RESEARCH ARTICLE

ASSESSMENT OF HEMATOLOGICAL STATUS OF SELECTED WOMEN

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ARTICLEINFO	ABSTRACT
	A study was conducted on assessment of hematological status of selected women of Nanded district of Marathawada region of Maharashtra state. A study was combination of anthropometry, food and nutrient intake, hemoglobin status and intervention program .Total 300 households were selected to record anthropometric measurements and food and nutrient intake. Diet survey was carried out by 24-hour recall method. Intervention study was carried out for a period of 90 days on selected 75 household women who were suffering with anemia i.e based on the HB content of women. Subjects belonging to experimental group received developed product, experimental control group neither received tablet nor product and normal control group received tablet. After the feeding trail was over the blood sample was collected with the help of trained personnel. The collected blood was immediately analyzed for HB, RBC, MCV, MCH and MCHC content. The result showed that the mean height and weight ranged between 148.2 to 150.80 cm and 43.55 to 49.57 kg. Whereas women belonging to almost all group recorded normal BMI i. e. 19.02 to 21.10. The mean food intake of i.e. cereals, pulses, green leafy vegetables, root and tubers, other vegetables, fruits, milk and milk products, fats and oil and sugar and jaggary was ranged between 277.58±25.80 to 290.64±63.00, 38.29±9.97 to 41.22±9.12, 20.15±13.2 to 30.85±13.27, 21.47±8.09 to 22.52±9.33, 39.38±15.13 to 40.86±14.04, 2.46±8.48 to 11.16±14.64, 57.5±14.87 to 68.87±17.82, 17.26±2.74 to 20.33±1.21 and 20.00±00 to 20.45±1.43 respectively. Fruits intake was very low than the other food groups. Whereas mean intake of different nutrients were energy (1975.23±222.18 to 2053.11±164.27), protein (44.99±4.89 to 46.84±6.70), fat (24.26±8.87 to 35.30±11.65), β-carotene (1422.85±637.59 to 1553.13±931.03), ascorbic acid (36.97±6.02 to 39.10±6.93), calcium (390.79±83.07 to 441.22±61.93) and iron (19.78±2.06 to 21.34±61.96) respectively. More than 50 percent (54.66%) rural women showed mild grade of anemia i.e having Hb level (10-12gm/dl) and 33.33percent rural women showed moderate grade of anemia having Hb level (7-10gm/dl). However urban women showed mild grade of anemia (30.66%). The experimental women exhibited 2.95 percent increment for hemoglobin. Mean values of RBC and MCV were improved by 0.44 percent and 4.00 percent. The highest increment was noted with respect to MCH content (23.67 percent) followed by MCVC (14.89 percent).

INTRODUCTION

Women invariably perform the duties of both employees and the housewives. This dual role entails heavy mental and physical effort which often leads to complete exhaustion of women due to over work. Good health is a requirement throughout life and vital to women in terms of their daily activities. To overcome these problems daily diet of the women should be nutritious. Nutritional status of an individual is assessed by anthropometry, which includes height, weight and other body measurements. The information on height throws light on the past nutritional status, that indicates how well-nourished they have been from the beginning. Body weight gives an indication of the current nutritional status to identify the individual as overweight, underweight or retarded growth (Bellurkar, 2015). But health is a crucial area where no due attention has been paid for women. Nutritional surveys indicate large gaps in nutritional requirements and consumption among females as compared to males. A majority of rural and tribal women suffer from anaemia which leads to low birth weight among babies (Jhamtani, 1995). Anemia is a widespread public health problem associated with an increased risk of morbidity and mortality, especially in reproductive age group women, pregnant women and children. National family health survey (NFHS-3) reveals that prevalence of anemia to be 70-80 percent in children, 70 percent in pregnant women and 24 percent in adult men (NFHS, 2005). A diet poor in iron can cause iron deficiency leading to anemia. This is the most common and major cause of anemia because of the lower calories requirements of women, the iron intake is likely to be not more than 10-12mg/day, even though the other aspects of the diet may be fully adequate for women whose menstrual losses are high. Besides medication iron can be supplied by diet also. Vegetables especially green leafy vegetables are important source of protective foods, which are highly

beneficial for good health and prevention of various diseases. Green leafy vegetables are rich in carotenoids as well as iron, calcium, ascorbic acid, riboflavin, folic acid and appreciable amount of other minerals (Kowshaly and Vidya, 2004). The minimum daily requirement of vegetables is about 284gm per head 10-20 percent of the total food requirement of an adult, it is more in case of vegetables (Gautam, 1997). Dehydration of vegetable is one of the most popular oldest methods of prevention. As minerals content are not lost during dehydration, thus the iron in the dehydrated green leafy vegetables is also present in concentrated amount along with other minerals. Dehydrated vegetables can be utilized to enrich the various conventional food products, which can be supplemented to the poor and marginalized women.Keeping this in view, this study was undertaken to explore micronutrient rich green leafy vegetables in the development of iron rich product and find its impact Assessment of Hematological Status of Selected Women

MATERIALS AND METHODS

A sample of 300 households from urban and rural area of Nanded city was selected randomly for the present study. To elicit the information regarding anthropometric measurements i.e. height (cm.), weight (kg.), arm circumference (cm) and waist circumference (cm) was recorded. Diet survey was carried out for all selected 300 households. The 24-hour recall method was used to assess the food and nutrient intake of the selected subjects. The intake of the food in cooked form was converted into raw food ingredients and the nutrient value of the raw foods was determined intake of the subject per day following the nutritive value of Indian foods. The mean nutrient intake of subjects was compared with Recommended Dietary Allowances of ICMR (2000). To judge the extent of prevalence of anemia among the household women, the blood sample was taken from rural and urban area of Nanded city, by giving finger prick. HB content from the collected blood sample was determined by heamocytometer (Crossby *et al.,* *1954*). Intervention study was carried out for a period of 90 days on selected 75 women household women who were suffering with anemia, the group were consisted of normal control, experimental control and experimental group. Based on the HB content household women were arranged in descending order. All those women who have higher HB content were categorized under normal control. The remaining women were randomly categorized into two groups. i.e. experimental control and experimental groups. Subjects belonging to experimental group received developed product, experimental control group neither received tablet nor product and normal control group received tablet. After the feeding trail was over the blood sample was collected with the help of trained personnel. The collected blood was immediately analyzed for HB, RBC, MCV, MCH and MCHC content.

RESULTS AND DISCUSSION

The data on anthropometric measurements of selected women for study is revealed in Table 1. The height of the women in rural and urban area was almost same i.e. 150.8±174 and 150.64±1.96 cm. whereas as per age and food habits also the height was found to be equal. However, income of the family shows slight difference among three group. In case of weight when noted area wise urban women were having better weight (47.61±4.48kg) than rural women (45.50±3.73kg). Similarly, it was found that the women in age group of 40 and above, non-

vegetarian and high income group women had better weight than their counter part. The women belonging to age group 40 and above recorded highest vales for weight (69.47kg) whereas women belonging to low income group recorded lowest value for weight i.e. 43.55kg. Similar trend was noted even in arm and waist circumferences. High income group and non-vegetarian women recorded high values of arm circumference and waist circumference. Further table revealed that the calculated values of BMI was ranging from 19.02 to 21.70, but among the group marginal difference was noted. The mean food intake of selected women as per different socio-economic categorizes is depicted in Table 2.

The mean food intake of cereals, pulses, green leafy vegetables, root and tubers, other vegetables, fruits, milk and milk products, fats and oil and sugar and jaggary was ranged between 277.58±25.80 to 290.64±63.00, 38.29±9.97 to 41.22±9.12, 20.15±13.2 to 30.85±13.27, 21.47±8.09 to 22.52±9.33, 39.38±15.13 to 40.86±14.04, 2.46±8.48 to 11.16±14.64, 57.5±14.87 to 68.87±17.82, 17.26±2.74 to 20.33±1.21 and 20.00±00 to 20.45±1.43 respectively. Fruits intake was very low than the other food groups. Inadequate consumption was noted for all food groups except sugar and jaggary when compared with ICMR recommended values among all selected female. Especially the consumption of green leafy vegetables, roots and tubers, fruits and milk and milk products was less. Mean nutrient intake of selected women as per different socio-economic situations is presented in Table 3. Mean intake of different nutrients energy (1975.23±222.18 to 2053.111164.27), protein (44.99±4.89 to 46.84±6.70), fat (24.26±8.87 to 35.30±11.65), β-carotene (1422.85±637.59 to 1553.13±931.03), ascorbic acid (36.97±6.02 to 39.10±6.93), calcium (390.79±83.07 to 441.22±61.93) and iron (19.78±2.06 to 21.34±61.96) respectively.

It is revealed from the table that intake of different nutrients was better higher urban, 20-40 years' age group and non-vegetarian groups. Data on hemoglobin content of women in rural and urban area is presented in Table 4. it is revealed from the table that 65.33 percent urban women was found to be normal whereas only 12.0 percent rural women was found to be normal. On the contrary more than 50 percent (54.66%) rural women showed mild grade of anemia i.e having Hb level (10-12gm/dl) and 33.33percent rural women showed moderate grade of anemia having Hb level (7-10gm/dl).however urban women showed mild grade of anemia (30.66%) and moderate grade of anemia (4.0%). None of the studied women showed severe grade of anemia i.e. having hemoglobin level less than 7gm/dl. The change in hematological parameters of adult women selected as experimental group for intervention is presented in Table 5. The experimental group women were neither received tables nor developed products. The hemoglobin level of selected women increased from 14.38±0.38 to 14.61±0.48 with 1.59 percent improvement. In case of RBC 7.23 percent improvement was noted. The increment was highest for MCH (10.72 percent) and lowest in MCV (1.50 percent). Though the percent improvement was noted statistically non-significant difference was observed, for all hematological parameter. The findings also support all the respondents in the study were found to be anemic. Table 6. Explains the hematological status of selected women as normal control group for intervention. The selected women recorded highest increment with respect to MCH (6.32 percent) and MCHC (5.81 percent) followed by hemoglobin (4.88 percent).

Table 1. Anthropometric measurement of selected women in Nanded city (n=300)

Sr. No.	Particulars	Height (cm)	Weight (Kg)	Arm circumference (cm)	Waist circumference (cm)	BMI
1.	Area					
I	Rural	150.8±1.74	45.50±3.73	23.66±2.64	75.25±3.75	19.81±1.48
II	Urban	150.64±1.96	47.61±4.48	25.22±3.70	74.00±3.18	20.85±1.81
2.	Age (Years)					
I	20-40	150.7±1.88	46.4±4.14	24.39±3.24	74.64±3.49	20.25±1.23
II	40< above	150.69±1.85	49.47±5.92	37.34±2.42	74.65±3.44	20.40±2.42
3.	Food habit					
I	Vegetarian	148.42±14.58	47.80±4.31	25.45±6.27	73.86±5.92	21.10±5.23
II	Non-vegetarian	148.44±14.47	47.81±3.50	25.3±5.65	74.62±5.86	20.78±5.10
4.	Income (monthly)					
I	5000-10,000/-	150.51±1.81	43.55±3.79	22.62±3.18	72.62±3.10	19.02±1.40
II	10,000-15,000/-	148.44±2.27	47.18±3.23	25.3±5.65	75.39±5.86	20.67±1.34
III	15,000 and above	148.12±2.32	48.38±3.81	25.61±2.88	75.48±5.98	21.06±3.00

Table 2. Mean food intake of selected women of urban and rural areas (n=300)

Particulars	Cereals (gm)	Pulses (gm)	Gr. Leafy veg. (gm)	Roots & tubers (gm)	Other veg. (gm)	Fruits (gm)	Milk (gm)	Fats & oil (gm)	Sugar & jaggery (gm)
Rural	290.64±21.63	39.19±10.97	20.15±13.12	21.75±9.55	39.72±17.36	11.16±14.64	57.5±15.87	17.26±2.74	20.00±00
Urban	277.58±25.80	39.66±9.47	29.33±12.54	22.32±8.19	40.04±13.05	2.46±8.48	66.0±18.90	20.33±1.21	20.48±1.42
20-40	283.5±25.40	40.78±10.74	30.85±13.27	22.19±8.73	38.95±15.62	5.43±11.49	62.29±17.84	18.94±2.46	20.36±1.24
40 and above	284.63±24.30	38.29±9.79	26.96±12.39	21.90±9.10	40.66±15.20	7.97±13.67	61.47±18.23	18.68±2.75	20.13±0.79
Vegetarian	284.86±25.06	38.43±10.75	29.45±13.03	21.76±8.69	40.16±15.54	7.02±12.73	61.42±17.82	18.78±2.62	20.19±0.90
Non-vegetarian	282.75±24.17	41.22±9.12	27.45±12.57	22.52±9.33	39.38±15.13	6.44±12.83	62.61±18.43	18.83±2.62	20.32±1.24
5000-10,000/-	286.19±22.36	38.55±9.78	30.43±13.94	22.81±9.84	40.02±17.02	9.13±14.28	59.48±18.29	18.21±2.71	20.05±0.50
10,000-15,000/-	287.31±24.70	40.28±11.50	27.79±12.16	21.83±8.79	38.83±15.04	7.25±12.86	62.16±17.85	18.31±2.81	20.21±0.92
15,000 and above	278.64±26.29	39.39±9.36	28.06±12.59	21.47±8.09	40.86±14.04	4.03±10.39	68.87±17.82	19.89±1.89	20.45±1.43

Table 3. Mean nutrient intake of selected women of urban and rural areas (n=300)

Particulars	Energy (Kcal.)	Protein (g/100 g)	Fat (g/100 g)	β-Carotene (mg/100gm)	Ascorbic Acid (mg/100g)	Calcium (mg/100 g)	Iron (mg/100 g)
Rural	1998.99±102.86	45.37±5.12	26.94±3.58	1529.09±661.31	36.97±6.02	399.58±168.51	20.25±2.18
Urban	2045.08±169.71	46.82±4.27	35.30±11.65	1446.31±802.27	39.10±6.93	431.81±89.98	20.95±2.17
20-40	2017.21±225.21	46.36±5.88	24.80±10.48	1496.67±614.04	38.48±6.23	436.73±173.88	20.65±2.14
40 above	2026.95±138.85	45.88±5.09	24.09±10.69	1480.07±829.23	37.66±6.87	397.97±89.57	20.56±2.28
Vegetarian	2031.96±145.08	45.71±5.76	23.41±10.93	1512.04±7.89	38.04±6.70	407.35±82.05	20.48±2.25
Non-vegetarian	2005.34±236.54	46.79.4.80	26.24±9.75	1443.68±16.35	38.03±6.42	430.69±199.57	20.81±2.12
5000-10000/-	1975.23±222.18	44.99±4.89	24.26±8.87	1490.98±607.92	37.93±5.99	390.79±83.07	19.78±2.06
10,000-15,000/-	2037.81±144.80	46.84±6.70	24.48±10.52	1422.85±637.59	37.52±6.70	415.05±81004	20.68±2.22
15,000 and above	2053.11±164.27	46.43±4.39	24.51±12.25	1553.13±931.03	38.69±7.04	441.22±61.96	21.34±61.96

Table 4. Hemoglobin content of women in rural and urban area of Nanded city

Hb values	Rural	Urban
>12gHb/ dl of blood (Normal anaemia)	18 (12.00)	98 (65.33)
10-12gHb/ dl of blood (Mild anaemia)	82 (54.66)	46 (30.66)
7-10gHb/ dl of blood (Moderate anaemia)	50 (33.33)	06 (4.00)

Table 5. Haematological status of selected women belonging to experimental control group

Particular	Before Intervention	After Intervention	't' values	Percent improvement
Hb (gm/dl)	14.38±0.38	14.61±0.48	0.03NS	1.59
RBC	4.49±0.29	4.84±0.52	0.01NS	7.23
MCV	84.2±5.48	86.9±5.10	0.29NS	1.50
MCH	29.65±1.81	32.83±2.34	1.13NS	10.72
MCHC	34.07±1.08	34.99±1.99	0.02NS	3.10

NS - Non significant ,*- Significant at 5 per cent , **-Significant at 1 per cent

Table 6. Haematological status of selected women belonging to normal control group

Particular	Before Intervention	After Intervention	't' values	Percent improvement
Hb (gm/dl)	13.09±0.50	13.73±0.33	1.29NS	4.88
RBC	4.46±048	4.49±0.29	0.40NS	0.67
MCV	82.16±11.49	83.78±6.46	0.29VS	1.97
MCH	30.44±11.02	32.21±6.50	0.24NS	5.81
MCVC	33.19±1.40	35.29±3.34	0.01NS	6.32

NS - Non significant ,*- Significant at 5 per cent , **-Significant at 1 per cent

Table 7. Haematological status of selected women belonging to experimental group

Particular	Before Intervention	After Intervention	't' values	Percent improvement
Hb (gm/dl)	11.51±1.37	11.48±1.01	1.20NS	2.95
RBC	4.46±0.55	4.48±0.36	0.44NS	0.44
MCV	74.13±14.29	77.10±15.98	0.24NS	4.00
MCH	26.99±9.6	33.38±3.45	0.01NS	23.67
MCVC	32.16±2.64	36.95±11.22	0.02NS	14.89

NS - Non significant ,*- Significant at 5 per cent , **-Significant at 1 per cent

The least increment was noted with respect to RBC and MCV. The women of normal control group were received one tablet of iron and ferrous sulfate for 3 months. Though it was there, non- significant difference was noted between the values of all hematological parameters after before and after intervention. The change in hematological parameters of adult women selected as experimental group for intervention is presented in Table 7. The experimental group women were neither received tables nor developed products. The hemoglobin level of selected women increased from 14.38±0.38 to 14.61±0.48 with 1.59 percent improvement. In case of RBC 7.23 percent improvement was noted. The increment was highest for MCH (10.72 percent) and lowest in MCV (1.50 percent). Though the percent improvement was noted statistically non-significant difference was observed, for all hematological parameter. The findings also support all the respondents in the study were found to be anemic.

Conclusion

The result concluded that the mean height and weight was ranged between 148.2 to 150.80 cm and 43.55 to 49.57 kg. Whereas women belonging to almost all group recorded normal BMI i. e. 19.02 to 21.10. The mean food intake of i.e. cereals, pulses, green leafy vegetables, root and tubers, other vegetables, fruits, milk and milk products, fats and oil and sugar and jaggary was ranged between 277.58±25.80 to 290.64±63.00, 38.29±9.97 to 41.22±9.12, 20.15±13.2 to 30.85±13.27, 21.47±8.09 to 22.52±9.33, 39.38±15.13 to 40.86±14.04, 2.46±8.48 to 11.16±14.64, 57.5±14.87 to 68.87±17.82, 17.26±2.74 to 20.33±1.21 and 20.00±00 to 20.45±1.43 respectively. Fruits intake was very low than the other food groups. Whereas mean intake of different nutrients were energy (1975.23±222.18 to 2053.11±164.27), protein (44.99±4.89 to 46.84±6.70), fat (24.26±8.87 to 35.30±11.65),

β-carotene (1422.85±637.59 to 1553.13±931.03), ascorbic acid (36.97±6.02 to 39.10±6.93), calcium (390.79±83.07 to 441.22±61.93) and iron (19.78±2.06 to 21.34±61.96) respectively. More than 50 percent (54.66%) rural women showed mild grade of anemia i.e having Hb level (10-12gm/dl) and 33.33percent rural women showed moderate grade of anemia having Hb level (7-10gm/dl). However urban women showed mild grade of anemia (30.66%) and moderate grade of anemia (4.0%). The experimental women exhibited 2.95 percent increment for hemoglobin. Mean values of RBC and MCV were improved by 0.44 percent and 4.00 percent. The highest increment was noted with respect to MCH content (23.67 percent) followed by MCVC (14.89 percent).

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