

Ayurvedic Preparation in the treatment of Nutritional Anemia

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Based on experience of the first author in his clinical practice a pilot study was carried out on 600 non-pregnant anemic women of reproductive age group (11-45 years) from Dehradun district to generate base line data on the efficiency of ayurvedic iron preparation (Ayas) **, Ayurvedic non iron preparation (SS)*** and combination of these two. For comparison a group of subjects was also given IFA tablet. In a 90 days duration study, the maximum gain (1.8 g%) in hemoglobin level was recorded with SS+Ayas followed by 1.6 g% with Ayas; 1.5 g% with SS and 1.1 g% with IFA. The good gain (1.5 g%) in hemoglobin level of anemic women given non ayurvedic preparation 'SS' was very encouraging as it is cost effective and showed almost no side effects in the present study. Sootshekhar rasa has been mentioned in various classical ayurvedic text in the chapter of 'Amla pitta Rogadhikara', which means to reduce acids in the body. Similarly Sitopaladi is a well known classical ayurvedic formulation, which has been described in the text as cough reducing agent. In the present study, authors used these medicines formulation for the first time in improving nutritional anemia in non pregnant women. The hypotheses for using non iron preparation SS was that it improves the absorption of iron in gastrointestinal tract. The result of these pilot study do indicate the possibility of using SS for improving nutritional anemia. Further studies are required covering larger population from different parts of country to ascertain efficiency, sustainability of hemoglobin level after discontinuation of treatment and also to understand the intrigue phenomenon about the character and pharmacology of these ayurvedic formulations.

INTRODUCTION

Anemia is a problem of public health significance. The consequences of iron deficiency anaemia in infants and children are impaired motor development and coordination, decreased physical activity, inattention, fatigue, etc. (Pollite and Leibel, 1982; Pollite et al., 1983; Soemantri et al., 1985; Pollite et al., 1985) In adults, anemia causes fatigue and decreased work capacity and productivity as also low earnings. (Viteri and Torun, 1974; Hallberg and Scrimshaw, 1981). In pregnant women, the iron deficiency anemia causes increased maternal and foetal morbidity

and mortality and increased risk of low birth weight. (Mac Gregor, 1981; Lieweyyn-Jones, 1965; Ratten and Beishcher, 1972; Yusufji et al., 1973) Anemia is the most prevalent nutrition problem in the world today. Affecting more than 700 million persons. (DeMaeyer and Adiels-Tegman, 1985). In India, the prevalence of anemia in pregnant women (hemoglobin < 11g per cent) of different parts of the country is in range of 33-89 per cent (Seshadri et al., 1994; ICMR, 1992; Christian et al., 1989; ICMR, 1989; Agarwal et al., 1987; Prema et al., 1981; Sood et al., 1975; Yusufji et al., 1973). Data on prevalence of anemia in adolescent girls is limited. A study concluded on 1513 rural adolescent girls in Gujarat indicated that 61 per cent of the girls were anemic with Hb < 12g per cent (Seshadri, 1998).

Correspondence to: VCP Cancer Research Foundation, Mandir Marg, Turner Clement Town, Dehradun - 248002 email: vcpcrf@gmail.com, Tel: 0135-2640792, Fax: 0135-640909,** Ayas: A proprietary ayurvedic preparation containing Iron Bhasma and Triphala powder *** SS: Classical ayurvedic preparation - combination of Sootshekhar Rasa and Sitopaladi Powder.

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The healing powers of Ayurveda, the age-old practice of going to the root of any disease without causing any side effects seems to find favor with public. Preliminary studies carried out by principal author revealed that in general Ayurvedic treatment on women, especially on anemic women was encouraging.

The objective: The pilot study conducted was to evaluate the efficacy of the various Ayurvedic formulations in curing nutritional anemia. The study was conducted during 1999-2000.

METHODOLOGY

Sampling: A total of 1830 women of reproductive age groups (11-45 years) were initially recruited for the study from 15 clusters covering rural and urban area falling under Raipur and Doiwala blocks of Dehradun district of Uttar Pradesh now Uttarakhand. Blood samples from these women were collected and hemoglobin estimation was carried out. A total of 838 (45.79 per cent) out of 1830 women were found anemic (hemoglobin <12 g per cent). Out of these 838 anemic women, 600 were selected for study and they were further divided into five groups, each consisting of 120 women (Table 1).

Table 1: Various study groups and types of treatment given

| Groups | Status | Treatment |
|--------|------------------|------------------|
| I | Control groups | Diet + Starch |
| II | Experiment group | Diet + IFA |
| III | Experiment group | Diet + Ayas |
| IV | Experiment group | Diet + SS |
| V | Experiment group | Diet + Ayas + SS |

Study Design: Pregnant women, lactating mothers (< 6 months), and those with diabetes, malaria, tuberculosis, or any malignancies/tumour were excluded from the study. Group I was control and women recruited in this group were taking normal diet. Women of groups II, III, IV and V were given

IFA tablets, Ayas (an Ayurvedic preparation), Sootshekhar Rasa and Sitopaladi Churana (SS: an Ayurvedic preparation) and Ayas + SS together, respectively, as per scheduled given in Table 2.

Table 2: Dosage of medicine given to women of various study groups

| Sr. No | Medicine | Dosages |
|--------|----------|------------|
| 1 | IFA | (1X1) 1 OD |
| 2 | Ayas | (1X2) 1BD |
| 3 | SS | (1X2) 1 BD |
| 4 | SS+Ayas | (1X2) 1 BD |

One dose of Ayas is made up of 125 Iron Bhasma and 500 mg Triphla Churana. The Sootshekhar Rasa and Sitopaladi Churana (SS) is a non-iron containing ayurvedic preparation. One dose of SS contains 125 mg and 500 mg of Sootshekhar and Sitopaladi, respectively. On 0 day, blood samples were drawn from all the subjects for hemoglobin estimation and thereafter medicines were given as per schedule mentioned in Table 1. Blood samples were drawn at fortnightly intervals thereafter upto the duration of study, i.e., 90 days for assessment of hemoglobin level. A questionnaire was used for collecting demographic information and assessment of knowledge, attitude and practices about anemia among women recruited for the study.

Operationalisation of study: Several meetings of villagers and the elected representatives of the Panchayat and other functionaries were held before the onset of study. The Block Pramukhs were roped in to motivate the subjects. Further, the investigators for the study were also introduced to the subjects who acquainted them with the aim, design and methodology of the study.

Biochemical investigation: Hemoglobin was estimated using filter paper method described by Dacie and Lewis (1984) and INACG (1985).

Quality Assurance Programme: Internal and External Quality Assurance Programmes were run

alongwith other ICMR study on micronutrients (vitamin A, iron and iodine) deficiency disorders and protein energy malnutrition. For External Quality Assurance Programme, the Assam Medical College, Dibrugarh was the ‘reference laboratory.’

RESULTS

The initial mean haemoglobin (Hb) levels (at 0 day) in all study groups was in range of 10.1 to 10.3 g per cent. The initial mean level of Hb in control group was 10.3 g per cent and at the completion of study at

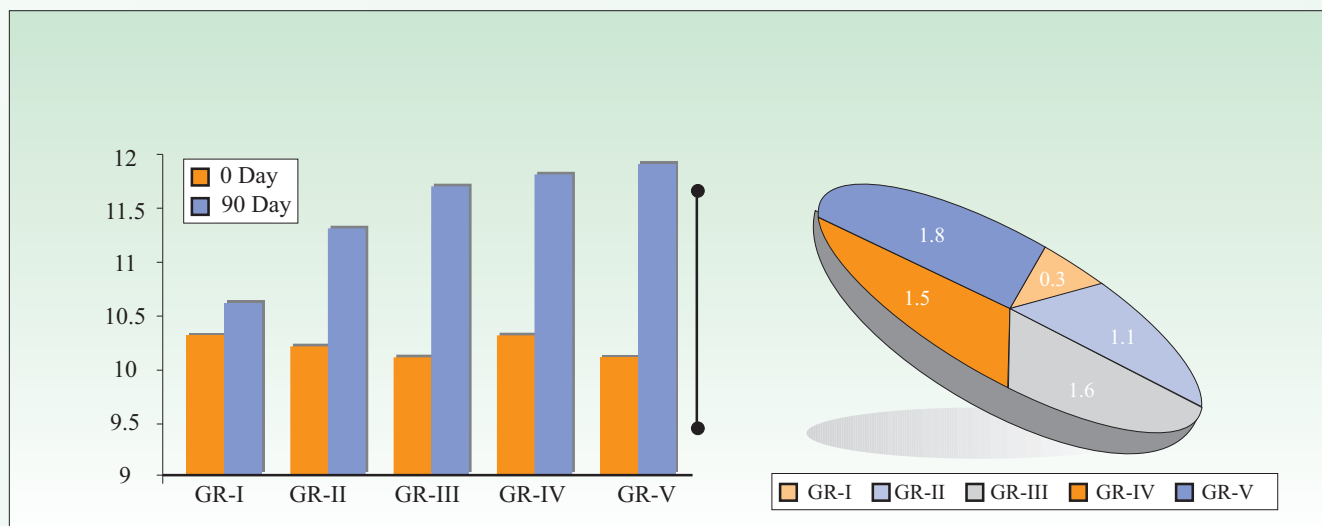
90 days the level of Hb was 10.6 g per cent; gain of 0.3 g per cent. Similarly, the gain in Hb level in other four groups II, III, IV and V was, respectively, 1.1, 1.6, 1.5 and 1.8 g per cent (Table 3 & Figure 1). The maximum gain in Hb level (1.8 g per cent) was observed in group V (Ayas + SS), whereas minimum (0.3 g per cent) gain was found in group II (IFA). The gain in Hb level was also considerable in group III (1.6 g per cent) and IV (1.5 g per cent) where Ayurvedic preparations Ayas and SS were given respectively.

Table 3: Effect of ayurvedic preparation on hemoglobin level of non-pregnant women (11-45 years)

| Days | Group | Mean hemoglobin (g%) level | | | | |
|---------|-------|----------------------------|------------|------------|------------|------------|
| | | I | II | III | IV | V |
| | N | 110 | 118 | 119 | 117 | 118 |
| 0 days | | 10.3 | 10.2 | 10.1 | 10.3 | 10.1 |
| 15 days | | 10.4 | 10.6 | 10.5 | 10.6 | 10.2 |
| 30 days | | 10.6 | 10.9 | 10.8 | 10.9 | 10.6 |
| 45 days | | 10.5 | 11.1 | 11.0 | 11.3 | 10.9 |
| 60 days | | 10.4 | 11.3 | 11.2 | 11.4 | 11.2 |
| 75 days | | 10.5 | 11.3 | 11.2 | 11.6 | 11.5 |
| 90 days | | 10.6 | 11.3 | 11.7 | 11.8 | 11.9 |
| Gain | | 0.3 | 1.1 | 1.6 | 1.5 | 1.8 |

N=582

Figure 1: Gain in Hemoglobin among various groups of Non-Pregnant women (11-45 Years)



Out of 582 anemic women, 260 were moderate anemic (Hb 7 to 10 g per cent). Attempt was made to see the impact of ayurvedic preparations on moderate anemic women. The mean Hb level in all the five groups on 0 day was in range of 8.1 to 8.8 g per cent (Table 4; Figure 2). There was a gain of 0.5 per cent at the end of study in the control group. The gain in Hb level in experimental groups was in range of 2.0 to 3.0 g per cent, the maximum being in group V (Ayas + SS), and minimum being in group II (IFA). The gain in Hb in two other groups, i.e., III (Ayas) and IV (SS) was 2.2 and 2.3 g per cent, respectively.

A total of 322 women out of 582 were anemic (Hb 10.1 – 11.9 g per cent). The initial Hb level at 0 day in five groups was in range of 10.8 to 11.2 g per cent (Table 5; Figure 2). There was no gain in Hb level in control group at the end of 90 days, whereas the maximum (1.2g per cent) and minimum (0.5g per cent), gain was observed in group IV (SS) and group II (IFA), respectively. In group III (Ayas) the gain was 1.1 g per cent, whereas in group V (Ayas + SS). The 0.9 g per cent gain was recorded.

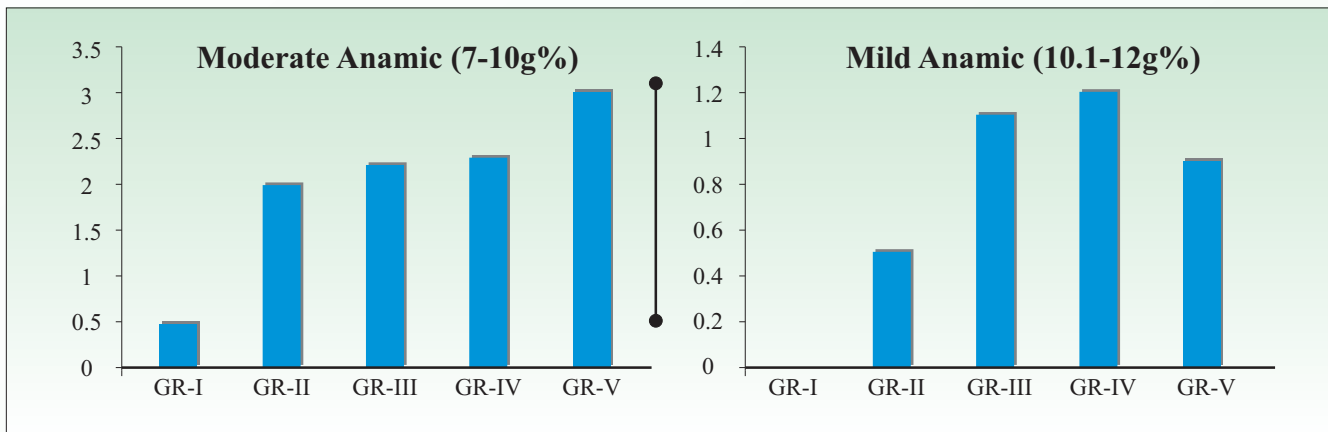
Table 4: Effect of ayurvedic preparations on moderate anemic women (Hb 7 to 10 g%)

| Days | Group | Mean hemoglobin (g%) level | | | | |
|---------|-------|----------------------------|------|------|------|-------|
| | | I | II | III | IV | V |
| | N | 52 | 45 | 56 | 50 | 57 |
| 0 days | | 8.8 | 8.7 | 8.3 | 8.1 | 8.3 |
| 15 days | | 9.0 | 9.2 | 9.0 | 8.5 | 9.0 |
| 30 days | | 9.1 | 9.7 | 9.5 | 8.9 | 9.6 |
| 45 days | | 9.2 | 9.9 | 9.9 | 9.2 | 10.3 |
| 60 days | | 9.2 | 10.3 | 10.2 | 9.7 | 10.3 |
| 75 days | | 9.3 | 10.7 | 10.4 | 10.2 | 10.6 |
| 90 days | | 9.3 | 10.7 | 10.5 | 10.4 | 11.3 |
| Gain | | 0.5 | 2.0 | 2.2 | 2.3 | 3.0 |
| | | | | | | N=260 |

Table 5: Effect of ayurvedic preparation on mild anemic women (Hb 10.1g% - 11.9g%)

| Days | Group | Mean hemoglobin (g%) level | | | | |
|---------|-------|----------------------------|------|------|------|-------|
| | | I | II | III | IV | V |
| | N | 58 | 73 | 63 | 67 | 61 |
| 0 days | | 10.8 | 11.0 | 10.8 | 11.1 | 11.2 |
| 15 days | | 10.9 | 11.3 | 11.2 | 11.2 | 11.0 |
| 30 days | | 10.8 | 11.4 | 11.4 | 11.4 | 11.3 |
| 45 days | | 10.9 | 11.3 | 11.6 | 11.8 | 11.5 |
| 60 days | | 10.8 | 11.4 | 11.7 | 11.9 | 11.7 |
| 75 days | | 10.9 | 11.5 | 11.8 | 12.0 | 11.8 |
| 90 days | | 10.8 | 11.5 | 11.9 | 12.3 | 12.1 |
| Gain | | 0.5 | 1.1 | 1.2 | 0.9 | |
| | | | | | | N=322 |

Figure 2: Gain in Hemoglobin (%) in moderate and mild anemic subjects



There were 435 adolescent girls among 582 subjects. The initial haemoglobin level at 0 day in all five groups was in range of 10.2 to 10.7 g per cent (Table 6 Figure 3). There was a gain of 0.3 g per cent at 90 days in control group. In all four experimental groups the maximum (1.5 g per cent) and minimum (1.0 g per cent) Hb gain was in group IV (SS) and group V (Ayas + SS) respectively. In group II (IFA) and III (Ayas) the gain was 1.1 and 1.4 g per cent, respectively.

Out of 582 anemic women, 147 were in age group of 19-45 years. In control group, there was no gain in mean haemoglobin level at the end of experiment, i.e., after 90 days. The gain in mean haemoglobin was maximum (1.7 g per cent) in both groups III (Ayas) and IV (SS). The gain in haemoglobin level in two other groups II (IFA) and (Ayas + SS) was 1.3 and 1.6 g per cent (Table 7; Figure 3).

Table 6: Effect of ayurvedic preparation on adolescent girls (11-18 years)

| Days | Group | Hemoglobin (g%) level | | | | |
|---------|-------|-----------------------|------|------|------|------|
| | | I | II | III | IV | V |
| | N | 72 | 99 | 98 | 92 | 74 |
| 0 days | | 10.2 | 10.3 | 10.2 | 10.3 | 10.7 |
| 15 days | | 10.4 | 10.6 | 10.4 | 10.6 | 10.6 |
| 30 days | | 10.5 | 10.9 | 10.7 | 10.8 | 11.1 |
| 45 days | | 10.6 | 10.8 | 10.9 | 11.3 | 11.2 |
| 60 days | | 10.5 | 11.2 | 11.2 | 11.4 | 11.5 |
| 75 days | | 10.5 | 11.3 | 11.3 | 11.6 | 11.6 |
| 90 days | | 10.5 | 11.6 | 11.6 | 11.8 | 11.7 |
| Gain | | 0.3 | 1.1 | 1.4 | 1.5 | 1.0 |

N=435

Figure 3: Gain in Hemoglobin (%) among different treatment groups

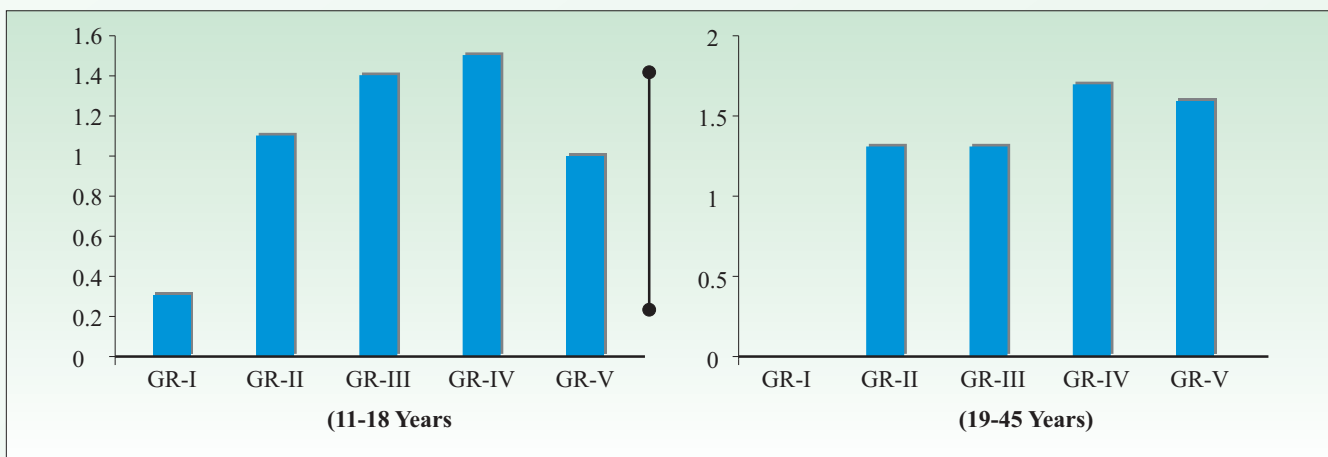


Table 7: Effect of ayurvedic preparation on women aged 19-45 years

| Days | Group | Mean hemoglobin (g%) level | | | | |
|---------|-------|----------------------------|------|------|------|-------|
| | | I | II | III | IV | V |
| | N | 38 | 19 | 21 | 25 | 44 |
| 0 days | | 10.5 | 10.2 | 10.3 | 10.3 | 9.0 |
| 15 days | | 10.4 | 10.5 | 10.6 | 10.6 | 9.5 |
| 30 days | | 10.3 | 10.7 | 10.7 | 10.7 | 9.9 |
| 45 days | | 10.3 | 11.0 | 11.0 | 11.0 | 10.5 |
| 60 days | | 10.4 | 11.0 | 11.1 | 11.1 | 10.9 |
| 75 days | | 10.4 | 11.3 | 11.4 | 11.4 | 11.0 |
| 90 days | | 10.5 | 11.5 | 12.0 | 12.0 | 10.6 |
| Gain | | 0 | 1.3 | 1.7 | 1.7 | 1.6 |
| | | | | | | N=147 |

Out of a total of 118 women studied in group-II (IFA), 22 (18.6 per cent) reported complaints of loose motion, nausea, headache, constipation and loss of appetite. In group III (Ayas), six (5.1 per cent) women developed pimples. In group IV, 4 (3.4 per cent) women out of 117 complained of mild headache. In group V, 12 (10.2 per cent) women complained of headache, nausea and loose motion. In this group, eight women who reported such complaints were from a particular pocket (Table 8).

The unit cost was minimum (Rs. 0.44) for SS and maximum (Rs.1.29) for SS + Ayas . However, the total dose cost was the cheapest (Rs. 0.65) for IFA tablets and costliest for SS + Ayas (Rs. 2.58). The per day cost for SS was Rs. 0.88 and for Ayas Rs. 1.70 (Table 9).

More than half (57 per cent) of the total women (582) studied were from rural clusters whereas the remaining (43 per cent) were from urban areas. Majority of women (92.1 per cent) had more than primary education. Only 45.2 per cent subjects were aware of IFA programme.

Table 8: Side effects reported among study groups

| Group | Controls I | Diet+IFA II | Diet+AP1 III | Diet+AP2 IV | Diet+AP1+AP2 V |
|---------------------------|---------------|--|-----------------|----------------|------------------------------------|
| No. of total participants | 110 | 118 | 119 | 117 | 118 |
| No. of Complaints | 4(3.6%) | 22(18.6%) | 6(5.1%) | 4(3.4%) | 12*(10.2%) |
| Nature of Complaints | | Loose motion Nausea Headache Constipation Loss of appetite | Pimples | Headache | Headache Nausea Loose motion |

* Eight complaints from particular pocket

Table 9: Cost of various medicines used in study

| Sr. No. | Medicine | Dose | Unit Price (Rs.) | Total (Rs.) |
|---------|----------|--------------|------------------|-------------|
| 1 | IFA | (1 x 1) 1 OD | 0.65 | 0.65 |
| 2 | SS | (1 x 2) 1 BD | 0.44 | 0.88 |
| 3 | Ayas | (1 x 2) 1 BD | 0.85 | 1.70 |
| 4 | SS+Ayas | (1 x 2) 1 BD | 0.44+0.85=1.29 | 2.58 |

DISCUSSION

The mean haemoglobin level in control group did not increase more than 0.5 g per cent in all types of subjects, viz., moderate and mild anaemic women and adolescent girls (11-18 years) as well as adult women (19-45 years) at the completion of the study, i.e., after 90 days (Table 10). Even in mild anemic adult women, there was no change in mean hemoglobin values of control group recorded at the initiation and completion of the project.

In terms of gain in hemoglobin level at the end of the study, all preparations, viz., IFA, Ayas, SS and SS + Ayas were most effective in moderate anemic women and least in mild anemic women. In 582 anemic women, the maximum gain (1.8 g per cent) in hemoglobin level was recorded with SS + Ayas; followed by 1.6 g per cent with Ayas; 1.5 g per cent with SS and 1.1 g per cent with IFA. One tablet of IFA was given per day which contains 100 mg of elemental iron whereas two doses of Ayas were given per day which contain together 250 mg of iron. The double dose of iron in Ayas as compared to IFA made better as compared to IFA made better hemoglobin gain (1.6 g per cent) in anemic women. However, the anemic women given non-iron Ayurvedic preparation, SS, also showed good gain (1.5 g per cent) in hemoglobin level; a little less than iron containing Ayurvedic preparation and much more than iron containing IFA tablets.

In moderate anemic women the maximum gain (3.0 g per cent) in hemoglobin level was observed with SS + Ayas and minimum (2.0 g per cent) with IFA.

The gain in hemoglobin level was 2.2 and 2.3 g per cent, respectively, with Ayas and SS.

In mild anemic women, adolescent girls (11-18 years) and adult women (19-45 years), the maximum gain was recorded with SS, a non-iron Ayurvedic preparation. However, in adult anemic women, the maximum gain in hemoglobin level with Ayas was the same (1.7 g per cent) as recorded for SS.

The gain in hemoglobin level was minimum with IFA in all the groups ranging from 0.5g per cent to 2.0 g per cent. The gain in hemoglobin level in two Ayurvedic preparations, i.e., Ayas and SS was comparable in all the groups, slightly higher gain with SS in most of the groups (Table 10).

Sootshekhar Rasa has been mentioned in various classical Ayurvedic text in the chapter of '*Amla pitta Rogadhikara*', which means to reduce acid in the body. Similarly, Sitopaladi is a well-known classical Ayurvedic formulation which has been described in the text as cough reducing agent. In the present study, the Principal Investigator has used this formulation first time in improving nutritional anaemia in non-pregnant women.

The hypothesis for using non-iron Ayurvedic preparation, SS, was that it improves the absorption of iron in gastro-intestinal tract. The results of this pilot study does indicate the possibility of using SS for improving nutritional anaemia which need to be ascertained by doing a larger study before it could be taken as a multi-centre study.

Table 10: Gain in mean haemoglobin level (per cent) at the completion of study

| | All women | Moderate anaemic women | Mild anaemic women | 11-18 years women | 19-45 years women |
|----------|-----------|------------------------|--------------------|-------------------|-------------------|
| N | 582 | 260 | 322 | 435 | 147 |
| Control | 0.3 | 0.5 | 0 | 0.3 | 0 |
| IFA | 1.1 | 2.0 | 0.5 | 1.1 | 1.3 |
| Ayas | 1.6 | 2.2 | 1.1 | 1.4 | 1.7 |
| SS | 1.5 | 2.3 | 1.2 | 1.5 | 1.7 |
| SS +Ayas | 1.8 | 3.0 | 0.9 | 1.0 | 1.6 |

ACKNOWLEDGEMENT

The authors are grateful to the department of Women & Child Welfare, Ministry of Human Resources, Govt. of India, for sponsoring the study and to Assam Medical College, Guwahati, for participating in Quality Assurance Program for Hemoglobin Estimation. The authors also acknowledges the efforts of Mr. Prabhu Lal Bahuguna-Block Pramukh, Raipur, and Mr. Chaddha-Branch Manager, Oriental Bank of Commerce, Balawale, Dehradun is also appreciated for motivating the community to participate in the study.

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