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RESEARCH ARTICLE

PROGRAM EFFECTIVENESS OF SCHOOL BASED WEEKLY IRON AND FOLIC ACID SUPPLEMENTATION IN URBAN SETTING – MUMBAI

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ABSTRACT

Program effectiveness of School Based Weekly Iron and Folic acid Supplementation (WIFS) in Urban setting – Mumbai

Introduction: Various studies have shown efficacy of WIFS in school children which involves the evaluation of an intervention under ideal, controlled conditions. However effectiveness trials help determine if interventions can reliably be used under real-world conditions.

Objective: To find the program effectiveness of school based WIFS in the urban setting in relation to the awareness of anaemia, perceived effects of the tablet, dietary practice, willingness to continue Weekly Iron and Folic Acid tablets and compliance to the tablet.

Method: The cross-sectional, observational study was conducted in the 2013-14 academic year for class X students. Ethical committee approval was taken prior to the study. Out of total 317 students, 214 students gave consent for WIFS. After one year of WIFS, all the students of class X were interviewed with pre-tested questionnaire.

Results: Awareness of anaemia was significantly high in those who consume WIFS as compared to those who did not consume WIFS. Perceived negative and positive effects were seen in 8.4% and 49.07% of the students respectively. Almost 70% of the students were willing to continue WIFS. Implementing supervised administration of Iron and Folic-Acid tablets during exam and vacation period was difficult. Due to this, mean compliance was 3 Iron and Folic Acid tablet / month.

Conclusion: School based WIFS program in the urban setting may require few modifications in the operational guidelines in the program for its effectiveness

INTRODUCTION

Iron deficiency anaemia occurs at all stages of the life cycle, but is more prevalent in pregnant women and young children (SEARO 2015). To combat anemia in adolescents in school going population, Government of India has decided to implement the Weekly Iron and Folic Acid Supplementation (WIFS) Programme. Various studies (Chakma *et al.,* 2013; Roschnik *et al.,* 2004; Vir *et al.,* 2008; Horjus *et al.,* 2005) have shown efficacy of weekly iron and folic acid supplementation in school children. However efficacy testing involves the evaluation of an intervention under ideal, controlled implementation conditions. Effectiveness trials help determine if interventions can reliably be used under real-world conditions and the extent to which effects observed under efficacy conditions are reproduced in natural settings. Some programs, despite being efficacious, may not be effective if they are difficult to implement or are not accepted by staff or students (Allensworth *et al.,* 1997). The present study was conducted to find the effectiveness of school based WIFS program in the urban setting. Previous research (Sabale *et al.,* 2013) done by us in the Government aided school located in the urban area of Mumbai showed that age was significantly associated and negatively co-related with mean haemoglobin values, with highest prevalence in age group of 15 to 19 years (Class X). It was thus decided to implement Weekly Iron and Folic Acid supplementation for one year period in the same school for students in the class X and study its program effectiveness in the school setting.

In our study, program effectiveness was studied in relation to the compliance of the students to weekly Iron-Folic Acid supplementation, awareness of anaemia, dietary practice to consume locally available iron rich staple food and willingness to continue Weekly Iron and Folic Acid tablets.

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MATERIALS AND METHODS

The cross-sectional, observational study was conducted in the 2013-14 academic year. School authorities, parents and students were sensitized regarding anaemia and its consequences. After ethical committee approval, consent form along with information sheet regarding anaemia was given to parents. Assent was also taken of all the students for consuming Weekly Iron and Folic acid tablets. Parents, teachers and students were given time to contact the research person in case of any queries. Out of total 317 students, 214 students gave consent for WIFS. All the students were again periodically sensitized regarding anaemia – its symptoms, causes, prevention and treatment. Nutrition Health Education sessions for anaemia were conducted by medical social worker along with medical and nursing interns with the use of flipcharts and posters. Awareness of importance of iron rich foods and locally available staple foods such as jaggery, ragi, green leafy vegetables, germinated pulses, egg and meat was also done in these sessions. To reinforce the messages, songs narrating prevention and symptoms of anaemia were sung and skits were enacted in the classrooms by nursing interns. After one year of supplementation, all the students of class X were interviewed for nutritional practices regarding eating of iron rich staple foods and awareness of anaemia. Those who consumed weekly Iron and Folic and acid tablets, were interviewed regarding any positive or negative side effects of the tablets, and their willingness to continue WIFS.

Statistical Methods

Data was analyzed using SPSS version 15 and expressed as percentages. Chi-square tests were applied to test the association at 95% level of significance.

RESULTS

Total strength of the class X was 317, out of which 214 students (67.5%) were enrolled for WIFS. Out of 214 students, 113 were females and 101 were males. Awareness of anaemia was significantly high in those who consume Iron and Folic Acid tablets as compared to those who did not consume tablets (Table 1). Nutritional practice of eating iron rich food – jaggery was significantly associated with awareness of preventive measures of anaemia (Table 2). Practice of eating other iron rich food such as green leafy vegetables, ragi, germinated pulses, egg, meat were not significantly associated with awareness about preventive measures of anaemia. When enquired about the perceived negative effects of the iron and folic acid tablets consumption, 18 students (8.4%) complained of the side effects (Table 3). However, 105 students (49.07%) mentioned about perceived positive effects of the Iron and Folic Acid tablets (Table 4). Almost 70% of the students (149 out of 214) were willing to continue Weekly Iron and Folic Acid Supplementation further.

Table 1. Association between awareness of anaemia and WIFS program

Awareness about anaemia		Students who did not consume WIFS		Students who consumed WIFS			Chi-Square Value	P value
		Frequency	%	Frequency	%	Total		
Knowing causes of anaemia	Correct response	5	12.80%	34	87.20%	39	7.85	0.005*
	Incorrect response	98	35.30%	180	64.70%	278		
Knowing preventive measure of anaemia	Correct response	4	11.40%	31	88.60%	35	7.96	0.005*
	Incorrect response	99	35.10%	183	64.90%	282		

* Significant

Table 2. Association between consumption of jaggery and awareness of anaemia

Habit of consuming jaggery	Awareness about preventive measures for anaemia				Total
	Incorrect answer or don't know		correct answer		
	Frequency	%	Frequency	%	
Do not consume jaggery	235	83.30%	21	60.00%	256
Consume jaggery	47	16.70%	14	40.00%	61
Total	282	100.00%	35	100.00%	317

Chi Square value = 10.91P value – 0.001 (significant)

Table 3. Perceived negative effects of the Iron and Folic Acid Tablets (n=214)

Perceived negative effects	Frequency	Percentage
Bitter taste, for next two days	1	0.47
Giddiness	2	0.93
Hard and black stools	1	0.47
Headache	5	2.34
Hypersomnia	8	3.74
Weakness	1	0.47

Table 4. Perceived positive effects of the Iron and Folic Acid Tablets (n=214)

Perceived Positive Effects	Frequency	Percentage
Improved concentration in school, and school performance	15	7.01
Feeling stronger and less tired	16	7.48
Increased appetite	12	5.61
Increased overall capacity to work	23	10.75
Better sleep	1	0.47
Increase in weight	4	1.87
Increase height	1	0.47
Had positive effects, but not answered the details of effects	33	15.42

After sensitizing the school authorities and parents regarding anaemia and its ill effects, both felt the need to start WIFS. While implementing WIFS in school, almost one class period (30 to 45 minutes) were spent in the activity of giving supervised iron and folic acid tablet every week. During vacation period, teachers were reluctant to give tablets to students worrying about the side effects and students misusing it. Also it was observed that, implementing supervised administration of Iron and Folic-Acid tablets during exam period was difficult as students were shuffled in the different class, and students were also reluctant to consume Iron and Folic acid tablet. Due to this, mean compliance was 3 Iron and Folic Acid tablet / month.

DISCUSSION

In WIFS program iron and folate tablets are given under supervision by the teachers (Training Material – National Health Mission 2014). Thus, in this program, effectiveness other than logistic supply depends mainly on the teachers' motivation. Another concern regarding compliance of the students is seen during vacation and examination period. In the present study weekly iron and folic supplementation could be not implemented in vacation and examination period. In WIFS, even missing one dose of iron-folate tablet means no supplementation for two weeks. This will hamper the effectiveness of weekly regimen. Unless ways are found to greatly improve "compliance" neither daily nor weekly iron supplementation is likely to be an effective approach to preventing and controlling iron deficiency anaemia in developing countries. (George H Beaton and George P McCabe, 1999). Thus, practical and feasible other strategy should be devised so that school children do not miss any tablets. Similar findings were found by Deshmukh *et al.* in their study (Deshmukh *et al.,* 2008). In their study effectiveness of the weekly supplementation of iron folic acid tablets was seen in rural and tribal areas, but not in urban slum areas.

In present study, only 67.5% gave consent for the iron supplementation and out of those who consumed iron supplementation, only 70% were willing to continue the same. These shows, for the program to be effective as well as sustainable, efforts have to be taken to sensitize and motivate the students regarding WIFS program. There should be a felt need for iron and folic acid supplementation amongst school children and community to sustain the program.

Awareness regarding anaemia was given to all students in their classrooms. However, awareness of anaemia in the group which consumed WIFS was significantly high as compared to those who did not consume WIFS. This was a positive finding. It shows that students who consumed Iron and Folic acid tablets were more aware about the anaemia with regards to prevention, causes and treatment of anaemia. But regarding the practice of eating iron rich foods, in-spite of raising awareness, there was no significant difference in dietary behaviour except increase consumption of jaggery. The present study being cross-sectional could not find the cause and effect of eating jaggery and awareness of anaemia. Kotecha *et al.* in their study also got unsatisfactory result with regards to educating the school children on dietary behaviour (Kotecha *et al.,* 2009). After one year of supplementation, students were interviewed about the positive and negative effects of the iron and folate tablets. None had any side effects to the weekly iron and folic acid supplementation. Only 8.4% had perceived negative effects to the tablets. Joshi *et al.* (2013) in their study got the prevalence of 8.3% for adverse drug reaction in weekly regime. Prevalence of perceived positive effects was 49.07% to iron and folate tablet supplementation. Bhatt *et al.* (2013) in their study got the prevalence of 41% and 9% for positive and negative benefits of iron supplementation respectively. In present study, only 7.01% mentioned about improvement in the concentration and school performance. Sen *et al.* (2009) in their study did not get significant improvement in the cognition after weekly iron supplementation.

The present study was conducted to study the effectiveness of the WIFS in the school setting. Observational studies have an important role in determining the effectiveness of drug interventions, especially with respect to long-term health outcomes and rare but severe adverse events (Gartlehner *et al.,* 2006). Thus, our observational study, throw some insight on the issues while implementing WIFS program. However, Operational research deals with wide ranging issues in public health-health system, disease prevention, and control along with community issues (Malhotra and Zodpey, 2010). Such type of research for WIFS program should be conducted especially in the urban setting, as factors influencing the effectiveness of program will be different in the urban setting as seen from present study. Factors that act as barriers and facilitators to the success of iron supplementation need to be evaluated in different settings, and innovative ways to minimize the former and maximize the latter must be explored (Lena Davidsson and Penelope Nestel, 2004). Limitation of our study is that we focussed only on class X, however WIFS program is implemented for class VI to Class XII (Government and Government aided school). Thus our findings cannot be generalized. Further large scale studies which include all the classes and different school should be conducted to evaluate the program effectiveness.

Conclusion

School based WIFS program in the urban setting may require few modifications in the operational guidelines in the program for its effectiveness. Further studies should be conducted to study effectiveness of the WIFS program

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