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# EFFECT OF NUTRITION INTERVENTION ON FOOD CONSUMPTION AND HAEMOGLOBIN LEVEL OF RURAL PREGNANT WOMEN

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## ABSTRACT

Effect of nutrition intervention on food consumption frequencies and haemoglobin level of rural pregnant women was determined. Total 90 pregnant women from three villages of Parbhani Tahashil, Maharashtra, India, were divided into experimental (n=60) and control group (n=30). Nutrition intervention was given for four months (weekly 1 session of 2 hrs) by means of lectures, chart, and leaflet, folder, demonstrations and nutrition game. Data regarding food consumption frequencies of subjects before and after nutrition intervention was collected by using pretested survey schedule by personal interview method. After nutrition intervention significant increase was observed in the food consumption frequencies of cereals, pulses, nuts, green leafy vegetables and fruits in the experimental group when compared to the control group subjects. Blood haemoglobin content of experimental group subjects was significantly higher (10.26 g/dl) at the end of intervention than the control group (9.21 g/dl). Study clearly demonstrates the beneficial role of nutrition intervention in improving the food consumption frequencies of rural pregnant women and there by improvement in the haemoglobin content.

**KEYWORDS:** Anaemia, Food Frequency, Nutrition Intervention, Pregnant Women

## INTRODUCTION

Pregnancy is the most critical and unique period in a woman's life. It is a period of considerable physiological and nutritional stress, during which the maternal requirements of almost all the nutrients are greatly increased in order to meet the needs of the growing foetus and of maternal tissues associated with pregnancy. Nutritional adequacy is of prime importance in pregnancy; deficiency of one or more nutrients in pregnancy may lead to several complications.

Nutritional anaemia is the condition that results from the inability of the erythropoietic tissue to maintain a normal haemoglobin concentration on account of inadequate supply of one or more nutrients leading to reduction in the total circulating haemoglobin. Anaemia is the late manifestation of deficiency of nutrients needed for haemoglobin synthesis. Inadequate supply of nutrients viz. iron, folic acid, vitamin $B_{12}$, proteins, vitamin A, vitamin C, niacin and pantothenic acid are involved in the maintenance of blood haemoglobin level. Among different types, iron deficiency anaemia continues to pose significant challenge to public health all over world. It is the commonest nutrition disorder in the world, particularly affecting the women in reproductive age group (Vijayraghavan, 2007). About one third of the global population (over 2 billion) is anaemic (WHO, 2004). Prevalence of anaemia in South Asian countries is highest in the world. WHO

estimates that even among the South Asian countries, India has the highest prevalence of anaemia (Ezzati *et al.*, 2002). In the developing world alone, 370 million women suffer from anaemia, with the prevalence being higher in pregnant women (51%) than in the non-pregnant women (41%). The prevalence among pregnant women in Southeast Asia varies from 13 percent in Thailand to the highest prevalence of 88 percent in India (Vijayraghavan, 2007). Inadequate intake of nutrients is one of the important cause of anaemia. Hence the attempt was made to analyse the food consumption frequencies and haemoglobin level of rural pregnant women.

## METHODOLOGY

The present study was carried out in the three villages of Parbhani Tahsil, Maharashtra, India. A total sample of 90 rural pregnant women with the gestational age of three to fifth month was randomly selected. The willingness of subjects to participate in the study was asked. A written consent was obtained and accordingly they were divided into experimental (n=60) and control group (n=30). The data was collected by using pretested survey schedule and educational material like chart, leaflet, folder, nutrition game was developed. Recipe book (with special emphasis on iron content) and scripts of lectures were also written and kept ready. Nutrition intervention was given for a period of four months (weekly 1 session of 2 hrs) by means of lectures, demonstrations and nutrition game. Data regarding food consumption frequencies of subjects before and after nutrition intervention was collected by using pretested survey schedule by personal interview method. Haemoglobin content was estimated by Cyanamethaemoglobin method before and after nutrition intervention.

## STATISTICAL ANALYSIS

Data obtained regarding food consumption frequencies and haemoglobin content of respondents before and after intervention was expressed in percentage. ‘z’ test was used to determine statistical difference in the selected variables (Gupta, 1992).

## RESULTS AND DISCUSSIONS

### Impact of Nutrition Intervention on Consumption Frequencies of Cereals, Pulses, Whole Pulses, Sprouts, Snacks and Tea

Data on consumption frequencies of cereals, pulses, whole pulses, sprouts, snacks and tea of rural pregnant women before and after nutrition intervention showed that cereals were consumed daily two to three times before and after nutrition intervention Table 1. There were 73.33 per cent experimental group subjects who consumed cereals three times a day before nutrition intervention which significantly increased to 100 per cent after undergoing nutrition intervention programme. Percent of subjects consuming pulses daily increased from 41.67 to 63.33 with nutrition intervention. Consumption frequencies of whole pulses were very less in both the groups at pre nutrition intervention. After intervention to experimental group a significant increase in consumption frequencies of whole pulses was observed in those who were consuming weekly twice. Consumption frequencies of sprouts was once a week, once a month and twice a month by 30, 41.67 and 28.33 percent subjects from experimental group and 26.67, 46.67 and 26.67 percent by control group respondents respectively. After intervention programme intake of sprouts by experimental group subjects was significantly increased. It could be due to gain in knowledge of experimental group that sprouts are good sources of vitamin C and they help in enhancing the absorption of iron which is beneficial for prevention and reduction of anaemia. Whereas, there was

no significant increase in consumption frequencies of sprouts by control group. After intervention, once a month and twice a month frequency of intake of snacks by experimental group subjects were reduced but it was shifted in daily and weekly twice frequency. Whereas, there was no such change in intake frequencies of snacks by control group. Before giving nutrition intervention there was similar trend in drinking tea by both the groups. A significant reduction in drinking of tea by experimental group drank subjects was observed and none of the pregnant woman from experimental group drank tea twice a day after imparting nutrition intervention. Sreegiri *et al.* (2010) also reported that more than 50 percent of antenatal mothers had daily calorie, protein and iron intake less than the RDA and prevalence of anaemia (Hb < 11 gm %) 66.5 per cent.

**Impact of Nutrition Intervention on Consumption Frequencies of Fermented Foods, Fleshy Foods, Milk & Milk Products and Nuts & Oil Seeds**

Table 2 gives the information about consumption frequencies of fermented foods, fleshy foods, milk & milk products and nuts & oil seeds by pregnant women. After nutrition intervention significant increase in percentage of respondents from experimental group was observed for weekly once, weekly twice and monthly twice frequencies of fermented foods. Whereas, there was no change in percentage of control group subjects for consumption frequencies of fermented foods. After implementation of nutrition education there was a non significant increase in percentage of respondents consuming fleshy foods from experimental group indicating the rigid mind set towards food habits of studied sample. Probably it is due to cultural aspects. Consumption frequencies of milk and milk products by pregnant women in both groups were almost similar before nutrition intervention. After exposure to nutrition intervention percentage of respondents of experimental group who consumed milk and milk products once a day, twice a week and thrice a week increased significantly while monthly once and monthly twice frequencies decreased significantly. There was no such significant increase in control group respondents. Experimental group respondents consuming gingelly seeds weekly once, weekly three times and monthly once time were 26.67, 21.67 and 25 percent respectively. A significant increase in percentage of respondents from experimental group was observed for daily once and weekly twice frequency consumption of gingelly seeds. However, there was no change in intake of control group respondents with regard to gingelly seeds and groundnut. At the beginning of nutrition intervention there was somewhat similar trend in percentage of respondents from both the groups for consumption frequencies of niger seeds. After nutrition intervention a significant increase in the subjects from experimental group was observed who included niger seeds in their diet daily and three times a week. Therefore significant reduction in once a week, twice a week and once a month frequencies was noticed. Consumption of linseed was very less in both the groups before nutrition education. A significant increase in the percentage of respondents from experimental group was observed who included linseed in their diet weekly once, weekly twice and twice a month.

**Impact of Nutrition Intervention on Consumption Frequencies of Green Leafy Vegetables**

Consumption frequencies of *Ambadi*, *Ambat chuka* at pre nutrition education were almost same in experimental as well as in control group (Table 3). After implementation of nutrition intervention a significant increase in weekly frequency of intake of *Ambadi* was observed in experimental group. This could be due to awareness created through nutrition intervention regarding importance of greens in diet. In experimental group consumption frequencies of *Ambat chuka* were weekly once by 48.33 percent, monthly once by 23.33 per cent and monthly two times by 28.33 per cent subjects at the beginning of nutrition intervention. On the other hand weekly once, monthly once and twice a month

frequencies of *Ambat chuka* by control group subjects were 46.67, 20 and 33.33 per cent respectively. After nutrition intervention a significant increase in percentage of respondents who took *Ambat chuka* weekly once was noticed. Such improvement was not seen in the control group. The percentage of rural pregnant woman from experimental group who included *Bengal gram leaves* in their diet weekly once was significantly increased with corresponding reduction in monthly frequency percentage as an effect of nutrition intervention. While, there was no change in control group. There were 66.67 and 30 per cent subjects from experimental group who consumed *shepu* weekly once and monthly twice and 3.33 percent subjects never took *shepu* in their diet. In control group there were 60 and 40 percent subjects who included *shepu* in their diet weekly once and twice a month. After intervention percentage of experimental group respondents who consumed *shepu* weekly once was significantly increased to 91.67 per cent. In control group also there was no significant increase in percentage of subjects who took *shepu* in diet weekly once. It could be due to seasonal availability. At the beginning of intervention none of the subject took *mustard leaves* and *radish leaves* in the diet because they were unaware about nutritional importance of these leaves. After undergoing nutrition intervention respondents from experimental group who consumed *mustard leaves* once a week were 11.67 per cent, monthly once were 21.67 percent and monthly twice were 28.33 percent. Furthermore, 16.66, 48.33 and 6.67 per cent respondents from experimental group started eating *radish leaves* weekly once, monthly once and twice a month respectively. Whereas none of the respondent from control group consume *mustard leaves* and *radish leaves*. Before nutrition intervention program majority of the respondents from experimental group (68.33) and control group (73.33) never took *amaranth* in their diet as they did not know that *amaranth* is a good source of iron which is very important nutrient for them for prevention of anaemia. A significant increase in the percentage of rural pregnant women from experimental group was observed who started consuming *amaranth leaves.* Before nutrition intervention the percentage of respondents consuming *colocasia leaves* once a month was 91.67 and 100 in experimental and control group respectively. After nutrition intervention a significant increase in the percentage of respondents who ate *colocasia leaves* weekly once and monthly twice was observed.

**Impact of Nutrition Intervention on Consumption Frequencies of Fruits**

Data regarding consumption frequencies of fruits is presented in Table 4. Before nutrition intervention there were 71.67 and 28.33 percent subjects from experimental group who consumed orange once a month and twice a month respectively. From control group percentage of rural pregnant women who took orange monthly once were 70 and twice a month were 30. After nutrition intervention 20, 8.33, 15 and 56 percent respondents ate orange once a week, twice a week, once a month and twice a month respectively. However, there was increase of 6.67 percent respondents from control group for monthly twice frequency of orange. The reason for this increase in control group subjects may be easy availability of orange due to season. Pomegranate consumption of experimental group increased significantly as an effect of intervention for once a week, twice a week and twice a month frequencies. While, there was no change in the percentage of control group subject for pomegranate intake. A similar trend was observed in both the groups at pre nutrition intervention for sapota consumption frequencies. Subjects under study from experimental group showed significant increment in their sapota intake for weekly twice, weekly three times and monthly once frequencies. Before implementation of nutrition sweet lime intake frequencies were once a week by 6.67 percent, twice a week by 10 percent, once a month by 53.33 percent and twice a month by 30 percent respondents from experimental group. The intake of sweet lime was once a week, twice a week, once a month and twice a month was observed by 6.67, 16.67, 56.67 and 20 percent respondents belong to

control group. After exposure to nutrition education the sweet lime intake frequencies by respondents increased significantly. There were 21.67, 23.33, 33.33 and 21.67 percent respondents from experimental group who consumed sweet lime weekly once, twice a week, once a month and twice a month respectively. However there was no change in control group regarding intake of sweet lime. Information regarding consumption frequencies of guava showed that there were 28.33, 20, 21.67 and 30 percent subjects of experimental group who consumed guava once a week, twice a week, three times a week and once a month respectively. There was somewhat similar trend in intake frequencies of guava and amla in both the groups at pre nutrition intervention. After imparting nutrition education a significant increase in three times a week consumption frequency of guava by experimental group subjects was observed. There was no change in intake frequencies of guava by control group women. Significant increase was also observed in weekly once, twice a week and three times a week frequencies of amla by experimental group subjects. This may be the impact of nutrition intervention as the subjects were taught that amla is a richest source of vitamin C. In experimental group subjects frequencies of lemon intake were once a week by 16.67 percent, twice a week by 13.33 percent, once a month by 50 percent and twice a month by 20 percent subjects. There were 30, 53.33 and 16.67 percent subjects of control group who took lemon in their diet once a week, once a month and twice a month respectively. After undergoing nutrition intervention a significant increase in consumption frequencies percentage of rural pregnant women were observed who took lemon in their diet once a week and three times a week. Whereas there was no change in control group subjects regarding lemon consumption. At the beginning of the study it was noticed that there were 53.33, 30 and 16.67 percent subjects from experimental group for weekly once, twice a week and three times a week intake frequencies of tomato. After disseminating nutrition education a significant increase in daily once and twice a day frequencies was observed. Whereas there was no change in consumption frequencies of tomato by control group subjects. There was significant increment in consumption frequencies of zizyphus by experimental group subjects after intervention. Consumption of fruits was less as compared to vegetables and all other foods. Similar findings were reported by Mallikharjun *et al*. (2010).

The mean blood haemoglobin content of experimental group pregnant women was 9.18 ± 1.63 g/dl and it was 9.19 ± 1.04 g/dl for control group respondents before nutrition intervention (Table 5). After nutrition intervention for four months there was significant increase in the haemoglobin content of experimental group pregnant women (10.26 ± 1.45 g/dl). The mean haemoglobin content of control group subjects was almost same (9.21 ± 1.02 g/dl) after intervention. This may be because the control group subjects were not given nutrition counselling and food consumption pattern was not improved. Similar finding was observed by Aashima and Kashap (2006).

## CONCLUSIONS

Present study clearly demonstrates the positive impact of nutrition intervention on food related behaviour of rural pregnant women. Furthermore intervention resulted in significant increase in the haemoglobin level of rural pregnant women which will have beneficial effect on maternal as well as foetal health and outcome of pregnancy.

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**Table 1: Impact of Nutrition Intervention on Consumption Frequencies of Cereals, Pulses, Whole Pulses, Sprouts, Snacks and Tea**

| Foods | | Frequencies | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Daily once | | Daily twice | | Daily 3 times | | Weekly once | | Weekly twice | | Weekly 3 times | | Monthly once | | Monthly twice | |
| | | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) |
| **Cereals** | BI | - | - | 26.67 | 30 | 73.33 | 70 | - | - | - | - | - | - | - | - | - | - |
| | AI | - | - | 0 | 30 | 100 | 70 | - | - | - | - | - | - | - | - | - | - |
| Z value | | - | - | 7.89** | NS | 1.67 NS | NS | - | - | - | - | - | - | - | - | - | - |
| **Pulses** | BI | 41.67 | 46.67 | 11.67 | 13.33 | | - | 21.67 | 26.6 | 25 | 13.33 | 0 | - | - | - | - | - |
| | AI | 63.33 | 46.67 | 16.67 | 13.33 | - | - | 0 | 26.67 | 0 | 13.33 | 20 | - | - | - | - | - |
| Z value | | 2.23* | NS | 1.97* | NS | - | - | 7.93** | NS | 7.90** | NS | 7.94** | - | - | - | - | - |
| **Whole pulses** | BI | - | - | - | - | - | - | 30 | 33.33 | NS | - | - | - | 70 | 66.67 | 0 | - |
| | AI | - | - | - | - | - | - | 26.67 | 36.67 | 11.67 | - | - | - | 23.33 | 63.33 | 38.33 | - |
| Z value | | - | - | - | - | - | - | 0.65 NS | 0.37 NS | 8.09** | - | - | - | 4.94** | 0.19 NS | 7.84** | - |
| **Sprouts** | BI | - | - | - | - | - | - | 30 | 26.67 | NS | - | - | - | 41.67 | 46.67 | 28.33 | 26.67 |
| | AI | - | - | - | - | - | - | 66.67 | 30 | 15 | - | - | - | 18.33 | 40 | 0 | 30 |
| Z value | | - | - | - | - | - | - | 3.92** | 0.46 NS | 8.01** | - | - | - | 4.03** | 0.60 NS | 7.88** | 0.46 NS |
| **Upma & Poha** | BI | 0 | - | - | - | - | - | 9.17 | 13.33 | 8.33 | 10 | - | - | 46.67 | 56.67 | 26.67 | 20 |
| | AI | 9.17 | - | | - | - | - | 8.33 | 13.33 | 53.33 | 10 | - | - | 0 | 56.67 | 20 | 20 |
| Z value | | 8.20** | - | - | - | - | - | 0.55 NS | NS | 6.52** | 0 NS | - | - | 7.82** | NS | 1.58 NS | NS |
| **Tea** | BI | 23.33 | 26.67 | 76.67 | 73.33 | - | - | - | - | NS | - | - | - | - | - | - | - |
| | AI | 66.67 | 26.67 | 0 | 73.33 | - | - | - | - | 33.33 | - | - | - | - | - | - | - |
| Z value | | 4.79** | 0 NS | 7.79** | NS | - | - | - | - | 13.24 | - | - | - | - | - | - | - |

*** Significant at 5% level, * * Significant at 1% level, E- Experimental group, C- Control group, NS-Non Significant BI- Before intervention, AI- After intervention**

**Table 2: Impact of Nutrition Intervention on Consumption Frequencies of Fermented Foods, Fleshy Foods, Milk & Milk Products and Nuts and Oil Seeds**

| Foods Groups | | Frequencies | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Daily once | | Daily twice | | Daily 3 times | | Weekly once | | Weekly twice | | Weekly 3 times | | Monthly once | | Never | |
| | | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) |
| **Fermented foods** | BI | - | - | - | - | 0 | - | 0 | - | - | - | 28.33 | 23.33 | 0 | 6.67 | 71.67 | 70 |
| | AI | - | - | - | - | 58.33 | - | 8.53 | - | - | - | 15 | 23.33 | 38.33 | - | 0 | 70 |
| Z value | | - | - | - | - | 7.80** | - | 8.24** | - | - | - | 3.29** | NS | 7.85** | - | 7.80** | NS |
| **Fleshy foods** | BI | - | - | - | - | 5 | 6.66 | - | - | - | - | 15 | - | 11.67 | - | 68.33 | 70 |
| | AI | - | - | - | - | 8.33 | 6.66 | - | - | - | - | 15 | - | 11.67 | - | 6 1.37 | 70 |
| Z value | | - | - | - | - | 2.86** | NS | - | - | - | - | NS | - | NS | - | 0.56 Ns | NS |
| **Milk & milk products** | BI | 21.67 | 23.33 | - | - | - | - | 0 | - | 0 | - | 41.67 | 46.67 | 36.67 | 36.67 | - | - |
| | AI | 33.33 | 26.67 | - | - | - | - | 11.67 | - | 55 | - | 0 | 43.33 | 0 | 30 | - | - |
| Z value | | 2.31* | 0.52 Ns | | - | - | - | 8.11** | - | 7.81** | - | 7.84** | 2.29* | 7.85** | NS | - | - |
| | AI | 51.67 | 16.67 | - | - | 0 | 33.33 | 23.33 | 23.33 | 13.33 | 26.67 | 11.67 | - | - | - | - | - |
| Z value | | 3.36** | NS | - | - | 7.89** | NS | 7.91** | NS | 2.61* | NS | 3.83** | - | - | - | - | - |
| **Groundnut** | BI | 48.33 | 50 | 8.33 | 10 | - | - | 21.67 | 23.33 | 21.67 | 8.33 | - | - | - | - | - | - |
| | AI | 63.33 | 50 | 13.33 | 10 | - | - | 15 | 23.33 | 8.33 | 8.33 | - | - | - | - | - | - |
| **Z value** | | 1.47 Ns | NS | 2.58* | NS | - | - | 2.01* | NS | 4.58** | NS | - | - | - | | - | - |
| **Niger seeds** | BI | 18.33 | 16.67 | - | - | 28.33 | 26.67 | 21.67 | 20 | 0 | - | 31.67 | 31.67 | 36.67 | - | - | - |
| | AI | 56.67 | 10 | - | - | 0 | 33.33 | 0 | 20 | 43.33 | - | 0 | 0 | 36.67 | - | - | - |
| Z value | | 5.03** | 1.94 Ns | - | - | 7.88** | 0.86 Ns | 7.93** | NS | 7.83** | - | 7.87** | 7.87** | NS | - | - | - |
| **Linseed** | BI | - | - | - | - | 0 | - | 0 | - | - | - | 80 | 76.67 | 76.67 | 20 | - | - |
| | AI | - | - | - | - | 41.67 | - | 38.33 | - | - | - | 0 | 76.67 | 76.67 | 20 | - | - |
| Z value | | - | - | - | - | 7.83** | - | 7.85** | - | - | - | 7.79** | NS | NS | NS | - | - |

*** Significant at 5% level, * * Significant at 1% level, E- Experimental group, C- Control group, NS-Non Significant, BI- Before intervention, AI- After intervention**

**Table 3: Impact of Nutrition Intervention on Consumption Frequencies of Green Leafy Vegetables**

| Vegetables | | Frequencies | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Weekly once | | Weekly twice | | Weekly 3 times | | Monthly once | | Monthly twice | | Never | |
| | | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) |
| Ambadi | BI | 33.33 | 30 | - | - | - | - | 35 | 33.33 | 31.67 | 36.67 | - | - |
| | AI | 51.67 | 30 | - | - | - | - | 28.33 | 40 | 20 | 30 | - | - |
| Z value | | 2.33* | NS | - | - | - | - | 1.56 Ns | 0.71 Ns | 2.45* | 0.78 Ns | - | - |
| Ambatcchuka | BI | 48.33 | 46.67 | - | - | - | - | 23.33 | 20 | 28.33 | 33.33 | - | - |
| | AI | 75 | 46.67 | - | - | - | - | 0 | 20 | 25 | 33.33 | - | - |
| Z value | | 2.33* | NS | -- | - | - | - | 7.91** | NS | 0.69 Ns | NS | - | - |
| Bengal gram | BI | 33.33 | 26.67 | - | -- | - | - | - | - | 66.67 | 73.33 | - | - |
| | AI | 53.33 | 26.67 | - | - | - | - | - | - | 46.67 | 73.33 | - | - |
| Z value | | 2.49* | NS | - | - | - | - | - | - | 1.91 Ns | NS | - | - |
| Shepu | BI | 66.67 | 60 | - | - | - | - | - | - | 30 | 40 | 3.33 | - |
| | AI | 91.67 | 66.67 | - | - | - | - | - | - | 8.33 | 33.33 | 0 | - |
| Z value | | 2.32 ** | 0.41 Ns | - | - | - | - | - | - | 5.50** | 0.71 Ns | 9.69** | - |
| Mustard leaves | BI | 0 | - | - | - | - | - | 0 | - | 0 | - | 100 | 100 |
| | AI | 11.67 | - | - | - | - | - | 21.67 | - | 28.3 | - | 38.33 | 100 |
| Z value | | 8.11** | - | - | - | - | - | 7.93** | - | 7.88** | - | 5.85** | NS |
| Amaranth | BI | 0 | - | - | - | - | - | 31.67 | 26.67 | 0 | - | 68.33 | 73.33 |
| | AI | 18.33 | - | - | - | - | - | 21.67 | 26.67 | 43.33 | - | 16.67 | 73.33 |
| Z value | | 7.96** | - | - | - | - | - | 2.05* | NS | 7.83** | - | 5.73** | NS |
| Raddish leaves | BI | 0 | - | - | - | - | - | 0 | - | 0 | - | 100 | 100 |
| | AI | 16.65 | - | - | - | - | - | 48.33 | - | 6.67 | - | 28.33 | 100 |
| Z value | | 7.99** | - | - | - | - | - | 7.82** | - | 8.40** | - | 5.37** | NS |
| Colocassia | BI | 0 | - | - | - | - | - | 91.67 | 100 | 8.33 | - | - | - |
| | AI | 11.67 | - | - | - | - | - | 57.67 | 100 | 36.67 | - | - | - |
| Z value | | 8.11** | - | - | - | - | - | 2.44* | NS | 5.93** | - | - | - |

*** Significant at 5% level, * * Significant at 1% level, E- Experimental group, C- Control group, NS - Non Significant, BI- Before intervention, AI- After intervention**

**Table 4: Impact of Nutrition Intervention on Consumption Frequencies of Fruits**

| Fruits | | Frequencies | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Daily once | | Daily twice | | Weekly once | | Weekly twice | | Weekly 3 times | | Monthly once | | Monthly twice | |
| | | E (n=60 | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) | E (n=60) | C (n=30) |
| Orange | BI | - | - | - | - | 0 | - | 0 | - | - | - | 71.67 | 70 | 28.33 | 30 |
| | AI | - | - | - | - | 20 | - | 8.33 | - | - | - | 15 | 63.33 | 56.67 | 36.67 |
| Z value | | - | - | - | - | 7.94** | - | 8.28** | - | - | - | 6.04** | 1.17 Ns | 3.50** | 2.76** |
| Pomegranate | BI | - | - | - | - | 20 | 16.67 | 16.67 | 20 | - | - | 50 | 46.67 | 13.33 | 16.67 |
| | AI | - | - | - | - | 28.33 | 16.67 | 26.67 | 20 | - | - | 23.33 | 43.33 | 21.67 | 20 |
| Z value | | - | - | - | - | 1.89 Ns | NS | 2.41* | NS | - | - | 3.79** | 2.29* | 0.61 Ns | 1.56 Ns |
| Sapota | BI | - | - | - | - | 21.67 | 23.33 | 13.33 | 16.67 | 0 | - | 45 | 46.67 | 20 | 13.33 |
| | AI | - | - | - | - | 28.33 | 23.33 | 35 | 20 | 11.67 | - | 11.67 | 46.67 | 25 | 10 |
| Z value | | - | - | - | - | 1.47 Ns | NS | 4.56** | 0.60 Ns | 8.11** | - | 5.62** | NS | 1.23 Ns | 5.77** |
| Sweet lime | BI | - | - | - | - | 6.67 | 6.67 | 10 | 16.67 | - | - | 53.33 | 56.67 | 30 | 20 |
| | AI | - | - | - | - | 21.67 | 6.67 | 23.33 | 16.67 | - | - | 33.33 | 53.33 | 21.67 | 23.33 |
| Z value | | - | - | - | - | 5.27** | NS | 4.17** | NS | - | - | 2.49* | 2.11* | 1.17 Ns | 0.60 Ns |
| Guava | BI | - | - | - | - | 28.33 | 30 | 20 | 26.67 | 21.67 | 23.33 | - | - | 30 | 20 |
| | AI | - | - | - | - | 36.67 | 30 | 26.67 | 26.67 | 36.67 | 33.33 | - | - | 0 | 10 |
| Z value | | - | - | - | - | 1.41 Ns | NS | 1.58 Ns | NS | 2.77** | 2.61* | - | - | 7.87** | 2.94** |
| Amla | BI | - | - | - | - | 11.66 | 13.33 | 0 | - | 0 | - | 66.67 | 63.33 | 21.67 | 23.33 |
| | AI | - | - | - | - | 26.67 | 13.33 | 33.33 | - | 40 | - | 0 | 63.33 | 0 | 23.33 |
| Z value | | - | - | - | - | 2.51* | NS | 4.39** | - | 7.84** | - | 7.82** | NS | 7.94** | NS |
| Lemon | BI | - | - | - | - | 16.67 | 30 | 13.33 | - | 0 | - | 50 | 53.33 | 20 | 16.67 |
| | AI | - | - | - | - | 35 | 30 | 25 | - | 40 | - | 0 | 53.33 | 0 | 16.67 |
| Z value | | - | - | - | - | 2.25* | NS | 1.01 Ns | - | 7.84** | - | 7.93** | NS | 7.83** | NS |
| Tomato | BI | 0 | - | 0 | - | 53.33 | 50 | 30 | 33.33 | 16.67 | 16.67 | - | - | - | - |
| | AI | 26.67 | - | 18.33 | - | 0 | 50 | 0 | 33.33 | 55 | 16.67 | - | - | - | - |
| Z value | | 7.89** | - | 2.45* | - | 7.86** | NS | NS | NS | 7.81** | NS | - | - | - | - |
| Zizyphus | BI | 20 | 23.33 | - | - | 33.33 | 33.33 | 0 | - | 0 | - | - | - | 46.67 | 43.33 |
| | AI | 33.33 | 16.67 | - | - | 0 | 33.33 | 23.33 | - | 43.33 | - | - | - | 0 | 43.33 |
| Z value | 2.70** | 5.65** | - | - | NS | NS | 5.50** | - | 2.29* | - | - | - | NS | NS | - |

*** Significant at 5% level, * * Significant at 1% level, E- Experimental group, C- Control group, NS - Non Significant, BI – Before intervention, AI – After intervention**

**Table 5: Blood Haemoglobin Content of Rural Pregnant Women**

| Parameter | Experimental (n=60) | | 't' value | Control (n=30) | | 't' value |
|---|---|---|---|---|---|---|
| | BI | AI | | BI | AI | |
| **Haemoglobin (g/dl)** | 9.18±1.63 | 10.26±1.45 | 3.86** | 9.19±1.04 | 9.21±1.02 | 0.08 Ns |

**NS- Non Significant ** Significant at 1% level, BI- Before intervention, AI- After intervention**