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RESEARCH ARTICLE

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Establishment of nutrition gardens for nutrition security

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ABSTRACT

The present study was taken up to study the influence of establishment of Nutrition gardens on nutrient security of the selected farm families . The findings of the study indicated that the establishment of Nutrition garden influenced the anthropometric measurement, degree of malnutrition and consumption of trace elements. In case of anthropometric measurement per cent, increment was observed in height, weight and per cent, standard weight for height among adult women, children from 1-12 years of age and adolescent girls of 13-18 years . The frequency of consumption of protective foods was increased markedly while there was small increase in consumption of staple foods. Slight increase in mean nutrient intake per consumption unit was also noted. Maximum increment in adequacy was noticed for iron(11.58%) followed by fat intake (7.39%) .

Key words : Nutrition garden, Nutrition security, Anthropometric measurement.

INTRODUCTION

Vegetables are an essential part of the diet throughout the world. Vegetables along with fruits are excellent sources of minerals and vitamins and enzymes. The minerals and vitamins are micronutrients required in small quantities. Though they are required in small quantities, these nutrients govern many functions of metabolism, reproduction, immune mechanism and intelligence. A large number of people worldwide , consume inadequate amount of vegetables and fruits which are rich sources of micronutrients. The deficiency of micronutrients leads to serious health complications . Increase in the production of vegetables can be basic approach to prevent micronutrient deficiencies (Vijaya raghvan, 1994). Establishment of nutrition gardens in the space available near house or in the field can promote the production of vegetables and fruits. In terms of achieving national food and nutrient security, horticultural production has to be increased to supply adequate quantities of nutrients . Nutrition garden can take care of multiple deficiencies. It helps to adopt dietary modification at house hold level. In long term modification of diet can prove the best strategy to eliminate micronutrient deficiencies. The extensive studies on food consumption pattern done by NNMB (1989) in 10 states of India indicate that only upper and middle income groups in urban areas consume the vegetables as per RDA .Where as intake of vegetables among lower income groups in urban and all income groups in rural areas are below the minimum recommended levels. In view of increasing the micro nutrient security of rural population and to overcome the prevailing micronutrient deficiency diseases, development of nutrition gardens is an easily adaptable technology. Hence, the nutrition gardens were established in village to assess the nutrition security among rural population.

MATERIALS AND METHODS

For establishment of nutrition gardens, 30 families were selected from a village Wangi of Parbhani district of Maharashtra who were having the facility of irrigation and space for the garden behind the house or near the house in their fields. The selected families were trained by giving talk and demonstration for preparation of land of the nutrition gardens. The crops to be taken in the garden mainly depended on the size of the garden and the choice of the family. Season wise monthly calendar for cultivation

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of vegetables in rotation was prepared. Approximately 33x33 meter land was acquired for establishment of nutrition garden. The seeds of tomato, brinjal, ladies finger, cluster bean, ridge gourd, spinach, coriander and chilli were given to the selected families. The impact of establishment of nutrition gardens on the nutritional status of family members was assessed. The anthropometric measurements *i.e.* height and weight of the children of 112 years, adolescent girls of 13-18 years and adult women including pregnant and lactating women were measured before and after establishment of nutrition gardens. The anthropometric measurements of children were compared with NCHS standards and the body mass index of adult women (BMI) was calculated. Food consumption pattern and mean nutrient intake per adult consumption unit (ACU) was also calculated before and after establishment of nutrition gardens. The per cent adequacy of the nutrients per adult consumption unit (ACU) was compared with RDA suggested by ICMR (1986). The total money earned by families was also calculated. The lectures were given to the beneficiary families regarding the important role of vegetables and fruits in maintenance of good health. Easily prepared recipes were demonstrated by using vegetables grown in the nutrition gardens.

RESULTS AND DISCUSSION

The information regarding the anthropometric measurement and Body Mass Index of all women in the selected families before and after establishment (pre and post) of nutrition garden is presented in Table 1. Before establishment of nutrition garden mean height and weight of adult women was 153 cm and 46.2 kg, respectively. However in case of weight slight improvement was observed with statistically non-significant difference and no increment in the height was noted after establishment of nutrition garden. Further, it is inferred from the table that the BMI of adult women was 19.87 before establishment of nutrition garden and it was increased up to 20.25. However, in case of lactating women, the increment in weight and BMI was noticed from 39.0 kg to 40.6, and 17.0 to 18.0 ,whereas no change was noticed in height after establishment of nutrition gardens.

Table 2 depict the data regarding classification of women on the basis of BMI. Adult women were categoriesed into three groups. *i.e.*< 18.5, 18.5-25.0, >25. Out of surveyed families, among adult women before establishment of nutrition gardens 27.58 per cent women were under the category of < 18.5 BMI and 72.41 per cent were in the range of BMI 18.5 to 25.0 which increased after establishment of nutrition gardens up to 20.68 per cent and 79.31 per cent, respectively. Percentage of undernourished women was decreased by 7 per cent. However, in case of lactating women before establishment of nutrition gardens 100 per cent women were under the category of < 18.5 BMI but after establishment of nutrition gardens it decreased to 75 per cent and 25 per cent were found in the category of normal BMI *i.e.* 18.5 to 25.None of the surveyed women was found to be obese before and after establishment of nutrition garden. This increment might be due to consumption of more amount of staple foods along with different vegetables grown in their nutrition gardens. Further, it was notice that the income level of beneficiaries was also improved which might had helped them to improve their purchasing power and ultimately to have an access to more food.

Data on anthropometric measurements of children

Table 1 : Anthropometric measures and BMI of women

	Weight		Height		BMI	
	Before mean ± S.D.	After mean± S.D.	Before mean ± S.D.	After mean± S.D.	Before mean ± S.D.	After mean± S.D.
Adult women (n=30)	46.2± 4.57	47.2 ± 4.63	1.53.1 ±3.61	153.0± 3.61	19.87 ±2.01	20.25 ±2.05
t value	(t=0.84)		(t=0.810)		(t=0.74)	
Lactating women (4)	39.0 ±1.4	40.6 ±1.38	152.3 ± 3.86	152.3 ±3.86	-	-
t value	(t= 1.64)		(t= 0)		-	

Table 2 : Classification of women by BMI

Classification	Adult women		Lactating women	
	Before	After	Before	After
< 18.5	8	6	4	3
	(27.58)	(20.68)	(100.0)	(75.0)
18.5	21	23	-	1
	(72.41)	(79.31)		(25.0)
> 25	-	-	-	-

Table 3 : Anthropometric measures of children and adolescent girls

Children age group	Weight		Height		% of standard weight/ height	
	Before	After	Before	After	Before	After
1-3 years	12.0±1.9	12.8±1.6	90.2±10.6	90.2 ±10.6	87.81 ±10.37	92.5 ±7.4
(N=5)	t=(0.72)		t: Nil		t=(0.82)	
4-6 yrs.	15.0±2	16.0±2.2	108.0±8.6	110.0±8.9	80.0±9.0	84.0±10.0
(N=12)	t=(1.17)		t=(0.56)		t=(1.03)	
7-9 yrs.	20.0±2	20.0±2.2	120±8.2	122.0±8.1	80.0±11	82.0±9.2
(N=14)	t=(0)		t=(0.65)		t=(0.52)	
10-12 yrs.	23.0±2	25.0±2.0	134.0±6.3	136.0±6.2	68.0±5	71.0±5.5
(N=17)	t=(2.98**)		t=(0.93)		t=(1.66)	
Adolescent girls						
13-15 yrs.	29.0±2.65	30.8±2.84	143.0±11.1	147.0±10.1	62.3±4.68	66.2±3.6
(N=3)	t=(0.80)		t=(0.48)		t=(1.14)	
16-18 yrs.	35.0±2.3	37.0±2.6	150.0±7.0	152.0±6.2	67.5±1.65	69.3±2.32
(N=4)	t=(1.15)		t=(0.42)		t=(1.26)	

Table 4 : Classification of children and adolescent girls based on Gomez classification

Age Group	Normal		Marginal		Moderate		Several	
	Before	After	Before	After	Before	After	Before	After
Children								
1-3 yrs	1 (200)	2 (50.0)	4 (80.0)	2 (50.0)				
4-6 yrs	2 (22.22)	3 (23.07)	7 (99.99)	7 (53.86)				
7-9 yrs	-	1 (11.11)	9 (100.0)	8 (88.8)				
10-12yrs	-	0	2 (11.76)	3 (17.64)	11 (64.7)	12 (70.58)	4 (23.52)	2 (11.79)
Adolescent girls								
13.15 yrs	-	-	-	-	1 (33.33)	3 (100)	2 (66.66)	-
16-18 yrs	-	-	-	-	3 (75.0)	2 (50.0)	1 (23.0)	2 (50.0)

from the beneficiary families before and after establishment (pre and post) of nutrition garden are shown in Table 3. Height, weight and per cent of standard weight for height were also calculated. The results indicated that there was increment in height and weight as well as per cent of standard weight for height of all the surveyed children after establishment of nutrition gardens. The children from the category of 1-3 years of age were found to be normal before and after establishment of nutrition gardens. However, slight increment in height was noticed. When considered the anthropometric measurements of children of 4-6 years of age group, it was noticed that there was improvement in height and weight as well as per cent of standard weight for height but statistically non significant difference was noted. Further incase of children of 7-9 years of age group, no difference was observed in weight after establishment of nutrition garden, whereas non-significant difference was noted for height and per cent of standard weight for height. It was noted that the children belonging to age group of 10-12 years showed significant improvement in weight where as slight improvement in height and per cent of standard weight for height after establishment of nutrition garden. In surveyed families among adolescent girls it was found that none of teh adolescent girls showed more than 69.3 per cent of standard weight for height during pre and post evaluation, whereas slight increment in weight was noticed.

Table 4 reveals the information regarding classification of children and adolescent girls based on Gomez classification. Only three normal children were noticed during pre evaluation, which were doubled during post evaluation. Number of severely malnourished children was reduced from seven to four after establishment of nutrition garden. Further, it was noticed that there was increase in number of children by depicting moderate malnutrition after post evaluation.

Mean nutrient intake of selected families per adult consumption unit per day before and after establishment

Table 5 : Mean nutrient intake of the family

Nutrients	Before	After	"t" value
Protein	47.67±7.98	49.39±7.73	0.85
Fat	22.14±6.02	23.62±5.79	0.98
Carbohydrate	262.45±50.41	277.0±42.50	1.209
Energy	1477.66±262.99	1518.0±244.4	0.615
Calcium	369.29±106.13	377.28±101.33	0.29
Iron	19.92±3.22	22.5±3.02	3.31**

Table 6 : Per cent adequacy of nutrient composition of families (per ACU/day) compared to RDA

Nutrients	Before	After	"t" Value
Protein	79.46±13.31	82.26±13.39	0.81
Fat	110.71±30.26	118.10±29.99	0.95
Carbohydrate	43.79±8.23	45.32±7.38	0.76
Energy	51.39±9.14	52.80±8.49	0.62
Calcium	92.32±26.51	94.32±26.22	0.28
Iron	69.04±8.83	80.62±11.15	4.47**

of nutrition garden is presented in Table 5. Pre and post mean protein intake was found to be 47.67 and 49.39 g which indicated increment but statistically non-significant difference was noted, where as slight improvement was noted in fat content (22.14 to 23.62g/day). The mean intake of carbohydrate, energy and calcium was found to be increased after post evaluation but significant difference was not noticed. However, after post evaluation statistically significant difference was noted in case of mean intake of iron (19.92 to 22.50 mg /ACU/day).

Per cent adequacy of the nutrient intake of the family per consumption unit per day compared with RDA is presented in Table 6. It was noticed that the intake of fat was more than RDA. Where as, intake of all the remaining nutrients was less than RDAs before and after establishment of nutrition gardens. The maximum increase in per cent adequacy of iron intake was noticed (11.58) followed by fat (7.39 per cent).

Conclusion:

The findings of the study indicated that the establishment of Nutrition garden influenced the anthropometric measurement , degree of malnutrition and consumption of trace elements per cent increment was observed in height, weight and per cent standard weight for height among adult women , children from 1-12 years of age , adolescent girls of 13-18 years . The frequency of consumption of protective foods was increased markedly while there was small increase in consumption of staple foods. Slight increase in mean nutrient intake per consumption unit was also noted. Maximum increment in adequacy was noticed for iron(11.58%) followed by fat intake (7.39%) .

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