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Nutri-Farms for Nutritional Security of Farm Women : A Study in Chamarajanagara District of Karnataka

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Abstract

The main focus of the study was to assess the impact of nutri-farms / nutrition gardening on nutritional status of farm women. Pre-tested schedule was used for data collection from farm women of Chamarajanagara district. The results revealed that 20 per cent of the respondents were underweight, 23 per cent were overweight and 17 per cent were obese. Forty per cent were falling in the normal BMI range of 18.5-22.9. After the nutri-farm intervention and awareness programme, the percentage in underweight and overweight marginally changed and there was an increase in the normal category (60.00%) of BMI. Waist to Hip Ratio (WHR) was also marginally changed after the intervention. Intervention studies have shown a positive impact on hemoglobin (57.00 %) and BMI status.

Keywords: Nutri-farm, nutritional security, anthropometry, haemoglobin and farm women

Malnutrition is a serious public health problem in developing countries. It retards child growth, increases the risk and duration of illness, reduces work output, and slows social and mental development. Malnutrition among women of reproductive age increases the risk of mortality during labour & delivery and puts their newborn children at risk of long-term deficiencies. Millions of people around the world suffer from 'hidden hunger' or micronutrient malnutrition. They do not get enough micronutrients like iron, calcium, vitamin A, folic acid and zinc required to lead healthy productive lives from the foods that they eat.

As per a Global Survey Report (2012) India ranked 112th place among the 141 countries with regard to Child Development Index (CDI) and 42 per cent of children in India are underweight and 58 per cent of children are suffering from stunted growth at the age of two years. More than 70 per cent of Indian women and children are facing serious nutritional deficiencies. Most commonly observed deficiencies related to imbalanced diet are Iron deficiency anaemia, lack of immunity due to zinc deficiency, calcium, iodine deficiency goitre, magnesium, selenium and vitamin A. Improving nutritional status, including micronutrient status, can lead to increased productivity, child survival and growth and reduced maternal morbidity as well as mortality (Anon, 2013 and Kawaljit, 2014).

Anemia continues to be a major public health problem worldwide, particularly among female of reproductive age in developing country. World Health Organization global estimates of anemia prevalence averaged 56 per cent, with a range of 35-75 per cent depending on geographic location (WHO, 2000). Prevalence of anemia in South Asia is among the highest in the world, mirroring overall high rates of malnutrition.

In India, recent nationally representative data from the National Family Health Survey 2011 (International Institute of Population Sciences and ORC Macro) on anemia of women of reproductive age describe the magnitude of the problem. More than one third of Indian women have a body mass index (BMI) <18.5 kg / m^2, reflecting chronic energy and micronutrient deficit. The prevalence of anemia among all women in the Indian sample is 52 per cent. While there are regional differences, prevalence rates across the states are remarkably similar, reflecting the underlying determinants that include diets low in heme-iron and high in phytates, high levels of malaria and other infectious diseases, and frequent reproductive cycling that decreases iron stores. Smaller-scale studies conducted in India of micronutrient deficiency

confirm the high prevalence of anemia among adolescent girls and women (Chakma *et al.*, 2007 and Rajaratnam *et al.,* 2007).

Three types of interventions are commonly employed to improve micronutrient status, *viz.,* capsule / tablet supplementation, fortification of commonly consumed foods, and diet diversification. Diet diversification is arguably the most sustainable and affordable strategy to improve nutrition for the majority of the population, particularly the poor. For poor households, vegetables and fruits are often the only source of micronutrients in the family diet. Nutri-farm of fruits and vegetables production provides the household with direct access to important nutrients that may not be readily available within their economic reach. Therefore, nutri-farms would be a good means to improve household food security. Equally important nutri-farm has been shown to be a source of additional income, by selling portion of the garden's produce. Studies suggest that this additional income is generally utilized to purchase supplementary food items, further, increasing the diversification of the family's diet, nutri-farm is especially important in enhancing seasonal availability of foods and promoting household self-sufficiency. As per National Nutritional Policy (NNP), nutri-farms are the one type of tool to combat malnutrition and provide access to fresh green leafy vegetables and other vegetables there by also improve the consumption.

Nutri-Farms are crops rich in protein, iron and carotene cultivated either through intervention of biofortified crops or crops which are already having good amount of protein (maize, soy and pulses) iron, zinc and carotene (millets, green leafy vegetable, amla and papaya etc.) grown on the main agricultural land of the farm families with protective irrigation (FAO 2011). Nutri-farms provide essential nutrients for good health of people especially women and children who are affected by malnutrition. Keeping the above in mind, present study was conducted with an objective to the impact of nutri-farms on nutritional status of farm women at Chamarajnagara district.

Material and Methods

The present study was carried out to understand and analyze the nutrition status of women involved in farm activities and to know the impact of nutri-farm on nutrition security. The population was from lower middle class family with agriculture being the major occupation. The study was conducted in Chamarajanagara district of Karnataka during the year 2014-15. Chamarajanagara district was purposively selected for the study, because it is one of the most backward districts of the Karnataka. Farm women aged between 20-40 years, engaged in household chores from agricultural families were selected by purposive random sampling. After the baseline data and nutritional status, assessment, 90 farm women were selected for intervention study based on their willingness and resources. The subjects were divided into three groups for intervention study (Fig. 1).

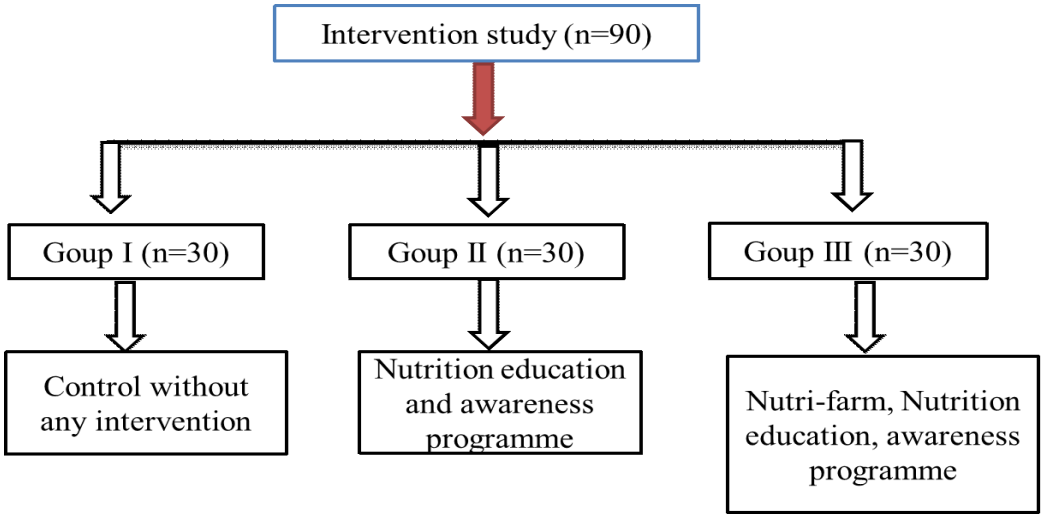

Fig. 1. Study sample

A detailed schedule was formulated to elicit the information on various aspects related to farm women. Information on somatic status using anthropometric measurements (height, weight, waist and hip circumference measurements) were taken using standard methods given by Jelliffe (1966). The derived anthropometrics measurements *viz.,* BMI using the cutoff levels suggested for Asian women (WHO, 2004) and WHR (Lean *et al.,* 1995) were calculated before and after intervention. Haemoglobin was estimated before and after intervention period for six months (WHO, 2001).

Nutri-farms are indigenous livelihood practices, scientific approach in provision and promotion of these livelihoods through awareness programmes aims to make these livelihoods sustainable. Nutri-farms are implemented without affecting the main crops. Crop intervention was based on the available resource. Saplings such as papaya, chakramuni, guava, drumstick, curry leaves, amla and lime and seeds *viz.,* cluster bean, bitter gourd, ridge gourd, ladies finger, field beans, radish, chilly, brinjal, tomato amaranths, palak and onion were distributed (Table I). Awareness was created to consume the produce.

TABLE I

Type and quantity of seed distributed to farm women

Saplings	Type of Seed	Quantity of Seed distribution (g/each)
Papaya	Cluster bean	150
Chakramuni	Bitter guard	50
Guava	Ridge guard	50
Drumstick	Ladies finger	50
Curry leaves	Filed beans	150
Amla	Radish	35
Lime	Chilly	20
	Brinjal	20
	Tomato	15
	Amaranths	50
	Palak	50
	Onion	100

RESULTS AND DISCUSSION

The mean anthropometric measurements of the respondents of before and after intervention are shown in Table II. In Group I, mean height and weight of the women was found to be 155.4 cm and 53.37, respectively. The average body mass index and WHR (Waist to Hip Ratio) was 22.24 and 0.88, respectively. In Group II, mean height of women was 152.83 cm and weight was 53.83 which slightly changed after nutrition education (53.97). Similarly, average body mass index was changed marginally from 23.14 to 23.72. Unlike BMI, no change was observed in the mean WHR (0.88). In Group III, similar trend was observed for height, weight, BMI (Before: 22.72, After: 22.33) and WHR before and after intervention. The weight was slightly changed in Group III after intervention (Before: 53.33, After: 54.91).

Anthropometric indices of the farm women is presented in Table III**.** As per the BMI classification, somatic status of group I revealed that 20 per cent of

TABLE II

Mean anthropometric measurements of the farm women

Categories	Group I (n=30)		Group II (n=30)		Group III (n=30)	
	Before Mean ± SD	After Mean ± SD	Before Mean ± SD	After Mean ± SD	Before Mean ± SD	After Mean ± SD
Height (cm)	155.4 ± 7.31	155.4 ± 7.31	152.83 ± 8.49	152.83 ± 8.49	153.33 ± 5.74	153.33 ± 5.74
Weight (kg)	53.37 ±9.7 3	53.49 ± 9.33	53.83 ± 9.63	53.97 ± 8.84	53.33 ± 8.66	54.91 ± 9.31
BMI	22.24 ±5.05	22.10 ± 4.97	23.14 ± 5.94	23.72 ± 4.24	22.72 ± 4.24	22.33 ± 3.12
WHR	0.88 ± 0.12	0. 88 ± 0.26	0.88 ± 0.64	0.88 ±0.12	0.88 ± 0.76	0.88 ± 0.12

TABLE III

Distribution of farm women according to anthropometric indices before and after intervention

Categories	Ranges	Group I (n=30)				Group II (n=30)				Group III (n=30)			
		Before		After		Before		After		Before		After	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
BMI	Underweight<18.5	06	20.00	06	20.00	06	20.00	05	17.00	06	20.00	02	7.00
	Normal(<18.5-22.9)	11	37.00	11	37.00	08	27.00	10	33.00	12	40.00	18	60.00
	Overweight(23-27.4)	08	27.00	08	27.00	09	30.00	08	27.00	07	23.00	06	20.00
	Obese>27.4	05	17.00	05	17.00	07	23.00	07	23.00	05	17.00	04	13.00
WHR	Normal	11	37.00	11	37.00	10	33.00	10	33.00	16	53.00	17	57.00
	Obesity	19	63.00	19	63.00	20	67.00	20	67.00	14	47.00	13	43.00

TABLE IV

Distribution of farm women according to haemoglobin levels before and after intervention

Categories	Ranges	Group I (n=30)				Group II (n=30)				Group III (n=30)			
		Before		After		Before		After		Before		After	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Deficient	<10	11	37.00	13	43.00	09	30.00	07	23.00	10	33.00	05	17.00
Low	10-11.99	10	33.00	09	30.00	11	37.00	10	33.00	09	30.00	08	27.00
Acceptable	>12	09	30.00	08	27.00	10	33.00	13	43.00	11	37.00	17	57.00

the respondents were underweight and 37 per cent were normal. According to WHR classification, 37 and 63 per cent of the subjects were found to be normal and obese, respectively. Further in Group II, 27 and 20 per cent of the subjects were normal and underweight, respectively. After providing education, the trend of being normal and underweight was changed slightly as depicted in Table III. (normal: 27 to 33 % and underweight: 20 to 17 %). In group III, 20 per cent of the respondent were underweight, 23 per cent overweight, 17 per cent were obese and 40 per cent were falling in the BMI range of 18.5-22.9. This trend changed after intervention. Percentage in underweight and overweight were marginally changed and there was an increase in the normal category from 40 to 60 per cent. Waist to Hip Ratio (WHR) was marginally changed after the intervention. It was observed that the 60 per cent of the subjects in the group III who received both awareness and nutri-farms were in the normal BMI levels which were higher compared to group I (37%) and group II (33%). Similarly, percentage of subjects in the underweight and overweight categories was marginally changed after the intervention. With regard to waist to hip ratio marginally decrease (47 to 43%) in the percentage of obesity was observed in the intervention group as compared to control group (63%).

Table IV depicts the haemoglobin status of the farm women before and after intervention. It was observed that in Group I, 37 and 33 per cent of the subjects were having deficient and low level of haemoglobin, respectively, whereas, only 30 per cent of the subjects were at acceptable level. In Group II, the percentages of the subjects in the acceptable level increased from 33 to 43 per cent after receiving education on nutrition and health. In Group III, the haemoglobin status of the farm women improved. As shown in the Table IV, the percentage of subjects in the acceptable levels increased from 37 to 57 per cent, after receiving the intervention along with education.

Consumption of rice and vegetables are very important for food and nutrition. Only cereals or vegetables cannot fulfill the requirements of balance food. Vegetables can improve the nutritional value of other food items. Improvement in the haemoglobin levels of the farm women was attributed to their increase in their knowledge level at the same time enabling them to use the resources (Nutri-farms) provided. Similar observations were observed by Pushpa *et al.* (2008), who reported that promoting nutrition garden in the space available in their backyard, the availability and consumption of green leafy vegetables and fruits was enhanced among selected families, haemoglobin levels also increased to the tune of 24.8 per cent among adult women and 46.1 per cent in adolescent girls.

TABLE V

Social and livelihood issues changes in different aspect of respondents (Group III)

Aspects of change	Extent of change	
	Before	After
Vegetable consumption	Partially	Greatly
Changes of land use pattern	Partially	Moderately
Opportunity of income generating activities	Partially	Moderately
Changes of food pattern	Partially	Greatly
Contact with extension workers (NGO)	Partially	Moderately
Changes of Nutrition knowledge	Partially	Greatly

Social and livelihood issues of respondents are very important factor. Nutri-farm vegetable production can play an important role in changing social and livelihood issues. As shown in Table V, overall change is observed in some selected social and livelihood issues. Regarding issue-wise changes, vegetable consumption, food pattern and nutrition knowledge has changed partially to greatly. Changes of land use pattern, opportunity for income generating activities and contact with extension workers (NGO) have changed from partially to moderately. Islam *et al.* (2004) also observed similar changes in social and livelihood issues.

Improved consumption of green leafy vegetables and fruits from nutri-farm is a low cost sustainable approach for reducing micronutrient malnutrition in developing countries. The need to bring about behavior change in sustainability of right food choices and

consumption of micronutrient rich foods should be fulfilled through nutri-farm in rural area. Malnutrition is highly prevailing in the selected rural communities. Food and crop based intervention are helpful in preventing micronutrient malnutrition especially iron deficiency anemia. Creation of awareness on low cost food based approaches to combat malnutrition had impact on farm women. Intervention studies have shown positive impact on hemoglobin and BMI status. But long term studies are needed to confirm these findings.

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