



Effect of Vastuk-Amalaki Mishrana on haemoglobin level

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Abstract- Balanced diet is not available to a large population of the world, particularly those in developing countries. Therefore population in developing countries is affected by malnutrition and micronutrient deficiency. In India malnutrition is a major nutritional problem which is responsible for about 40-50 percent of the infant deaths..

Dehydrated foods are more concentrated source of minerals than any other preserved form of foodstuff. Dehydrated Vastuk can be added in various food products in order to increase their nutritive value. Therefore, the present study was planned to explore possibilities of using the dehydrated leaves of Vastuk with Amalaki Churn.

Keywords- Vastuk, Amalaki, Dhatri Lauha, Haemoglobin, Rakta, Raktalpta

I. INTRODUCTION

DRUG REVIEW

Rasa Panchaka of Vastuk:

- **Rasa** Madhura
- **Guna** Snighdha, Guru
- **Veerya** Sheeta
- **Vipaka** Madhura

KARMA OF VASTUK

S. No.	Nighantu	Karma
1.	K.N.	Pachana, Rochana, Hridhya, Medhya
2.	S.N.	Agnideepak, Snehan
3.	M.N.	Pachana, Ruchikar, Shukrabalprada
4.	B.N.	Saraka, Krimighana
5.	R.N.	Malamutrashudhhikar, Rochana

Vastuk-Amalaki Mishran:

Though Vastuk is a very good source of Iron. This is clinically tested. On the other hand Amalaki is an excellent source of Vitamin C, which helps the iron absorption in the body. This is why we selected the Kalpit Yog for trial to evaluate the efficacy of the Yog in relation Vastuk Churn.

Ingredients of VASTUK AMALAKI YOG

1.	Vastuk powder	5gm
2.	Amalaki powder	3gm

3.	Black pepper	1gm
4.	Salt	500mg
5.	Sugar	500mg
6.	Corn floor	5gm

Dose: A single dose of 15 gm

Dhatri Lauha: . Dhatri Lauha is mentioned in Bhaisajya Ratnavali, padurogadhikara and shoal rogadhikar. It contains amalaki Lauha bhasma. Madhu and goghrita is used as sahpana properties of amalaki ,Lauha bhasma is agnidipaka, ruchikara, kriminashaka. So it is helpful in curing pandu roga.

Ingredients :

- Amalaki Churnam : 4 parts
- Lauha bhasm : 2 parts
- Yasthimadhu Churan : 1 part

Guduchi Kwath for processing

Approach to Rakta Dhatu Kshya management

Sushruta says laghu, Snigdha, Slightly Sour and warm food should be used to increase Rakta Dhatu.¹ Ayurvedic management of any clinical condition involves dietary and life style management, rational medication and required cleansing of the system.

The most fundamental pharmacological principles of ayurveda are panchamahabhoota and Samanya Vishesh siddhanta. Panchamahabhoota principle establishes structuro- functional similarity between the substance used and the body.² When a substance is subjected to an effective engagement with the body, the outcome of such an engagement is guided by Samanya Vishesh siddhanta. Components and attributes in a substance will lead to an increase in similar components and attribute within the body.³

Iron deficiency causes Hb deficiency therefore iron supplementation should lead to increase in iron content and consequent increase in Hb levels. Keeping this principle in mind iron containing diet, medicine and herbomineral preparation were planned to be evaluated in this study. *Vastuk* (*Chenopodium album* Linn.), a commonly used leafy vegetable contains-30.78 mg /100 gm of iron. *Vastuk-Amalaki mishran* contains – 39.18 mg/ 100 gm of iron, *Dhatri lauha* contains- 300 mg of iron in the form of *Lauha Bhasma* per 1 gm. Daily average requirement of iron is to make up the normal daily loss of iron are-

Adult male : 13 µg / kg

Adult female : 21 µg / kg

Therefore the selected trial drug provides more than sufficient iron supplementation.

Samanya Vishesh Siddhanta also underlines the fact that absence of obstructing factors is required for the ultimate result. Vitamin C deficiency, *Agnimandhya* etc. decreases iron absorption and utilization in the body. The trial drug *Vastuk* and *Dhatri lauha* contains Vitamin C.

The trial drug *Vastuk* possess deepan, pachana properties i.e. it will increase agni and facilitate digestion and metabolism. *Vastuk* has also have krimighna effect and thus can play a role in parasitosis, a cause of iron deficiency

Against these backdrops, the trial drugs were hypothesized to improve the iron and Hb levels in the body.

Phytochemical And Pharmacognostical Study:

¹ Su. S.Su.14/38

² Ch. S. Su. 26/10

³ Ch. S.su.1/44

The Pharmacognostical and phytochemical study was carried out to establish the botanical authenticity and to assure the quality of the trial drugs.

Vastuk (*Chenopodium album* Linn.) was collected by the scholar from the cultivated fields from Bharatpur, Rajasthan. The respective herbariums sent to University of Rajasthan, Botany department Jaipur and was certified by them for the Botanical authenticity.

Vastuk and Vastuk-Amalaki were subjected to pharmacopial pharmacognostical and phytochemical investigations. The results are as follows –

Name of investigation	Vastuk	Vastuk- Amalaki mishran
Moisture Content	6.56%	3.82%
Total Ash	4.45%	13.7%
Acid insoluble ash	0.34%	1.67%
Water soluble ash	1.54%	1.84%
Aqueous Extractive Value	26.46%	20.14%
Alcoholic Extractive Value	18.47	16.12%
Petroleum Ether / Extractive Value	6.2%	11.25%
Colour	Green	Blackish brown
Odour	Sharp Characteristic	Pleasant
Taste	Sweet, bitter	Sour
Touch	Fine	Fine

Vastuk has not been yet included in API or any Pharmacopial document. Therefore, this could not be compared with such values. The study results may be used as a published source for these investigations in the future.

The plants have subjected to qualitative examination to find out the presence of micro-nutrients. It is found that calcium, potassium, magnesium, iron, phosphorus were present in *Vastuk* and Vastuk Amalaki mishran

Qualitative analysis of inorganic matter showed the presence of carbohydrate, alkaloids, tannin, protein & Resins in *Vastuk*.

T.L.C. of Methanolic extract of *Chenopodium album* Linn.-

- Mobile phase- Toluene: Ethyl Acetate: Formic Acid (7:2.9:0.1)
- Rf value in day light – 0.15,0.50,0.55,0.63,0.76,0.82,0.89,0.97

T.L.C. of Methanolic extract of Vastuk-amalaki mishran. -

- Mobile phase: toluene: ethyl acetate: formic acid: methano(16:4:0.3)
- Rf value in day light 0.26,0.38,0.47,0.48,0.51,0.56,0.91,0.94

Quantitative assessment of Iron by AOAC 985.35 METHOD done@CEG TEST HOUSE, JAIPUR:

By using **AOAC 985.35 METHOD** Iron content of the both samples were calculated and found to be 30.78 mg/100gm for Vastuk and 39.18 mg/100 gms Vastuk amalaki mishran against the value of iron 27.48 mg.

CLINICAL STUDY

The main object of present research work is to undertake a clinical and laboratory study of *Vastuk* and *Vastuk-Amalaki* mishran in apparently healthy volunteers having hemoglobin between 8-11 gm% in females and 9-12 gm% in males.

AIMS & OBJECTIVES OF STUDY

1. To evaluate the efficacy of *Vastuk* and *Vastuk-Amalaki* mishran on blood Hb level.
2. To provide bi- fold management of Iron deficiency through *Ahara* and *Aushadha*.
3. To provide low cost, easily available and effective supplement of iron.

II. MATERIALS & METHODS

(A). Method of Preparation of Trial Drugs

(1). *Vastuka* - Fresh leaves of *vastuk* were taken and dried under shade for 15 days. These dry leaves were powdered by a pulverizer and were passed through sieve size 80. This powder was then packed in HDPE packs of 5 gms each

(2). *Vastuk-Amalaki Mishran* - *Vastuk* powder : *Amalaki* powder : black pepper powder : sugar : black salt : Corn floor = 10:6:2:1:1:10 in a container and stirrer well to be homogenous mixture.

This mixture (we termed it as "*Vastuk - Amalaki mishran* ") was then packed in HDPE packs in 15 gm in each pack.

(3). *Dhatri lauha*- Powder was procured from market, manufactured by KRISHNA GOPAL AYURVEDA BHAWAN (D. T.), KALERA, AJMER, RAJASTHAN. (Reff. YOGRATNAKAR) and then packed this powder in capsules containing each 500 mg. The volunteers were given 1 capsule b.d with normal water .

(A) Selection of Cases

45 Apparently healthy consenting volunteers were selected and registered in OPD of NIA, Jaipur. 15 volunteers for *vastuk Churna*, 15 volunteers for *vastuk-Amalaki mishran* and 15 volunteers for *Dhatri lauha* were selected.

(B) Inclusion Criteria

The following inclusion criteria's were included in research work:

1. Apparently healthy volunteers.
2. Age - 15 -45 years
3. Volunteers having hemoglobin between 8-11 gm% in females and 9-12 gm% in males.

(C) Exclusion Criteria

The following exclusion criteria's are included in research work:-

1. Below 15 & above 45 years of age.
2. Pregnant ladies.
3. Volunteers suffering from malignant diseases like leukemia.
4. Hemoglobin less than 8 gm %.
5. Volunteers suffering from serious diseases such as IHD, CCF.
6. Volunteers suffering from chronic disorders like Rheumatoid arthritis, Renal failure, Hypothyroidism, Hyperthyroidism.
7. Anemia due to causes other than Iron deficiency.

(D) Criteria for Withdrawal

1. During the course of trial if any serious condition or any serious adverse effects which requires urgent treatment.

2. Volunteers wishing to withdraw from the clinical trial.
3. Non Compliance by the volunteers.

(E)Administration of Drugs

45 apparently healthy volunteers were divided randomly into three groups and 15 volunteers were included in each group.

- **Group 1:** *Vastuk* 5 gm dry powder twice a day for 45 days.
- **Group 2:** *Vastuk amalaki mishran* 15gm once a day for 45 days.
- **Group 3:** Dhatri lauha 500 mg twice a day for 45 days.

(F)Duration of clinical trial and follow up study

1. 45 days with follow up after 15 days.

(G)Criteria of Assessment

During this clinical trial, patients were assessed on following parameters:-

1. Subjective improvement
2. Objective improvement

SUBJECTIVE CRITERIA

Table No. 1 Scoring pattern Adopted for Assessment of Clinical Features:

S.No.	Clinical Features	Grade	Score
1.	Absence of signs and symptoms	-ve	0
2.	Mild signs and symptoms	+ ve	1
3.	Moderate signs and symptoms	+ ve	2
4.	Severe signs and symptoms	+ ve	3

Parameters:

Parushata, Rukshata, Sphutita, Mlana, Amlashishirapriti, Constipation, Appetite, Dizziness, Palpitation, Headache, Breathlessness, Fatigue Irritability, Angular Stomatitis, Drowsiness.

OBJECTIVE CRITERIA

Hematological Assessment:

Hematological investigations i.e. Hb % and complete blood count were conducted to evaluate the attribute changes produced by the trial drug given.

Volunteers were subjected to Hematological investigation before and after completion of trial.

III. STATISTICAL PRESENTATION AND ANALYSIS

All the signs and symptoms, blood investigations before trial and after trial were compared. Hb gm % was analyzed statistically.

Statistical calculation:

Paired "t" test for intra group assessments and analysis of Variance (ANOVA) Tukey-Kramer Multiple Comparisons Test, Post Tukey-Kramer Multiple Comparisons Test, Kruskal-wallis test and Dunn multiple comparisons post tests, for inter group comparison, by Graphpad InStat 3 were used in this study.

OBSERVATIONS

In study of **Age wise** distribution we got that the maximum number of volunteers were in 26-35 age group 20 (44.44 %), followed by 15-25 age group 19 (42.22 %), and minimum number of Volunteers were in 36 – 45 age group 6 (13.33 %). The 25-35 years is the age group for aggravation of *Pitta*. Perhaps these Volunteers had been doing excessive exercise, improper diet and suffering from mental stress due to their responsibilities for their family and society.

In study of **Gender wise** distribution we got that the maximum number of Female volunteers were 36 (80%) and only Male volunteers were 9 (20%). Prevalence of female is high than male which may be due to insufficient dietary habits, social negligence, unawareness about receiving extra iron containing diet for their menstrual blood loss.

In study of **Religion wise** distribution we got that the maximum numbers of Volunteers were in *Hindu* community 45 (100 %). There were no any Volunteers from Muslims, *Shikh*, Christian and other communities. Observation reveals that maximum volunteers in the present study were Hindu. The data only highlight that the hospital is located in Hindu dominant area and majority of volunteers were Hindu attending the hospital.

In study of **Marital Status wise** distribution we got that the maximum Volunteers were Unmarried 23 (51.12%), than rest of the Volunteers were Married 22 (48.88 %). This distribution pattern is attributed to the fact that the study population comprised of mainly unmarried student.

In study of **Education status wise** distribution we got that the maximum number of Volunteers were in Graduation 14 (31.11 %), than were in High school 13 (28.89%), than were in Post graduation 12 (26.67%) and minimum number of Volunteers were in Middle 6 (13.33%). Low educated persons are usually careless or less conscious about their nutritional requirements and also do not have proper knowledge of diet and hence may have low Hb level, Educated on the other hand, were living in very stressful life style, improper diet and highly professional life style, which might be reason to develop this condition.

In study of **Social Occupational status wise** distribution we got that the maximum number of Volunteers were Student 29 (64.44 %), than in House wives 10 (22.23 %), than 6(13.13%) govt.service. Minimum no. Were in Labour class and no work which is equal in number 0 (00 %). Hence data reveals that hemoglobin status is not directly related with occupation.

In study of **Social Economical status wise** distribution we got that the maximum number of Volunteers were in Middle class 30 (68.67%), than in Higher class 8 (17.78 %), followed by lower class 7(15.55%) This distribution pattern is attributed to the fact that the study population comprised of mainly middle income group.

In study of **Diet Pattern wise** distribution we got that the maximum Volunteers were Vegetarian 26 (57.77%), than rest of all were having Mixed diet 19 (42.23%). It is because vegetarian predominant area and iron is present in fewer amounts in vegetables and it is mainly nonheme iron which is less absorbable.

In study of **Addiction wise distribution** we got that the maximum number of Volunteers were having no addiction 21(46.67%), of Tea/Coffee 20 (44.44%), than equally of smoking and Pan/Gutkha 2 Each (4.45 %). No one having Alcohol. These all are mainly of Kashaya-Rasa predominance and might be causing obstruction in absorption of the diet.

In study of **Nidra wise** distribution we got that the maximum number of Volunteers were having *samyak Nidra* 28(62.22%), than in *alpa Nidra* 15 (33.33 %) and there were 2 (14.45%) Volunteers having *Ati*

Nidra. Lack of sleep is one of the predisposing cause for iron deficiency which is corroborated by the study findings.

In study of **Agni wise** distribution we got that the maximum numbers of Volunteers were having *Samagni* 19 (42.22%), followed by *Mandagni* and *Vishmagni* havine 13 in each group (28.89%). *Agni vikara* is one of the causes for rakta Dhatu Kshaya as found in this study.

In study of **Koshtha wise** distribution we got that the maximum number of Volunteers were having *Mridu Koshtha* 22 (48.89%), followed by *Madhyam Koshtha* 12 (26.66%), and there were minimum Volunteer were having *kroor Koshtha* 11 (24.45 %). Findings indicate towards status of *koshtha* in general population.

In study of **Deha Prakriti wise** distribution we got that the maximum number of Volunteers were have *Vata-Pittaja Prakriti* 17 (37.78 %), followed by *Vata-Kaphaj Prakriti* 9(20 %), than *Pitt-kaphaja* 7 (15.56%), than *vataja* and *Pittaja* *equally* 5-5(11.11%), than 2(4.44%) *volunteers from kaphaja prakriti* and there were no any Volunteers we got in *Sam Prakriti* Groups. These findings re-establishes the *paittika* nature of the disease and individuals of *vata pitta prakriti* are more prone to develop this disease.

In study of **Maanas Prakriti wise** distribution we got that the maximum number of Volunteers were have *Raajas Maanas Prakriti* 35 (77.78 %), followed by *Taams Maanas Prakriti* 10 (22.22 %) and there was no any Volunteer we got in *Saatvik Prakriti* group. *Krodha*, *Chinta* and *Shoka* are the dominant *manasa bhavas* in *Rajasiks* persons. Their mind reacts more quickly to unfavorable conditions and ultimately person become depressed or anxious. Both body and mind affect the functioning of each other. Again loss of appetite, improper diet and improper digestion contribute to the development of *pandu*.

In study of **Abhyavaharana Shakti wise** distribution we got that the maximum numbers of Volunteers were have *Madhayam Abhyavaharana Shakti* 24 (53.33%) than have *Avar Abhyavaharana Shakti* 11 (24.44%) and minimum Volunteer were having *Pravar Abhyavaharana Shakti* 10(22.23%). Findings indicate towards status of *Abhyavaharana Shakti* in general population.

In study of **Jaaran Shakti wise** distribution we got that the maximum numbers of Volunteers were have *Madhyam Jaaran Shakti* 28 (62.22%) than have *Pravar Jaaran Shakti* 10 (22.23%), and there were minimum number of Volunteers have *avar Jaaran Shakti* 11 (24.44%). Findings indicate towards status of *Jaaran Shakti* in general population.

IV. RESULTS:

Effects of trial drugs on objective parameter (Hemoglobin) in all three groups:

G	Mean		D	Change in %	S.D.	S.E.	t	p	R
	B.T.	A.T.							
A	10.08	11.24	1.16	11.51	0.6556	0.1466	7.912	<0.0001	HS
B	10.2	11.03	0.83	8.137	0.4465	0.0998	8.962	<0.0001	HS
C	10.12	11.92	1.80	17.59	0.4577	0.1023	11.039	<0.0001	HS

The trial drugs were evaluated on the single objective parameter of Serum Hb content both before and after trial. Although highly significant results were observed in all the three groups as expected owing to the high iron content in all three trial drugs, quantitatively the most effective result (mean difference between AT and BT = 1.16) was seen in Group A. In other two groups mean difference was 0.83 and 1.80 respectively. It is an interesting observation, considering the fact that *Vastuk* (which was used in Group A contains the least iron (30.78 mg/100 gm; as estimated in the trial drug sample) in comparison to *Vastuk-amalaki mishran* (39.18 mg/100 gm; as estimated in the trial drug sample) and *Dhatri lauha lauha* (30 gm lauha bhasma /100 gm; Calculated value).

All the three trial drugs contain iron in significant amount. Therefore all the three trial drugs possibly effectuated an increase in iron contents in variable degree on the basis of *Samanya Sidhhanta*. Hb contains most of the body iron (65%), therefore increase in iron leads to in Hb.

Compare overall effect of therapy in all groups Subjective Parameters)

S. N.	Sign & symptoms	Relief in percentage		
		Group A	Group B	Group C
1	<i>Parushata</i>	66.66	73.33	73.53
2	<i>Rukshata</i>	66.66	75.00	80.00
3	<i>Sphutita</i>	63.64	66.66	80.55
4	<i>Mlana</i>	87.05	84.57	66.66
5	<i>Amlashishirapreeti</i>	75.71	84.80	73.34
6	<i>Constipation</i>	68.89	53.33	68.14
7	<i>Loss of Appetite</i>	86.20	75.75	83.33
8	<i>Dizziness</i>	74.40	79.16	84.00
9	<i>Palpitation</i>	44.82	70.00	63.64
10	<i>Headache</i>	80.61	82.75	83.33
11	<i>Breathlessness</i>	80.00	77.14	50.00
12	<i>Irritability</i>	50.00	50.00	66.66
13	<i>Fatigue</i>	23.07	30.00	73.33
14	<i>Angular stomatitis</i>	66.66	62.96	66.66
15	<i>Drowsiness</i>	75.00	77.27	60.00

ADRs

No ADRs were observed with any of the three trial drugs during the study period suggesting that all the three drugs are well tolerated in the doses used in the trial.

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