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Impact Of Feeding Shepu Greens Products On Iron Status Of School Children

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Abstract:
As a public health problem in school aged children, anaemia deserves greater attention not only because of its deleterious effects, which include lower school achievement due to impaired cognitive development, fatigue and poor attention span, and increased morbidity because of reduced resistance to infection, but also because of large numbers of school-aged children affected. So an attempt has been made to evaluate the impact of consumption of iron rich bakery products prepared by incorporation of Shepu greens (Peucedanum graveolens) on iron status of children. School children from Government school were estimated for haemoglobin and divided into control and experimental group. Products which were developed by incorporating 5 per cent dried shepu greens in masala bun and rusk were best accepted and taken for feeding trials along with basic recipe. Deworming was carried out before the feeding trials. Intervention programme was carried for 90 days and final hemoglobin estimation was carried out. Results revealed that the feeding with shepu greens incorporated products for 90 days to experimental were shown an improved haemoglobin level (11.8), whereas the control group did not change significantly after intervention. It is evident from the study that, foods play a major role in combating the nutritional deficiency disorders prevalent in the population. So, the green leafy vegetables especially shepu greens can be used for all intervention programmes as supplementation of iron in replace of iron tablets. To ensure the availability of greens, schools can be encouraged to grow nutrition garden, so that can be used in the midday meal preparation.

Key words: *Anaemia, shepu, school children, haemoglobin.*

1.Introduction

Iron deficiency is the most widespread micronutrient deficiency in the world today. Anaemia is a major problem among women and young children, but there is growing evidence that it is also a problem in school-aged children. Its importance as a public health problem in school aged children deserves greater attention not only because of its deleterious effects, which include lower school achievement due to impaired cognitive development, fatigue and poor attention span, and increased morbidity because of reduced resistance to infection, but also because of large numbers of school-aged children affected.

Prevalence is highest in Asia (58.4%) and Africa (49.8%) where around half of school-aged children suffer from anaemia. In India incidence of anaemia varies from 20-70 per cent and it is an important public health problem affecting people from all walks of life.

The average diet in most of the Asian countries is predominantly cereal based with rice, wheat and millet as major staple foods. These diets have poor bioavailability of iron and other micronutrients due to lower contribution of fruits and vegetables leading to the wide prevalence of iron deficiency anaemia. Green leafy vegetables may turn out to be a single strategy for increasing micronutrient intake of iron.

The Indian Council of Medical Research (ICMR) established the National Nutrition Monitoring Bureau (NNMB) in 1972 in the States of Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Orissa, West Bengal and Uttar Pradesh. It has been carrying out regularly annual surveys on diet and nutritional status of the populations for the past 30 years, the results of which are published in the form of technical reports.

Among the various species of edible leafy vegetables, shepu greens (Peucedanum graveolens) are the one of the conventional greens available throughout the year in India which are rich source of iron and other micronutrients. These green leafy vegetables are perishable soon compared to other vegetables. There was need to increase the shelf life of the greens through dehydration for further processing. So the products were developed from dry and fresh shepu greens at different level of incorporations for evaluating the

acceptability. So the study was undertaken to observe the impact of shepu greens incorporated products on iron status of school children.

2.Material And Methods

The study was conducted for school children studying in government school, residing in Gangenahalli, Bengaluru rural district. The haemoglobin level was estimated for 60 children and were screened into two groups, control and experimental. Each group comprises thirty children of different class of anaemia. The control group had more number of normal children, while experimental had a high number of milder anaemic children.

General information such as family background, age, class in which studying, type of family, educational level of parents, anthropometric measurements which included height, weight. Mid upper arm circumference, and skin fold thickness, dietary intake, clinical symptoms and health status were collected from school children. Iron status of school children was assessed by haemoglobin estimation.

Control and experimental group were selected for an intervention study. Before intervention deworming was carried out to enhance the absorption of iron through diet. The children were given with iron supplements through Government, was stopped one month prior to intervention programme for both groups. The intervention programme was carried out for a period of 90 days. For control group plain buns and rusk was fed and for experimental group children shepu greens incorporated bun and rusk were provided. After completion of feeding programme again blood was drawn from both groups for analysing the haemoglobin level with pre level.

3.Results And Discussion

After processing of Shepu greens, it was dried and analysed for proximate, calcium, phosphorous, iron and oxalate. The fresh Shepu greens were estimated for vitamin C and the values were presented in Table 1.

Nutrient/antinutrients	Content (per 100g)
Proximate principle	
Moisture	91.68 g
Protein	2.24 g
Fat	0.43g
Ash	1.17 g
Crude fibre	0.83 g
Carbohydrates▪	5.87 g
Energy▪	36.00 Kcal
Vitamin C	40.00mg
Minerals	
Iron	46.89 mg
Calcium	249.00 mg
Phosphorous	447.20mg
Anti-nutrient	
Oxalate	40.50 mg

Table 1: Estimated Nutrient And Anti-Nutrient Content Of Shepu Greens

▪ *Computed Values*

The products like masala bun, flaky biscuits, chilli biscuits and masala rusk were developed and standardized by incorporating fresh and dried shepu greens to enhance the iron content. The products selected for feeding trials i.e. masala bun and masala rusk were analysed for proximates and iron content as presented in Table 2.

Nutrients	Products	
	Masala bun	Masala rusk
Moisture(g)	32.85	3.30
Protein(g)	18.04	15.68
Fat (g)	9.34	12.93
Ash(g)	3.87	2.89
Crude fibre (g)	0.68	0.97
CHO▪ (g)	35.17	64.28
Energy▪(Kcal)	297.00	430.00
Iron (mg)	2.36	7.34

Table 2: Estimated Nutrient Content Of The Products Per 100g
▪Computed Values

All the products were accepted incorporated with dried shepu greens at different levels, but highest score found at 5 per cent level of incorporation. On the basis of overall
acceptability of the product, level of incorporation, convenience for preparation and transportation, Masala bun and masala rusk prepared from dried shepu greens were selected for intervention programme (Table 3).

Masala bun					
Treatment	Mean sensory scores				
	Appearance	Texture	Colour	Taste	Overall acceptability
Control	7.7	8.0	7.1	7.5	7.5
5% shepu	7.4	8.1	8.3	8.4	8.1
10% shepu	8.0	8.0	8.2	8.1	8.0
15% shepu	7.1	7.1	7.1	7.1	6.9
F – value	3.10*	4.00*	7.41*	9.71*	13.12*
SE m±	0.209	0.234	0.244	0.187	0.151
CD at 5% level	0.606	0.648	0.676	0.518	0.418
Masala rusk					
Control	8.1	8.3	8.3	8.3	8.3
5% shepu	8.1	8.2	8.1	8.0	8.3
10% shepu	7.9	7.8	8.1	8.1	8.1
15% shepu	7.8	7.9	7.9	8.0	8.1
F – value	0.25 NS	0.72 NS	0.29 NS	0.29 NS	0.20 NS
SE m±	0.299	0.279	0.301	0.263	0.258
CD at 5% level	-	-	-	-	-

Table 3: Sensory Scores Of Bakery Products
**Significant At 5 Percent Level, NS: Non Significant*

After screening the 60 children into control and experimental group i.e. 30 in each group, with and without shape greens incorporated products were fed to experimental group and a control group for 90 days. Table 4 exhibit the haemoglobin classification of children belonged to control and experimental group. There was a highly significant difference observed in haemoglobin level between the groups. This distribution of subjects was important to observe the impact of feeding on haemoglobin levels.

Classification	Hemoglobin▪ (g/dl)	Control		Experimental		$\chi 2$ value
		N	%	N	%	
Normal	≤11	20	66.6	10	33.3	*
Mild	9-11	10	33.3	16	53.3	
Moderate	7-9	0	0.0	4	13.3	
Total	-	30	100	30	100	

Table 4: Haemoglobin Classification Of The Subjects

Before the feeding trials mean haemoglobin level was higher in the control group (11.0) than the experimental group (9.8). The low mean haemoglobin level in the experimental group may be due to inadequate intake of iron rich foods. Haemoglobin estimated after feeding trials is presented in Table 5.

The feeding of shepu greens incorporated products for 90 days into experimental group showed improved haemoglobin level (11.8), whereas control group fed with non incorporated shepu green product, did not change significantly in haemoglobin level after intervention. There was a statistical significant difference observed in haemoglobin level of the experimental group. The increase in the mean haemoglobin level was due to high iron content of shepu greens.

Category	Control		Experimental	
	Pre	Post	Pre	Post
Mean	11.0	11.2	9.8	11.8
SD	2.210	2.185	2.531	2.956
Paired 't' test	1.80 NS		9.18*	

Table 5: Impact Of Intervention Programme For Haemoglobin Level Of The Subjects
**Significant At 5 Percent Level, NS: Non Significant*

4.Conclusion

Foods play a major role in combating the nutritional deficiency disorders prevalent in the population. Intervention through food is cost effective, easy to conduct, less monitoring is required than giving supplements, which some time is not accepted by the population. So, the green leafy vegetables especially shepu greens incorporated product had a highly significant influence on the haemoglobin level after feeding the same. Intervention through feeding programme is a much better option in regulating iron levels, than tablets, as it is more acceptable to the children and it works out to be cheaper than tablets. To ensure the availability of greens, schools can be encouraged to grow nutrition garden, so that can be used in the midday meal preparation.

5.References

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