

ISSN : 2231-2374

RESEARCH HIGHLIGHTS



Journal of

Avinashilingam

Institute for Home Science and Higher Education for Women

University

(Estd. u/s 3 of UGC Act 1956)

Coimbatore - 641 043, Tamil Nadu, India

Vol. 22, No.2

*

Quarterly

*

April 2012

EFFECT OF SUPPLEMENTATION OF AN IRON RICH FOOD AMONG ADOLESCENT PREGNANT WOMEN IN MALAPPURAM DISTRICT OF KERALA

* THILAKAVATHY, S.
** PYARIJAHAN, V.T.

Introduction

Pregnancy occurring in adolescent women aged 19 years or still younger is called adolescent pregnancy (Kohler et al., 2008). Pregnant teens are prone to nutritional deficiencies from poor eating habits common in adolescence, including attempts to lose weight through dieting, skipping meals, food faddism, snacking and consumption of fast food. The focus of nutrition during adolescent pregnancy is targeted to micro and macro nutrient intake, appropriate weight gain, elimination of harmful social factors and addressing psychological, biological and system barriers to optimum nutrition.

Out of the micro and macro nutrients requirement in the adolescent stage, it is essential to improve the intake of micronutrient iron in the adolescent period before child bearing, especially in developing countries like India (Kurz and Galloway, 2006).

Dietary diversification and modification of diets to increase the iron content or improve iron bioavailability is the feasible and sustainable strategy at household level to alleviate anaemia

(Kowsalya and Shrimpray, 2008). Pooram powder is a traditional Kerala recipe consumed by pregnant women before and after delivery. In the present study, the pooram powder was given value addition to make it as an iron concentrate. The ingredients like rice flour, wheat flour, ragi flour, sesame seeds, rice flakes, jaggery and chekkurmanis leaves powder rich in micronutrients are used for preparing iron rich food.

By keeping all these points in mind the present study was conducted with the following objectives: To

- elicit the background information and dietary pattern of the selected adolescent pregnant women
- assess their nutritional status by anthropometric, clinical and biochemical methods and
- study the effect of supplementation of iron concentrate developed among the adolescent pregnant women.

Materials and methods

The area selected for the study was Malappuram District of Kerala, where majority of the population belonged to

* Asst. Professor in Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641 043.

** Postgraduate student

Muslim religion and early marriage is a common practice among them. Adolescent girls usually get married in the age group of 15-18 years in that area. Out of the married adolescent women 60 pregnant women were selected by purposive sampling method.

An interview schedule was formulated and data regarding the socio-economic status, food consumption pattern, nutrient intake, food beliefs, taboos, para of pregnancy, exercising pattern, special foods included and avoided, deficiency symptoms during pregnancy and medications taken during pregnancy were collected. Anthropometric measurements, clinical and biochemical assessment were also conducted.

Pooram powder is prepared using the ingredients like rice flour, sugar, cumin seeds, ghee and coconut. Variations of the standard pooram powder was prepared with dried drumstick leaves powder (*Moringa oleifera*), amaranthus powder (*Amaranthus polygonoides*) and chekkurmanis leaves (*Sauropus androgynus*).

The variation which obtained maximum score in the acceptability trials was selected for supplementation, the

developed pooram powder was supplemented for 90 days to 20 selected women (experimental group) after doing haemoglobin test and confirming anaemia. A control group of 20 who were not anaemic also were selected. Out of the experimental group (n=20), 10 women were supplemented with 100g of pooram powder along with one glass of lemon juice. The vitamin C content of the lemon juice with two lemon was 15 mg. Another 10 women were supplemented with only pooram powder. The biochemical parameter haemoglobin was estimated for both the control and experimental group by cyanmethaemoglobin method.

Results and discussion

Out of the selected adolescent pregnant women 57 per cent belonged to high income (ie) with an income of Rs.7500/- and above. All were educated either upto high secondary or upto graduation. Most of the girls continued their studies even though they were married and pregnant. Of the selected samples 38 per cent of the adolescent pregnant were married at the age of 13-15 years and 62 per cent were married at the age of 16-18 years.

Table 1 gives the age of first pregnancy para and trimester of present pregnancy pregnant women.

Table 1. Age of first pregnancy, para and trimester of present pregnancy

Age of first pregnancy			Trimester of pregnancy		
Age (in years)	Total number (N=60)	Per cent	Trimester	Total number (N=60)	Per cent
13-15	8	13	I	3	5
16-18	52	87	II	46	77
-	-	-	III	11	18

Of the selected women, 87 per cent were in the age between 16 and 18 years and only 13 per cent belonged to the much younger age group of 13 and 15 years during first pregnancy. Sixty eight per cent were expecting their first child, 28 per cent expected second and three per cent expected their third child.

Table 2 reveals the details regarding the exercise done by the pregnant women.

Table 2. Exercise pattern of the adolescent pregnant women

Type of exercise	Duration (in minutes)	Per cent (N = 60)
Walking	≤ 30	45
	> 30	2
Yoga	≤ 30	8
	> 30	-

From the table it is evident that 62 per cent of the adolescent pregnant women were doing exercise regularly to favour normal delivery. The remaining 38 per cent did not do any exercise. Walking was the main type of exercise done by 45 per cent of pregnant women for less than 30 minutes and yoga was practised by eight per cent of pregnant women.

Dietary habits of the adolescent pregnant women

Out of the 60 adolescent pregnant women, 95 per cent were non-vegetarians and only five per cent were ova-vegetarians. Table 3 presents the details about special foods included and avoided during pregnancy.

Table 3. Special foods included and avoided during pregnancy

Condition	Food	Reasons (N=60)	Per cent
Included	Rice flakes	Rich in fibre, iron and B complex vitamins	13
	Ragi	Rich in fibre, calcium and iron	27
	Green leafy vegetables	Avoids constipation	27
	Fruits	Rich in micronutrient	32
	Egg	Complete protein	7
	Milk	Rich in calcium	63
	Saffron	For fair complexion of the baby	22
Avoided	Papaya & pineapple	Abortive food	65
	Fenugreek seeds	Affect fertility capacity	10
	Meat and fish	Causes nausea	12
	Seasoning of foods	Causes aversion to food	7
	Sesame seeds	Produce heat in the body	3
	Sweets	Gestational diabetes	3
	No special foods	-	20

*Multiple responses

During pregnancy nearly one third of them (32%) had fruits which are rich in micronutrients such as vitamins, minerals and fibre. Rice flakes as special food with or without jaggery was included by 13 per cent of the adolescent pregnant women since, it is rich in B complex vitamins, fibre and iron and to avoid angular stomatitis. Among the selected subjects 27 per cent each had green leafy vegetables to avoid constipation and had ragi which is rich in calcium, fibre and iron. Milk leeing, rich in calcium and also helpful for the proper growth and maintenance of bones and teeth for both mother and foetus, was consumed by 63 per cent. Along with hot milk saffron was included by 22 per cent of pregnant women to increase the complexion of baby. Only seven per cent had egg as a special food because it is a complete protein food.

Sixty five per cent of the pregnant women were not having papaya and pineapple because they believed that both these fruits are abortive foods. About 12 per cent had no meat and fish, and seven per cent avoided seasoned foods because these foods cause nausea and vomiting during pregnancy. Ten per cent of the pregnant women avoided fenugreek seeds during their pregnancy because of the belief that it will affect the fertility capacity. Three per cent of the adolescent pregnant women who had gestational diabetes avoided sweets and the remaining 20 per cent included all the foods in their diet.

Table 4 projects the data on mean nutrient intake of the pregnant women.

Table 4. Mean nutrient intake of the adolescent pregnant women

Age (Years)	Details	Energy (kcal)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	β carotene (μ g)	Thiamine (mg)	Ascorbic acid (mg)
13-15 years	* Recommended Dietary Allowance (RDA)	2680	75	20.	1200	38	6400	1.2	50
	Actual Intake	2000	70	48.6	802.9	20.5	5300	0.9	92.6
	Per cent difference	-25.9	-6.5	+144	- 33.1	- 46.1	- 17.2	- 23.3	+85.2
16-18 years	Recommended Dietary Allowance (RDA)	2435	75.1	15	1200	38.0	6400	1.2	50
	Actual Intake	2012	68	45.2	850.9	22.4	5430	0.98	89.7
	Per cent difference	-17.4	-9.3	+201	-29.1	-41.1	-15.2	-18.3	+79.4

* ICMR 2009

In accordance with the food intake, the mean nutrient intake among 13-15 years adolescent pregnant women, energy, protein, calcium and iron intake was below RDA by 25.9, 6.5, 33.1 and 4.6 per cent respectively. β carotene and thiamine were below RDA by 17.2 and 23.3 per cent respectively. The intake of other nutrients like, fat and ascorbic acid only were over and above RDA by 14.4 per cent and 85.2 per cent respectively. Similar trend was observed in the case of mean nutrient intake by 16-18 year adolescent pregnant women, where the nutrients which were present in

excess amount were fat and ascorbic acid. The nutrients energy, protein, calcium, iron, β carotene and thiamine were below RDA by 17.4, 9.3, 29.1, 41, 15.2, and 18.3 per cent respectively.

In Kerala almost all the families use fish and green leafy vegetables daily. On the other hand they use a very low amount of pulses and milk. Only at the time of pregnancy, they include milk. Hence the protein intake was lesser than RDA.

Table 5 reveals the deficiency symptoms of adolescent pregnant women.

Table 5. Deficiency symptoms of adolescent pregnant women

Symptoms	Total Number (N=60)	Per cent
a) Healthy and free from deficiencies	37	62
b) Not free from deficiencies	23	38
Deficiency symptoms*		
1. Mild anaemia	2	9
2. Deficient subcutaneous fat	8	35
3. Bleeding gums	2	9
4. Dental caries	4	17
5. Angular stomatitis	3	13
6. Poor musculature	4	17
7. Oedema	4	17

* Multiple responses

Of the selected adolescent pregnant women 62 per cent were healthy and free from deficiencies and only 38 per cent were suffering from deficiency diseases. Out of the 38 per cent, 35 per cent had mild anaemia and 17 per cent each had dental caries, poor musculature, oedema and deficient fat, while 13 per cent of them suffering from angular stomatitis. From this data it is

evident that majority of the women suffered from micronutrient deficiency diseases and anaemia predominates among pregnant women.

Mean score of iron rich food

Table 6 presents data about the acceptability test done for the value added pooram powder.

Table 6. Mean scores for the iron rich food developed and standardized

(Max.Score: 5)

Product	Appearance	Colour	Texture	Taste	Aroma	Total
1. Variation-I	5	5	5	5	5	25
2.Variation-II	3	4	4.8	3.9	5	20.7
3.Variation-III	4	3.2	4.3	3.8	5	20.3

Out of the three products developed the variation I prepared out of rice flour, ragi flour, wheat flour, powdered rice flakes, sesame seeds, coconut, jaggery, ghee and chekkurmanis leaves powder got the maximum mean score of 25 with highest acceptability. In variation II and variation III drumstick leaves powder and amaranthus powder were added instead of

chekkurmanis leaves powder and the score obtained were 20.7 and 20.3 respectively. Thus the pooram powder prepared with chekkurmanis leaves which obtained the highest score of 25 was selected for supplementation.

Table 7 represents the analysed iron content of the value added pooram powder developed.

Table 7. Iron content of the value added pooram powder developed

Ingredients	Amount(g)	Iron(mg/100g)
Wheat flour	10	0.50
Rice flour	10	0.07
Ragi flour	5	0.2
Rice flakes	10	2
Gingelly seeds	5	0.47
Jaggery	20	0.53
Chekkurmanis	40	11.2
TOTAL	100	15

During the supplementation period each sample in the experimental group was supplemented with 100g of the pooram powder. The iron rich food developed contained 15 mg of iron per 100g of the product. This amount of iron meets more than one third of the total daily iron

requirement of the pregnant adolescent women.

Effect of supplementation of iron rich pooram powder on adolescent pregnant women

Table 8 represents the effect of supplementation of value added pooram powder on the blood haemoglobin level of adolescent pregnant women.

Table 8: Effect of supplementation of iron concentrate pooram powder on adolescent pregnant women

Study groups	Mean blood haemoglobin level Mean+S D (g/dl)		Difference (g/dl)	I Vs F	T value	
	Before supplementation	After supplementation			Between groups	
					Before supplementation	After supplementation
Experimental group (A) (n=20) Supplementation with pooram powder alone (n=10)	10.3±0.47	10.64±0.37	0.34	6.93**	1.17 ^{NS} A and B 3.98** A and C	1.13 ^{NS} A and B 2.46* A and C
Experimental group(B) Supplementation with pooram powder + lemon juice (n=10)	9.58±1.09	10.18±1.11	0.6	21.21**	1.17 ^{NS} B and A 5.38** B and C	1.13 ^{NS} B and A 3.26** B and C
Control group (C) No supplementation (n=20)	11.56±0.39	11.39±0.42	- 0.17	1.47 ^{NS}	3.98** C and A 5.38** C and B	2.46* C and A 3.26** C and B

* P(<0.05)

p(<0.01)

** NS: Not significant

The subjects selected for supplementation were taken according to their blood haemoglobin level before supplementation. The subjects with mild anaemia were supplemented with value added pooram powder alone, whereas subjects with moderate anaemia were supplemented with value added pooram powder and lime juice. It was observed that the mean haemoglobin level showed an increase of 0.34 and 0.6 g/dl in the groups receiving supplementation with pooram powder alone and pooram powder with lime juice respectively whereas in the control group there was a decrease of blood haemoglobin level by 0.17g/dl. Longer periods of supplementation could probably improve the haemoglobin status.

There was significant increase in the blood haemoglobin level after supplementation with pooram powder and

pooram powder with lime juice ($p < 0.01$). The difference between groups A and B before and after supplementation was not statistically significant whereas B and C, A and C showed difference before supplementation ($p < 0.01$) and after supplementation the groups A and C, B and C showed significant ($p < 0.01$) difference.

Conclusion

The findings of the study revealed the efficacy of supplementation of value added pooram powder on the haemoglobin level of adolescent pregnant women. The effect of supplementation of iron along with lime juice and without lime juice is comparable. Lime juice increased the iron absorption. The findings pave way to undertake various studies using chekkurmanis leaves, because it is an under exploited and underutilized green leafy vegetable but having a high iron content.

REFERENCES

1. Kohler, P.K., Manhart, L.E. and Laffety, W.E. (2008). Abstinence only and comprehensive sex education and the initiation of sexual activity and teen pregnancy, *Journal of Adolescent Health*, 42, 344-351.
2. Kurz, K.M., and Galloway, R. (2006), Improving adolescent iron status before child bearing, *Journal of Nutrition*. 130, 4375-95.
3. Kowsalya, S. and Shrimpray, C.A. (2008), Impact of supplementation of lotus stem (Nelumbium Nulumbo) on the iron intake of adolescent girls (13-18yrs) in Manipur *Indian Journal of Nutrition of Dietetics*, 45, s47.

Research Highlights

Vol. 22, No. 2, 2012

RESEARCH ARTICLES

1. Mysteries inside batteries for gadgets and electric cars
Meenakshisundaram, T.S.K. 96
 2. Effect of nutrition education on nutritional outcomes among school going girls
Anisa, M. Durrani 99
 3. Effect of supplementation of an iron rich food among adolescent pregnant women in Malappuram district of Kerala
Thilakavathy, S. and Pyarijahan, V.T. 104
 4. Educational intervention for school children on human rights
Baradha, G. and Swarnali Talukdar 112
 5. Modified average outgoing quality for single sampling plan
Sudamani Ramasamy 119
 6. Optical characterization of antimony trisulphide (Sb_2S_3) thin films by chemical bath deposition technique
Rachel Oommen and Shamna Rasheed 128
 7. A study on women labourers with special reference to the female health workers in Tuticorin district of Tamil Nadu
Nainar, B. 135
 8. A study on customer awareness and satisfaction of mobile service providers in Coimbatore city
Manonmani, M. and Karthikayani 141
 9. Upamanyu Chatterjee's English, august : an Indian story : an existential study
Chitra, S. 152
 10. Factors influencing the scholastic achievement of high school students residing at orphanages
Vasuki, N. 159
- RESEARCH ABSTRACT 165
- NEWS MAKERS 169
- SHORT COMMUNICATION 172
- BOOK REVIEWS 175