

Factors Influencing Weekly IFA Supplementation Programme (WIFS) among School Children: Where to Focus Our Attention?

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ABSTRACT

Introduction: Iron-deficiency anaemia is a public-health concern in developing countries. Weekly IFA consumption can significantly reduce prevalence of nutritional anemia among adolescents. Govt. of India launched the WIFS programme in 2012 to reduce prevalence and severity of nutritional anaemia among adolescent population. Research was done to study factors influencing weekly IFA supplementation programme at selected schools in rural Pondicherry and to explore perceptions regarding weekly IFA supplementation programme qualitatively.

Material and methods: A school based cross-sectional study was conducted during July-Dec 2013 in selected government schools of Bahour commune in rural Pondicherry. After obtaining permission from school headmasters, total 240 school children (both boys and girls from 9th and 10th standards) were interviewed. Pre-tested proforma in local language was used and multi-stage sampling technique was followed for quantitative data collection. Qualitative information was collected through 6 FGDs. Data was analysed using SPSS version 17.0 and Anthropac 4.98.1/X software.

Results: 47.2% children were consuming IFA tablets regularly, 52.8% were consuming occasionally or rarely. Stomach pain (41.7%), nausea and vomiting (24.5%) and disliking of tablets (22.3%) were predominant causes for IFA tablet refusal. Reduced fatigue (43.7%), increased appetite (41.1%) and improved concentration (37.7%) were cited as major benefits of IFA tablets. Gender, type of family, parents' education and occupation were not associated with consumption of IFA tablets. Girls perceived that IFA tablets causes weight gain, and may have side effects like bad taste, pain abdomen and giddiness. Boys considered that these tablets were not necessary and has side effects like stomach pain and nausea and often throw away tablets. Occasional unavailability of IFA tablets, poor awareness regarding importance of IFA tablets, and casual program implementation were other important factors.

Conclusion: Creating awareness regarding importance of IFA supplementation and careful program implementation including regular supply of IFA tablets should be considered to make WIFS programme successful.

Keywords: Adolescent, Anaemia, School children, Iron Folic Acid

among school children can be prevented by deworming, iron supplementation and proper diet.¹

The prevalence of anaemia (girls Hb <12 gm% and boys (Hb <13 gm %) according to NFHS-3² (2005-2006), was more than 55% among both adolescent boys and girls. In this direction, Government of India launched the *Weekly Iron and Folic Acid Supplementation* (WIFS) Programme in year 2012 to reduce prevalence and severity of nutritional anaemia among adolescent age group population. WIFS is also supposed to reach out-of-school boys and girls in the age group of 10-19 years through the platform of anganwadi centers (located in every village). This strategy involves a 'fixed day-Monday' approach for IFA tablet distribution among children. Teachers in schools and anganwadi workers for non-school going children (AWWs) are supposed to ensure the ingestion of IFA tablets by the children.³

According to WIFS programme, IFA tablet containing 100 mg elemental iron and 500 microgram folic acid will be supplemented for 52 weeks in a year. In addition to IFA supplements, Albendazole tablets for de-worming will also be administered twice a year to the same target group.^{3,4}

Objectives of the research were to study the factors influencing weekly iron and folic acid supplementation at selected schools in rural Puducherry and to explore the perceptions regarding weekly iron and folic acid supplementation programme among school children, teachers and parents qualitatively.

MATERIAL AND METHODS

Quantitative data collection

A school based cross-sectional study was conducted during July-Dec 2013 in selected two government schools of Ba-

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INTRODUCTION

Iron deficiency anaemia is a public health concern in most developing countries. Nutritional anaemia result in impaired physical growth, poor cognitive development, reduced physical fitness, decreased concentration, weakness, and menstrual irregularities among girls affecting physical and mental health of school children. The common causes of iron deficiency are incorrect dietary habits, infections, infestations and menstrual blood loss among girls. Anaemia

hour commune in rural Pondicherry (Vanidhasan Government Higher Secondary School, Seliamedu and Kasthuribai Government School, Bahour). After obtaining permission from school headmasters, students from 9th and 10th standards from selected 2 schools and willing to participate in the study were included as study subjects. Considering prevalence of anemia among adolescent population as 65.3%⁵, (calculated sample size 207) a total 240 school children (30 boys and 30 girls from 9th and 10th standard from both the schools) were interviewed. Boys and girls from each standard and school were selected systematically.

The purpose of the study was explained and permission was obtained from headmasters of the respective schools. The subject confidentiality was assured and maintained during and after information collection. Health education was imparted to school children regarding importance of IFA tablet consumption and iron rich foods, adverse effects of iron deficiencies. Referral was facilitated to those children with clinical anemia for hemoglobin estimation and further management.

The quantitative data were collected by trained medical professionals using a pre-designed and pre-tested proforma in local language (Tamil) during afternoon hours in the respective schools. Information on background characteristics, symptoms suggestive of anaemia, consumption of IFA tablets, and problems faced due to IFA tablet consumption by school children were obtained. Clinical examination was done to assess signs suggestive of iron deficiency anaemia among school children. It took approximately 18-20 minutes to complete one study proforma.

Qualitative data collection

Qualitative data about perceptions of school children, teachers and parents regarding benefits and problems of weekly iron and folic acid supplementation programme were collected in a triangulated manner in the form of focus group discussion (FGD) [PRIA guidelines were used]⁶, free listing and pile sorting exercise [Dawson 1993].⁷ For this purpose two semi-structured FGDs each with school boys, girls and teachers (total 6 FGDs) till point of exhaustion (around 40-45 minutes each) were conducted by study investigator. FGDs were supervised by faculty from Dept. of Community Medicine with more than five years of experience in qualitative research. FGDs included 8-12 purposefully selected participants who can talk freely and were willing to participate.

DATA ANALYSIS

Quantitative data was analyzed using Statistical Package for the Social Sciences software for Windows (SPSS Inc., Chi-

cago, Illinois, USA) version 18.0. The data were presented in the form of numbers, distribution, and percentages. $p < 0.05$ was considered as statistically significant. The content analysis of FGDs, free listing and pile sorting exercise were undertaken using ANTHROPAC 4.98.1/X computer software.⁸

RESULTS

Total 240 school children were interviewed, 120 were girls and 120 were boys. The mean age of study children was 14.5 ± 2.4 years. 46.7% of mothers and 40.8% fathers of study children were educated till primary level only (less than seven years of schooling). Among the total children, 75.8% belonged to nuclear family and 24.2% children were from joint families. Gender, type of family, parent's education and occupation were not associated with consumption of IFA tablets.

Table 1 show various symptoms suggestive of anaemia as perceived by school children. 26.3% of the school children had easy fatigability, followed by difficulty in concentration (22.9%) and giddiness (15.8%). Among total 240 children, 117 boys and 116 girls, total 233 (97.1%) were taking tablets. Among those children 45.8% were consuming IFA tablets regularly. Among the children with regular consumption of IFA tablets, proportion of boys (73%) was double in number when compared to girls (37%). This is reverse in occasional conception of IFA tablet (37 boys and 64 girls). 51.3% were consuming occasionally (42.0%) or rarely (9.2%). 179 (76.8%) children were consuming IFA tablet after meals and 54 (22.5%) children were consuming without meals or before meals. There is no marked difference between boys (28%) and girls (26%) in consuming the IFA tablets without meals.

After consuming IFA tablets, 63.4% children could perceive positive effects of IFA tablets, 16% told that no positive benefits were noticed and 20.6% said that they couldn't assess. Table 2 shows one fourth of the children had stomach pain (24.2%), 14.2% children perceived nausea followed by disliking (12.9%) the IFA and headache (7.1%). Nearly 7% were not consuming due to bad taste and black coloured stools. 10% were due to other reasons like sickness, fear of weight gain, leave from school, non-availability of tablets and consuming antiepileptic drugs.

Children who were consuming IFA tablets, 28.3% perceived reduced fatigability and increased appetite (25.8%), followed by one fourth of the children reported improved concentration (24.6%). Reduced giddiness (10.4%) and menstrual regulations (10.4%) and reduced white discharge were also reported by the children.

Symptoms	Boys (120) N (%)	Girls (120) N (%)	Total (240) N (%)	p value
Easy fatigue	32 (26.7)	31 (25.8)	63 (26.3)	0.883
Inability to concentrate	28 (23.3)	27 (22.5)	55 (22.9)	0.877
Giddiness	15 (12.5)	23 (19.2)	38 (15.8)	0.157
Worm in stools	10 (8.33)	10 (8.3)	20 (8.3)	-
Occasional palpitation	8 (6.7)	11 (9.2)	19 (7.9)	0.473
Eating mud / non-food items	3 (2.5)	4 (3.3)	7 (2.9)	0.701
Others	-	7 (5.8)	7 (2.9)	-

(Multiple options possible)

Table-1: Symptoms suggestive of iron deficiency anaemia among school children

Reasons	Boys (120) N (%)	Girls (120) N (%)	Total (240) N (%)	p value
Stomach pain	26 (21.7)	32 (26.7)	58 (24.2)	0.366
Nausea/vomiting	13 (10.8)	21 (17.5)	34 (14.2)	0.139
Headache	6 (5)	11 (9.2)	17 (7.1)	0.208
Bad taste	9 (7.5)	4 (3.3)	13 (5.4)	0.154
Black colour stools	-	3 (2.5)	3 (1.3)	-
Don't like	8 (6.7)	23 (19.2)	31 (12.9)	0.004
Not necessary	4 (3.3)	12 (10)	16 (6.7)	0.038
Others	6 (5)	9 (7.5)	15 (6.3)	0.424

(Multiple options possible)

Table-2: Reasons narrated by school children for not consuming IFA tablet

Benefits	Boys (120) N (%)	Girls (120) N (%)	Total (240) N (%)	P value
Reduced fatigue	48 (40)	20 (16.7)	68 (28.3)	<0.001
Increased appetite	31 (25.8)	31 (25.8)	62 (25.8)	-
Improved concentration	36 (30)	23 (19.2)	59 (24.6)	0.051
Reduced giddiness	17 (14.2)	8 (6.7)	25 (10.4)	0.057
Menstrual regulation	-	25 (20.8)	25 (10.4)	-
Others	-	1 (0.8)	1 (0.4)	-

(Multiple options possible)

Table-3: Benefits perceived by school children after consuming IFA tablets

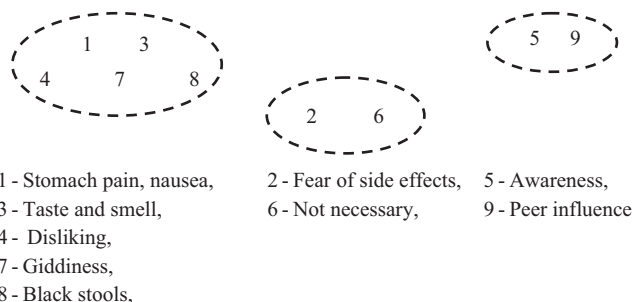


Figure-1: Two dimensional hierarchical cluster analysis: Barriers of IFA consumption

Among 240 children, 28.8% were found to be pale during general examination; among boys 20.8% had pallor and 36.7% girls were found to be pale. This difference was statistically significant (Chi-square value 7.34, p value <0.001). Among all children with pallor 36.2% were boys and 63.8% were girls.

Among the total 240 children, 233 were consuming IFA tablets (97.1%), among them 71.7% didn't have pallor, remaining 28.3% had pallor; whereas, among non-consuming children 42.9% had pallor and 57.1% didn't have pallor. But this difference was statistically not significant (p value 0.403). Thus, there was no significant association between consumption of IFA tablets and pallor; the probable reason could be, even though they are not consuming IFA tablet, the fulfillment of their iron requirement is being achieved by adequate intake of iron rich foods and already staying healthy.

Qualitative findings

Factors influencing weekly IFA supplementation programme and the perceptions regarding this programme among school children, teachers and parents were explored qualitatively in a triangulated manner in the form of 2 Focus Group Discussions (2 with boys and 2 with girls and 2 with teachers), and free listing and pile sorting exercise.

Girls perceived that IFA tablets produce side effects like ab-

dominal pain, nausea, giddiness, bad taste and causes weight gain. Boys considered that these tablets were not necessary and have side effects like stomach pain and nausea and often they threw away tablets. Occasional unavailability of IFA tablets, poor awareness, and casual program implementation were other important issues raised during FGDs.

Free listing

Factors responsible for not consuming IFA tablets as per discussion with school children (with descending Smith's S value, as per Salience analysis, which accounts for frequency of mention by participants) were stomach pain, fear of side effects, bad taste, disliking, poor awareness among students and their parents, not necessary, giddiness, black coloured stool and peer influence.

Pile sort analysis

School children could identify 3 broad categories of barriers for IFA consumption among both boys and girls during the study. First broad category of factors responsible for barrier of IFA consisted of stomach ache and nausea, metallic taste, disliking and giddiness. Second group consisted of fear of side effects of IFA tablets and thinking of IFA was not necessary. Third group consisted lack of awareness and peer influence on not consuming tablets (Figure 1). Thus, participants could enumerate different set of factors which acted as barriers for IFA consumption in the study area.

DISCUSSION

Adolescence is a period of transition from childhood to adulthood. It is characterised by rapid physical, biological and hormonal changes resulting in psycho-social, behavioural and sexual maturation.⁹ Adolescence is a period of rapid growth and this will lead to increased iron requirement. Failure to fulfill this iron requirement leads to iron deficiency anaemia.

Nutritional anaemia is a major preventable public health problem in both developing and under developed countries.

During adolescence, anemia is prevalent in both sexes but more among girls, especially during menarche. Iron deficiency anemia among females is one of the major risk factors for infant mortality, maternal mortality and preterm birth. It is becoming increasingly evident that the control of anaemia in pregnant women can be more easily achieved if a satisfactory iron status can be ensured in the adolescent females prior to marriage.¹⁰ The reasons for the high incidence of anaemia among adolescent girls include increased iron requirements because of growth, menstrual loss, discrepancy between high iron need for haemoglobin formation and low intake of iron containing foods, erratic eating habits, dislike for foods which are rich in iron, like green leafy vegetables, iron absorption inhibitors in food (phytates /tannins).¹¹

In our study among 240 children, 97.1% were consuming IFA tablets. 45.8% children were consuming IFA tablets regularly. 51.3% were consuming occasionally or rarely. Stomach pain (24.2%), nausea and vomiting (14.2%) and disliking of tablets (12.9%), bad taste, headache, were predominant causes for IFA tablet refusal. Fears of weight gain, sickness, leave days, non-availability of tablets were also reported as barrier for IFA conception. These findings were supported by a study conducted by Rajshree et al¹, where 66% of study population discontinued IFA tablets due to side effects which were mainly vomiting, gastric problem and giddiness. About 50% girls, who participated in the initial phase (2000-2005) of *Adolescent Girls Anaemia Control Programme*, reported some undesirable effects such as black stools, nausea, giddiness, heartburn and vomiting. The incidence of side effects declined as the programme matured. For example in Gujarat state, the reported side effects have come down from 30% during initial phase to 14% at programme end line. It was also supported by UNICEF intensified technical support to state governments for effective IEC strategy, monitoring and evaluation of *Adolescent Girls Anaemia Control Programme* during consolidation phase (2006-2010).⁹

In the present study, among 240 children, 28.8% were found to be pale (36.2% were boys and 63.8% were girls) during general examination; among boys 20.8% had pallor and 36.7% girls were found to have pallor. This difference was statistically significant (Chi-square value 7.34, p value <0.001). In comparison, NFHS-3² data showed that more than 55% of adolescent girls in India and boys were anaemic. Our study findings are comparable with a study conducted in Nepal by Singh et al,¹² which documented that 29.7% adolescent girl and 22.4% adolescent boys were anaemic. It also documented that irregular eating habits and lower consumption of animal source foods contributes to development of nutritional anemia. In both these studies girls were having higher incidence of anemia. Higher proportion of anaemia (78.75%) among adolescents was observed by another study conducted in Chennai by Premalatha et al.¹³ This study also concluded that though initiation of iron fortification has been initiated by Govt. of India, it should be in commonly reachable vehicles like salt, sugar and available for all, which doesn't demand individual co-operation.

Similarly, higher proportion of anaemia was also noticed by Sharatha et al in Pondicherry, where out of 300 college students, 228 (76%) were anaemic, 32.3% students gave history

of passing worms in stool. In our study, only 8.3% reported passage of worms in stools. This could be due to supplementation of IFA tablet and bi-annual deworming in schools through WIFS programme; whereas, this provision is not in institutions and they also added that in the same institution most of the students were staying in hostels and have a modified dietary pattern.¹⁴

Children who consumed IFA tablets, 63% (151) could perceive positive effects of IFA tablets, 16% communicated that no positive benefits were noticed, and 20.6% said that they couldn't assess. Similarly, study conducted in Ahmedabad by Rajshree et al¹ also observed that nearly 47% of the subjects were unaware of positive effects.

Reduced fatigue (43.7%), increased appetite (41.1%) and improved concentration (37.7%) were cited as major benefits of IFA tablets. Similar benefits were also obtained from a study conducted in Wardha district by Dongre et al.,¹⁵ they also documented that weekly IFA tablet consumption can significantly reduce prevalence of nutritional anemia (from 73.8% to 54.6%) among adolescent girls. In addition, improvement in awareness regarding iron-rich foods among mothers of children was also observed in the same study.

Relatively similar benefits were documented in *Adolescent Girls Anaemia Control Programme* also. About 80% of girls who were covered under this programme perceived various benefits and they reported that do not feel tired, can concentrate better on their studies, do not fall sick, not feeling sleepy, feeling healthier, having more energy, having regular menstrual cycle and reduced abdominal pain during menstruation. This programme became an important platform for intersectoral convergence among key government departments and UNICEF programmes to empower adolescent girls, reduce gender and social inequities, and break the inter-generational cycle of under nutrition and deprivation in India.⁹ So documented benefits under this programme, supports our study findings on perceived benefits by school children after IFA consumption.

During the FGD with school children, even though the IFA supplementation programme was going well, we observed that nutritional health education sessions were not conducted regularly (monthly interval - as it is stated in WIFS operational framework manual)¹⁶ to school children by nodal teachers. Children were unaware of benefits of IFA tablets and these issues were supposed to be insisted by teachers. Also nodal teachers could have consumed the IFA in front of students to get their confidence and reassurance (as per manual).

In this survey, we observed that 76.8% children were consuming IFA tablet after meals and 23.5% were consuming without meals also. Since approximately one-fourth children were consuming IFA in empty stomach, it is important to educate the students to consume the tablet after meals, so that majority of the gastric side effects can be avoided. On the other hand, after health education sessions, children were also insisting that nutritional health education session should be conducted by doctors or health staffs instead of non-health worker such as teachers. This can also be suggested to health department, because students had been strictly handled or warned instead of getting aware by teachers. Thus,

problems like students not showing interest in IFA tablets could be rectified easily.

Discussion with teachers revealed that, on the whole teachers were not comfortable with this programme because the programme is time consuming, pressured by government, overloaded with extra work like maintaining and issuing the IFA tablets, often thrown away tablets by students even after giving instructions, issues with the side effects of the tablets and mainly they raised the issue that they were not the health staff to do all these work. So keeping this in mind, as government is giving incentives for health worker (e.g. under family planning and institutional delivery programmes), incentives can also be given to the teachers especially nodal teachers for successful implementation of this programme.

CONCLUSION

Most of the school students consume IFA tablets under WIFS programme, although irregularly and inadequately. Barriers of IFA tablet consumption like side effects, lack of awareness among students and irregular supply of tablets should be considered. Iron fortification of foods and/or changing composition of iron preparation to avoid side effects may also be considered in future.

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