Prevention of Under-nutrition in Women with Soya Multigrain and Iron Based Oral Nutritional Supplements: An Experimental Study

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Abstract - The aim of the present study was to assess the effect of soya multigrain and iron based oral nutritional supplements in management of undernutrition in women. This study was conducted on 100 malnourished women of Chhattisgarh. The age range of selected subjects was 18-30 years. The criterion for selection of malnourished women was based on BMI classification in which BMI of less than 18.5 was considered undernourished. The selected subjects were further divided into experimental and control group with equal number of subjects in each group. In this pre-post experimental design, supplementation of soya multigrain along with iron and folic acid was given to selected subjects for three months. The anthropometric measurements height and weight was assessed prior to commencement of study period. Weight was again measured after three months. The BMI was again calculated after the study period of three months. BMI classification revealed that under nutrition in women was reduced considerably after supplementation of three months of soya multigrain panjiri along with iron and folic acid tablet. The under nutrition in women subjects representing control was not altered so much after three months of study period. It was concluded that soya and iron based oral nutritional supplements can be used as therapeutic measure to control under-nutrition in women of reproductive age.

Keywords - Under-nutrition, women, Oral nutritional supplements, Soya, Iron

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INTRODUCTION

Undernutrition means inadequate intake of energy and nutrients so as to meet a person's requirement to maintain good health. In general terms undernutrition is considered as malnutrition but in broader sense malnutrition includes both under and over nutrition. Undernutrition is a condition in which a person can not absorb nutrient in required quantity or lack of consumption of nutrients required for energy and growth. Micronutrient deficiencies come under the umbrella of undernutrition and it occurs due to deficient intake of micronutrients namely iron, vitamin C, folate etc. In adults one of the most common measure to assess undernutrition is body mass index. Body mass index is a useful method to evaluate health status of person. An adult Person with BMI of 18.5 or lower is considered to be underweight and can be considered as under nourished.

Mothers often neglect their health. It is more so in low socio economic group because of lack of resources. This causes undernutrition. Several studies have documented the vulnerability of women towards malnutrition during reproductive age. [Tinker et al., 1995] Body Mass Index (BMI or the ratio of weight-for-height) of a sizeable proportion of women i.e. 23% and men 20% in the age group 15-49 is found to be falling below the norm.[NFHS – 4. 2015-16] In Chhattisgarh 26.7% women and 24.1 men were under nourished.(**NFHS-4.2015-16)** To address the issue of undernutrition various cost effective oral nutritional supplements are advocated. In this sense it would be worthwhile to assess the impact of soya and iron based oral nutritional supplements in management of undernutrition in women of reproductive age. Hence the present study was planned to assess the impact of soya and iron based oral nutritional supplements in management of undernutrition in women.

REVIEW OF LITERATURE

The efficacy of oral nutritional supplementation on malnourished women has been studied extensively. The notable studies were conducted by Sheila et al. (2008), Deshmukh et al. (2008), Yadav et al. (2011), Sanap, Yogita and Jadhav Kalpana (2014), Gurwara, N., and Barai, Reena., (2016), Ramya and Thomas (2016), Bairwa et al. (2017) respectively. Despite extensive research it is also noticeable that impact of soya and iron based oral nutrition supplement in management of undernutrition in women has not been conducted. Hence the present study was planned.

OBJECTIVES

The objective of this experimental study is to assess the efficacy of soya multigrain and iron based oral nutritional supplements in prevention of undernutrition in women.

MATERIALS AND METHODS

Sample :

The population for the present study comprise of women from Raipur city between 18 to 30 years of age. The criterion for selection of undernourished women was based on BMI classification in which BMI of less than 18.5 was considered under

nourished. The sample comprise of women belonging to low socio economic status. Purposive sampling was used for selection of subjects.

Tools :

Body Mass Index:

Height was determined by an anthropometer and the weight of the selected women was evaluated with the help of Agaro body weighing scale.

Body Mass Index was calculated with the help of following formula (Eknoyan, 2007).

$$BMI = \frac{Body\ Weight\ (kg)}{Height\ (m^2)}$$

The most commonly used definitions by WHO in 1997 and published in 2000 classify BMI into following categories:

Grading	BMI
Underweight	<18.5
Normal	18.5-25
Overweight	25-29.9
Obesity	>30

Design :

The two group pre-post test design was preferred to conduct the study.

METHOD AND PROCEDURE:

- First of all 100 under nourished women from Raipur city were selected as per the criterion laid down for the present study.
- Soya multigrain panjiri was prepared wheat flour 10gm; soya flour 20gm, black till 10gm, ragi 10gm, Jaggery 20gm and ghee 5gm. The proportion of wheat flour, soya flour was kept at the ratio of 1:2 It is standard practice to apply controlled heat to the soya flour which inactivates the antinutritional factors. Daily 75gm was provided to each subject conditioned to consume it on that particular day. Subjects of experimental group were also supplemented iron-folic acid tablets once a week.
- The supplementation period was of three months
- The data was collected twice as per the requirement of pre-post research design. The results are presented in table 1 and 2 respectively.

RESULT AND DISCUSSION:

The pre-post frequency distribution on the basis of WHO classification of Body Mass Index is shown table no. 1.

Table No. 1 Pre-Post Test Frequency Distribution of Selected Undernourished Women on the Basis of Body Mass Index

Groups↓	BMI	Pre Test (N=50)		Post Test (N=50)		% Decrease
		Frequency	%	Frequency	%	
Experimental Group	Under weight (<18.5 kg/m²)	50	100.0	34	68.0	32.0
	Normal (18.5-25.0 kg/m²)	-	-	16	32.0	
	Total	50	100.0	50	100.0	
Control Group	Under weight (<18.5 kg/m²)	50	100.0	48	96.0	4.0%
	Normal (18.5-25.0 kg/m²)	-	-	02	4.0	
	Total	50	100.0	50	100.0	

In experimental group, post test frequency distribution showing that 68% subjects were under-weight while 32% subjects had normal BMI. It shows that 32% subjects were not undernourished after three months of study period.

In control group, post test frequency distribution showing that 96% subjects were under-weight while 04% subjects had normal BMI. It shows that 96% subjects were undernourished after three months of study period.

The percentage decrease in under nourished women belonging to experimental group was found to be 32% while for control group the percentage decrease was 4%. It shows that 32% subjects belonging to experimental group were not under nourished after three months of soya and iron based oral nutritional supplementation as compared to control group in which only 4% subjects were normal weight after three months of supplementation period.

The oral nutritional supplement for the present study was soya based multigrain panjiri. The multigrain panjiri consists of ingredient such as soya flour, black till, ragi, jaggery and ghee. According to USDA National Nutrient Database for Standard Reference, Nutrition value.org. report published in 2018, soya has very high protein content and it is also very rich in fibres as well as calcium, magnesium and iron respectively. The soy protein has a high biological value and contains all the essential amino acids. According to American Journal of Clinical Research, wheat flour is rich in catalytic elements, minerals such as calcium, magnesium, potassium, sulphur, chlorine, arsenic, silicon, manganese, zinc, iodide, copper, vitamin B, and vitamin E respectively. Due to this reason it is the foundation of nourishments. Chemical composition of sesame includes 50-60% of oil, 18-25% of protein, 13.5% of carbohydrate and rest i.e. 5% ash. (Elleuch et al., 2007) It is good source of folate. Ragi is superior to rice and wheat in certain constituent of calcium. This finger millet protein has well balanced amino acid profile and is a good

source of methionine, cystine and glycine and contributes vitamins like thiamine, riboflavin, foline and niacin. Soya flour was chosen for incorporation as it is less expensive yet rich in calories, protein, fats, vitamins and minerals. Soya contains 45 percent of protein of high biological value. Jaggery contain all the vitamins. It is rich in important minerals Calcium, Magnesium, Potassium, Phosphorus, Sodium, Iron, Manganese, Zinc, Copper, vitamins and along with rich source of protein which can be made available to the masses to mitigate the problems of under nutrition (Sahu et al., 1998). It has been scientifically documented that iron is important especially for biological development of women. This is because of iron, iron gives body a support for maintaining nutritional health. Hence the results are not surprising.

CONCLUSION
On the basis of results it may be concluded that prevention of undernutrition in women can be achieved by soya multigrain and iron based oral nutritional supplementation along with other therapeutic measures.

RECOMMENDATIONS
On the basis of results it is recommended that soy and iron based oral nutritional supplementation in the form of soya multigrain panjiri along with iron-folic acid tablets should be included in plans and strategies for prevention of undernutrition in women.

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