young collegiate girls (%) Anaemic (<120 g/L); mildly anaemic: (110-119g/L); moderately anaemic (80-109g/L); severely anaemic (<80g/L); (Source: WHO, 2011a)

n	Prevalence of anaemia n (%)								Mean ±SD (g/L)	Median (g/L)	Range (g/L)	95th CI
	Anaemic		Mild		Moderate		Severe					
	n	%	n	%	n	%	n	%				
111	55	49.5	27	24.3	25	22.5	3	2.7	106.3 ±11.7	109	65-119	103.3-109.3

Prevalence of low serum ferritin and vitamin B_{12}

The mean serum ferritin level among (n=109) college girls was 25.3±21.4 ng/mL, (95th CI 21.3-29.3). The mean serum vitamin B_{12} level among (n=109) college girls was 201.2±137.4 pg/mL, (95th CI 167.2-235.2). Out of 109 college girls, about (45%) were found to have low serum ferritin levels i.e. below 15ng/mL (WHO, 2011b), whereas (63.3%) were found to have low serum vitamin B_{12} indicated by levels below 203pg/mL (WHO,2008b) .

Levels of serum ferritin among anaemic and non-anaemic

61% of anaemic subjects had serum ferritin deficiency, whereas among non-anaemic, only 29% had serum ferritin deficiency as evident by serum ferritin levels of <15ng/mL.

The mean serum ferritin level among non-anaemic, i.e. 31.6ng/mL (95th CI 25.9-37.3) was found to be significantly higher ($p<0.05$) than those found anaemic 18.9ng/mL, (95th CI 13.4-24.4). The Table 2 depicts the levels of serum ferritin among anaemic and non-anaemic participants.

Table 2: Serum ferritin levels among anaemic and non-anaemic collegiate girls

Serum ferritin levels	Mean±SD (ng/mL)	Median (ng/mL)	Range (ng/mL)	95th CI
Anaemic (n=54)	18.9±20.1	10.6	2.8-89	13.4-24.4
Non-anaemic (n=55)	31.6±21.0	26.8	1.2-120	25.9-37.3

*Serum ferritin was calculated for 109 collegiate girls out of 111 participants.

Prevalence of multiple micronutrient deficiencies

Amongst 109 young collegiate girls, 33 (30.3%) had low levels of haemoglobin and serum ferritin, while 15 (14%) had low levels of haemoglobin and serum vitamin $B_{12.}$ About 12 adolescent girls (11%) had low levels of haemoglobin, serum ferritin and serum vitamin B_{12} . the. Figure 1 depicts the prevalence of multiple micronutrients deficiencies among young collegiate girls.

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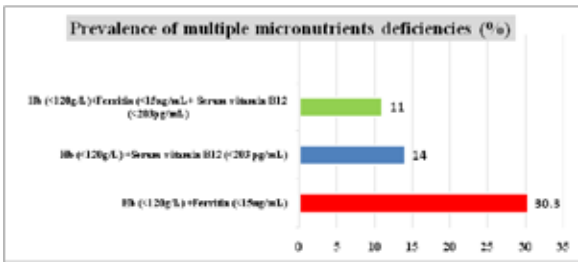
Figure 1: Prevalence of multiple micronutrients deficiencies among young collegiate girls



Dietary status

Dietary information was collected on a subsample of 55 adolescent girls by using one day 24 hour recall and qualitative food frequency questionnaire. The mean intake of nutrients was compared with the RDA (ICMR, 2010). In the study, the mean energy intake was 1292±268 kcal/d against the RDA of (2440 Kcal/d), whereas the mean protein intake was 42±10g/d against the RDA of (55.5g/d). The iron intake among the young collegiate girls was inadequate with a mean intake of 11±3.4mg/d as compared to RDA of (26mg/d). The mean vitamin C intake found to be 60mg/d which was above the RDA (40mg/d). The intake of GLVs wasn't satisfactory among the collegiate girls. The sources consumed by the collegiate girls were mostly in the form of non-haem iron.

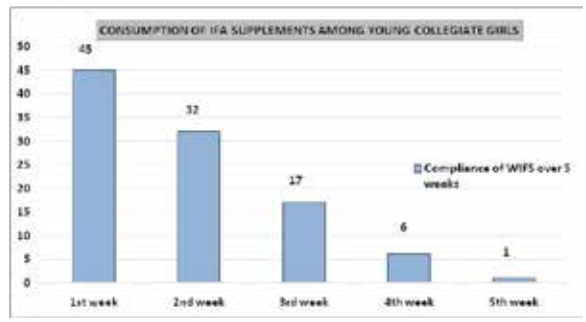
Impact of IEC session

IEC sessions were imparted among young collegiate girls whose biochemical status was analyzed. IEC sessions were conducted in small groups by showing PowerPoint presentation and they were explained about anaemia, the importance and benefits of consuming weekly iron-folic acid supplements (100 mg elemental iron and 500 mcg folic acid) as a preventive strategy to combat anaemia. It was left on their own will whether they want to consume IFA supplements or not under free living conditions irrespective of their haemoglobin levels. KABP scores were gathered regarding anaemia before and after a week of IEC session. The total scores showed significant ($p<0.01$) improvement from pre-test to post-test.

Compliance with IFA supplementation over a period of 5 weeks

Amongst 111 young collegiate girls, who had attended the IEC sessions, only 45 (40.5%) volunteered and consumed deworming tablets. After 2-3 days, all of them reported for the consumption of IFA supplements. On the analysis of data, out of 45 young collegiate girls who consumed supplements, 25 were non-anaemia followed by 9 mildly anaemic, 10 moderately anaemic and 1 was severely anaemic respectively. The figure 2 depicts the consumption of IFA supplements among young college girls over a period of 5 weeks.

Figure 2: IFA supplements consumption among young collegiate girls over a period of 5 weeks



Since, it was a time bound study the compliance with IFA supplementation was studied over a period of 5 weeks. Compliance rate was poor by the 4th and 5th week. Out of 45 young collegiate girls, only 1 had consumed supplement over a period of 5 weeks.

On collecting information on side effects of IFA consumption, only 3 girls had mentioned the side effects in the 1st week i.e. minor headache and dizziness on the consumption of supplements, whereas rest of the girls had no side effects. Higher attrition rates were observed due to lack of motivation, forgot to take, peer pressure and sheer fear of having side effects.

Focus group discussion

Four Focus group discussions (FGDs) were conducted among the participants at the end of the study to elicit the information on their attitudes and perceptions with respect to WIF Sunder free living conditions. Out of four FGDs, two FGDs were conducted with IFA consumers, whereas other two FGDs with non-IFA consumers. The number of participants per group were 7 girls. Majority of the IFA consumers responded positively and found IEC sessions very beneficial. Participants accepted the benefits on consumption of IFA supplements.

"We feel quiet energetic and the appetite has increased".

Parents and peer groups had played a role in motivating the participants. Few of the participants got motivated either by their parents or got self-motivated. Majority of the non-IFA consumers had reported that due to fear of side effects and lack of self-motivation they didn't volunteer to consume these supplements.

"We had a fear that these supplements may cause side-effects as we got to know through IEC sessions. Therefore, we didn't volunteer to consume these supplements".

Few of the participants stated that *"Our parents didn't allow us to consume these supplements without consulting a doctor".*

Discussion

In different parts of the country, studies have shown the prevalence of anaemia ranges between 22% to 96.5% (Vasanthi et al, 1994; Jondhale et al, 1999; Sidhu et al, 2005; Gawarika et al, 2006; Chaudhary, M. S. & Dhage, R.V., 2008, Premalatha et al, 2012). In the present study, the overall prevalence of anaemia among (n=111) young collegiate girls was 49.5%. Nearly 24.3% were mildly anaemic, while 22.5% and 2.7% were moderately and severely anaemic respectively.

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A study has been carried out in Jaipur City to assess the micronutrient status of adolescent girls. The study has shown the prevalence of anaemia to be 96.3%, while 69% had low levels of serum iron and 75% of the adolescent girls had serum ferritin levels below 15mcg/L (Goyle & Prakash, 2009). A study undertaken in Chandigarh among 1120 adolescent girls and boys aged 12-18 years indicated that 81.7% and 41.6% of the adolescent girls and boys had low levels of serum ferritin (Basu et al, 2005). The present study has shown the prevalence of serum ferritin deficiency among anaemic college girls was 61%, whereas 29% in non-anaemic.

A study undertaken in Dhaka District, Bangladesh among non-pregnant girls aged 14-18 years indicated that twice-weekly supplementation of IFA & multiple micronutrient (MMN) groups had notably higher haemoglobin and serum ferritin levels. Riboflavin, Vitamin A and C deficiencies prevalence decreased in MMN group than in IFA group (Ahmed et al, 2005).

In the present study, low level of compliance (15%) with iron-folic acid supplements was observed by the third week. On the other hand, the study undertaken among adolescent girls for 3 months showed higher level of compliance (95%) with supplements and counselling was done if the consumption of tablets was found to be irregular (Bhanushali et al, 2011). The present study done under free living conditions on the educated girls studying in college revealed that WIFS should be supervised for any effect. Further WIFS need not be a school based programme as 17-19 years adolescents are mostly in colleges in which supervised administration is a limitation.

Conclusion

The population being studied was a literate group and IEC sessions were delivered to explain about anaemia, the importance and benefits of consuming weekly iron-folic acid supplements. It was left on their own will whether they want to consume IFA supplements or not under free living conditions irrespective of their haemoglobin levels. In the current study, the outcomes showed that due to lack of self-motivation, forgot to take, peer pressure and sheer fear of having side effects led to a poor compliance. To make weekly iron-folic acid supplementation programme more sustainable, it is cardinal to generate awareness among adolescents as well as their parents through frequent sessions on importance of iron-folic acid supplements and deworming tablets. Adolescents should be counselled by the teachers at schools and colleges to consume WIFS. College students in the age group of 17-19 years should be covered under WIFS programme. Efficacious counselling and supervision helps in reaching higher rate of compliance.

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