# A Comparative study of the Efficacy of *Ayapatra Pralipta Pippali* and *Plihari Vati* in Iron Deficiency Anemia

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## Abstract

**Iron deficiency anemia is the most prevalent nutritional disorder in India. It can be effectively treated in line of treatment of *pandu*. The study was carried out to compare the efficacy of *ayapatra pralipta pippali* and *plihari vati* in iron deficiency anemia. In this randomized control study, a total of 60 patients fulfilling the assessment and inclusion criteria were included and the trial was done for a duration of 30 days. It showed highly significant result in subjective parameters like *panduta, aruci, daurbalya* etc and also showed an improvement in lab parameters like Hb%, RBC count, MCV, MCH etc. This effect can be attributed to the properties of the ingredients of the trial drug such as *deepana, balya, rasayana* etc.**

***Keywords:*** **Iron deficiency anemia, *Pandu, Ayapatra pralipta pippali, Plihari vati.***

## Introduction

Anemia is the commonest nutritional deficiency disorder in the world. Most of the anemias are due to inadequate supply of nutrients like iron, folic acid and vitamin B12, proteins, amino acids, vitamins A, C, and other vitamins of B-complex group.[1] Prevalence of anemia in all the groups is higher in India as compared to other developing countries.[2] Among the nutrition factors contributing to anemia, the most common one is iron deficiency. In the milder form, anemia is "silent", without symptoms. In its severe form, anemia is associated with symptoms like fatigue, weakness, dizziness and drowsiness. It may further include loss of normal color in the skin (in fair skinned people) and also in the lips, tongue, nail beds and the blood vessels in the white of the eye. If not treated, anemia can worsen and becomes an underlying cause of chronic ill health, such as impaired fetal development during pregnancy, delayed cognitive development and increased risk of infection in young children, and reduced physical capacity in all people. Anemia can be understood in parallel to *pandu roga* due its similarity in symptoms and pathogenesis involved. *Pandu* is a *rasa pradoshaja* disease according to *caraka*[3] and *rakta pradoshaja* disease according to *susruta*[4]. *Rasa* and *rakta* which do the functions of *prinana* and *jivana*[5] in the body directly reflect the status of nutrition in the body. Moreover, *pitta dosha* vitiates in *pandu roga* with increase in its *dravamsa* losing its *taijasa guna*. It leads to *agnimandya* and further depletion of *rasa, rakta* and other *dhātus*.[6] The drugs which are *deepana* (corrects the metabolism) and contain *lauha* which is *taijasa* can effectively treat the condition. Hence this study was carried out to compare the efficacy of two iron containing preparations i.e. *Ayā pātra pralipta pippalī & Plīhāri vaṭī* in combating iron deficiency anemia.

## Aims and Objectives

The aim of the study was to clinically assess iron deficiency anemia and to compare the efficacy of *plīhāri vaṭī and ayapātra pralipta pippalī* in *pāṇḍu roga* (iron deficiency anemia).

## Materials and Methods

A total of 64 patients were randomly selected from the OPD, IPD of NIA. Out of these, 60 patients completed the trial and 4 patients discontinued the treatment.

## Criteria for Selection

### Inclusion Criteria

1) Patients of iron deficiency anemia with Hb% less than 11gm/dl in females and 12gm/dl in male.

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2) Patients were selected randomly irrespective of sex.

3) Patients of age group of 15-50 yrs.

**Exclusion Criteria**

1) Mentally challenged patients.
2) Uncooperative patients.
3) Patients suffering from acute infections, tuberculosis, malignancies and bleeding disorders.
4) Patients on any maintenance therapy.
5) Any other type of anemia except IDA.
6) IDA with any severe complication.
7) Pregnancy.

## Assessment Criteria

All the patients will be assessed on the basis of the assessment criteria as follows:

**A) Clinical Criteria**

1) *pāṇḍuta*
2) *daurbalya*
3) *śrama*
4) *rūkṣata*
5) *śvāsa*
6) *hritspandana*

**B) Laboratory Criteria**

1) Hemoglobin percentage.
2) Total leukocyte count.
3) ESR
4) TRBC
5) PCV
6) MCV, MCH, MCHC

## Modality of Treatment

In group A, Patients were given *ayapātra pralipta pippalī* in powder form (Dose: 5g bid) with water as *anupāna*. In group B, patients were given *plīhāri vaṭī* (Dose: 250mg bid) with water as *anupāna*.

**Trial Duration**: 30 days.

## Follow Up Schedule

Patients were reviewed in every 15 days for 30 days after their inclusion in trial. Result of the clinical study was assessed on the basis of clinical features and lab investigations.

## Statistical Analysis

All the calculations were calculated through 'Graph Pad In stat' software. Paired 't' test for parametric assessment, Wilcoxon signed rank test for non-parametric assessment, and Mann Whitney Test, for comparison of results of symptoms of group 'A' and 'B' are used.

## Results

Highly significant results were obtained in the symptoms of *pāṇḍuta, aruci, daurbalya, hṛdaya spandana, śvāsa*, and *śrama* in both the groups. *Tvagrūkṣata* was not relieved significantly in group A but results were better in group B. The laboratory parameters which are mainly significant are Hb%, RBC count, MCV, MCH, MCHC, RDW and ESR.

**Percentage Change in Subjective Parameters**

*Pāṇḍutā*: Very significant results are seen in both the groups i.e. 44.83 in group A and 58.82 in group B.

*Daurbalya*: 52.73% in group A and 46.43% in group B.

*Aruci:* 76.36% in group A and 75.00% in group B.

*Hridaya spandana:* 51.72% in group A 39.62% in group B.

*Śvāsa:* 42% in group A and 51.92% in group B.

*Śrama:* 53.57% in group A and 41.82% in group B.

*Tvagrūkṣatā*: The drugs were not found to be much effective in this regard with 8.11% change in group A and 24% change in group B.

**Percentage Change in Lab Parameters**

RBC Count was changed 0.63% in group A and 0.41% in group B. Hb% was changed in group A by 4.35% and in group B by 5.57%. MCV is another important investigation for anemia. In group A, 0.25% change was observed and in group B, 0.09% change was observed. MCH showed 0.10% change in group A and 0.19% in group B. MCHC showed 0.06% change in group A and 0.13% in group B. But these results were not statistically significant.

## Discussion

*Pāṇḍu* is a *tridoṣaja vyādhi* in which *pitta* loses its original qualities by its increased *drava guṇa* facilitating the *kapha* and *vāta vṛddhi*. *Mandāgni* and increased *pitta* causes *vidagdhata* of *rasa dhātu*. It produces more *kitta bhāga* as *kapha* and its *prasāda bhāga* does not get converted in to *rakta*. *Aṣṭāṅga saṃgraha* adds a different dimension to the *samprāpti* of *pāṇḍu* as *kapha doṣa* when get localized in *rakta dhātu*, *paṇḍu* results.[7] *Pāṇḍutā* is a *lakṣaṇa* of *bahu doṣa avasthā* and *ubhaya ṣodhana* is the prime treatment modality in *pāṇḍu*. It shows the predominance of *kapha* and *pitta doṣa* in the *samprāpti*. As *pitta* loses its properties, *kapha vāta* symptoms are also predominant in *pāṇḍu*. The first medicine mentioned in *Caraka pāṇḍu cikitsā* is *dadimādi ghṛta*, the *doṣaharatva* of which (*kapha vāta hara*) clearly indicate the role of *kapha vata doṣas* in the back ground of *pitta*. In *pāṇḍu vāta doṣa* has the *kṣepaka dharma* and it spreads the *duṣṭa rasa, rakta* and *tridoṣa* between *tvak* and *maṃsa. Vilīna kapha* cause *Pitta guṇa hāni* and *Pitta vṛddhi* in turn may cause *Kapha vilayana*. This is a vicious cycle. Hence the treatment should focus on *agni dīpana* and *kapha vātaharatva* should decrease the *drava guṇa* and increase *taijasa guṇa* of *pitta*.

The drugs selected are *Aya pātra pralipta pippali* and *Plīhāri vaṭi*. *Aya pātra pralipta pippali* is *vāta kaphahara* and it is expected to decrease the *drava guṇa* of *pitta* due to the dosage form (*cūrna*) and the method of preparation. The iron content in the preparation is expected to add *taijasa guṇa* to *pitta*. The ingredients are generally *kaphavātahara* and help to alleviate *pitta duṣṭi* with *tikṭa* and *kaṣāya rasa* predominance. *Laśuna* is *tīkṣṇa* and may help to cure the *agnimāndya* and *kāśīsa* is expected to add *taijasa guṇa* to *pitta*. *Droṇa puṣpi* which is *dīpana* and is known to have antihelminthic activity as per modern research is effective in *pāṇḍu* which is the *upadrava* of *purīṣaja kṛimi* as mentioned by *madhu koṣa*.[8]

## Effect of Therapy

*Pāṇḍutā*:

It is the cardinal feature in *pāṇḍu*. *Varṇa* or *prabha* are the features of normal *pitta*. Increase in *dravamsa* of *piita* and *kapha duṣti* lead to *pāṇḍuta*. Very significant results are seen in both the groups, i.e. 44.83% in group A and 58.82% in group B. The results were found to be extremely significant in both the groups ($P < 0.0001$).

*Daurbalya*:

*Daurbalya* is a common symptom found in *pāṇḍu*. It results due to *dhātu kṣaya* and resultant *ojo kṣaya*. As per modern lines, the decrease in number of RBC and amount of hemoglobin reduces the amount of oxygen in blood hastening the metabolic activities. When this continues for a long time, it precipitates debility. Significant results were obtained in both the groups: 52.73% in group A and 46.43% in group B. *Rasāyana* and *balya* effects may have contributed in this regard.

*Aruci*:

*Aruci* in *pāṇḍu* results due to *agnimāndya* and the trial drugs being both *dīpana* and *pācana* could yield good results in this regard (76.36% in group A and 75.00% in group B).

*Hṛidaya spandana*:

*Hridaya spandana* results due to *vyāna vāta duṣti* and *alpa raktata*. Significant results were obtained with the drugs which are *dīpana*, *pācana* and *vāta kapha hara*: 51.72% in group A and 39.62% in group B.

*Śvāsa*:

*Śvāsa* in *pāṇḍu* also results due to *daurbalya* and aggravated *vāta*. Significant results were obtained in both the groups: 42% in group A and 51.92% in group B.

*Śrama:*

*Śrama* in *pāṇḍu* also results due to *daurbalya* and aggravated *vāta*. Significant results were found in both the groups: 53.57% in group A and 41.82% in group B.

*Tvagrūkṣatā*:

It is due to *vāta vṛddhi* and *pitta duṣti* in *pāṇḍu*. The drugs were not found to be much effective in this regard with 8.11% change in group A and 24% change in group B. *Aya pātra pralipta pippali* being a *rūkṣa* drug, it was not found to be much effective in dryness of skin. *Plihari Vati* showed better results as compared to *aya pātra pralipta pippali.*

## Effect of Therapy on Lab Parameters

The laboratory parameters which are mainly significant are Hb%, RBC count, MCV, MCH, MCHC, RDW and ESR. RBC count was changed by 0.63% in group A and 0.41% in group B. But the

results were statistically insignificant (p value in group A < 0.0221 and in group B < 0.0057).

Hb% was changed in group A by 4.35% and in group B by 5.57%. Hence group B shows better change in Hb% as compared to group A. This may be because of the presence of iron in ferrous form in *Plihari Vati* enhancing the absorption when compared to elemental iron in *Aya pātra pralipta pippali*. Stastically also the result showed significant result (p<0.0001). MCV is another important investigation for anemia. In group A, 0.25% change was observed and in group B, 0.09% change was observed. MCH showed 0.10% change in group A and 0.19% in group B. MCHC showed 0.06% change in group A and 0.13% in group B. But these results were not statistically significant.

RDW is also important in diagnosing the type of anemia. In group A, 0.50% change was observed and in group B, 0.37% change was observed. But statistically, results were insignificant. ESR is an important investigation in the assessment of efficacy of treatment. ESR being an indicator of any tissue injury or inflammation, it can logically indicate the presence of *āma* or any other defective tissue activity. ESR also depends upon the red cell volume. ESR decreases when the red cell volume increases. In trial, very significant results could be achieved in reducing the ESR level. Group A showed 13.79% change & group B showed 19.13% change which was statistically very significant (p < 0.0001). This can be attributed to the *dīpana* and *pācana* action of drugs.

## Comparison of Treatment

Highly significant results were obtained in the symptoms of *pāṇḍuta, aruci, daurbalya, hṛdaya spandana, śvāsa*, and *śrama* in both the groups. *Tvagrūkṣata* was not relieved significantly in group A but results were better in group B. *Aya pātra pralipta pippali cūrṇa* is more *rūkṣa* because of its contents and method of preparation. *Plīhāri vaṭi* is less *rūkṣa* because of the contents like *abhraka, kumāri, kāsīsa* etc which are *snigdha*.

## Conclusion

Iron deficiency anemia especially nutritional iron deficiency anemia can be very well compared to *pandu* based on the similarity in symptoms and pathogenesis. Analyzing the pathology, it can be concluded that the treatment should focus on *agni dīpana* and *kapha vātaharatva*, should decrease the *drava guṇa* and increase *taijasa guṇa* of *pitta*. *Aya pātra pralipta pippali* and *plīhāri vaṭi* are *rūkṣa*, and *kapha vāta hara* imparts *taijasa guṇa* by the presence of *loha*. They correct the metabolism by *dipana* property. *Ayapatra pralipta pippali* contain iron in ferric form but in *plihari vati* it is in ferrous form which is more bioavailable compared to the former one. *Dipana* drugs in both the compounds enhance the bioavailability of iron. *Aruci* showed maximum improvement among the subjective parameters showing the *dīpana* action of the drugs. Hb% showed the maximum improvement among the objective parameters. Overall improvement of subjective and objective parameters was better in group B which can be due to the presence of iron in the ferrous form. The study was conducted in a small sample and for further evaluation it should be conducted in larger samples with long term follow up. It may prove as an effective drug of choice with iron content of good availability compared to the allopathic drugs which cause different adverse effects.

| Symptoms | N | Mean | | Diff. | % of Change | SD | SE | T | p |
|---|---|---|---|---|---|---|---|---|---|
| | | BT | AT | | | | | | |
| *Panduta* | 30 | 1.93 | 1.07 | 0.87 | 44.83 | 0.43 | 0.08 | 11.12 | <0.0001 |
| *Aruci* | 30 | 1.83 | 0.43 | 1.40 | 76.36 | 0.56 | 0.10 | 13.61 | <0.1001 |
| *Daurbalya* | 30 | 1.83 | 0.87 | 0.97 | 52.73 | 0.49 | 0.09 | 10.80 | <0.0001 |
| *Hridaya spandana* | 30 | 1.93 | 0.93 | 1.00 | 51.72 | 0.26 | 0.05 | 20.86 | <0.0001 |
| *Shvasa* | 30 | 1.73 | 0.83 | 0.90 | 51.92 | 0.61 | 0.11 | 8.12 | <0.1001 |
| *Shrama* | 30 | 1.87 | 0.87 | 1.00 | 53.57 | 0.53 | 0.10 | 10.43 | <0.1001 |
| *Twagrikshata* | 30 | 1.23 | 1.13 | 0.10 | 8.11 | 0.40 | 0.07 | 1.36 | <0.3125 |

**Table 1.Effect of Group A drug (*Aya patra pralipta pippali*) on Subjective Parameters**

| Parameter | N | Mean | | Diff. | % of change | SD | SE | T | p |
|---|---|---|---|---|---|---|---|---|---|
| | | BT | AT | | | | | | |
| WBC | 30 | 7.28 | 7.34 | -0.06 | 0.82 | 0.32 | 0.06 | 1.03 | <0.3099 |
| RBC | 30 | 3.79 | 3.81 | -0.02 | 0.63 | 0.05 | 0.01 | 2.42 | <0.0221 |
| HB | 30 | 10.95 | 11.43 | -0.48 | 4.35 | 0.41 | 0.07 | 6.42 | <0.0001 |
| HCT | 30 | 31.00 | 31.12 | -0.10 | 0.33 | 0.25 | 0.05 | 2.24 | <0.0119 |
| MCV | 30 | 82.62 | 82.41 | 0.21 | 0.25 | 0.34 | 0.06 | 3.32 | <0.0002 |
| MCH | 30 | 29.58 | 29.61 | -0.03 | 0.10 | 0.15 | 0.03 | 1.07 | <0.0174 |
| MCHC | 30 | 35.94 | 35.91 | 0.02 | 0.06 | 0.14 | 0.02 | 0.94 | <0.1741 |
| RDW | 30 | 13.28 | 13.21 | 0.07 | 0.50 | 0.20 | 0.04 | 1.84 | <0.0427 |
| PLT | 30 | 250.00 | 250.03 | -0.03 | 0.01 | 1.38 | 0.25 | 0.13 | <.8954 |
| ESR | 30 | 16.20 | 13.97 | 2.23 | 13.79 | 1.14 | 0.21 | 10.78 | <0.0001 |

**Table 2.Effect of Group A drug (*Aya patra pralipta pippali*) on Laboratory Parameters**

| Symptoms | N | Mean | | Diff. | % of Change | SD | SE | T | p |
|---|---|---|---|---|---|---|---|---|---|
| | | BT | AT | | | | | | |
| *Panduta* | 30 | 1.70 | 0.70 | 1.00 | 58.82 | 0.59 | 0.11 | 9.33 | < 0.0001 |
| *Aruci* | 30 | 1.87 | 0.47 | 1.40 | 75.00 | 0.62 | 0.11 | 12.34 | < 0.0001 |
| *Daurbalya* | 30 | 1.87 | 1.00 | 0.87 | 46.43 | 0.57 | 0.10 | 8.31 | < 0.0001 |
| *Hridaya spandana* | 30 | 1.77 | 1.07 | 0.70 | 39.62 | 0.60 | 0.11 | 6.43 | < 0.0001 |
| *Shvasa* | 30 | 1.67 | 0.97 | 0.70 | 42.00 | 0.68 | 0.12 | 5.65 | < 0.0001 |
| *Shrama* | 30 | 1.83 | 1.07 | 0.77 | 41.82 | 0.63 | 0.11 | 6.71 | < 0.0001 |
| *Twagrikshata* | 30 | 1.67 | 1.27 | 0.40 | 24.00 | 0.50 | 0.09 | 4.40 | < 0.0001 |

**Table 3.Effect of Group B drug (*Plihari vati*) on Subjective Parameters**

| Parameters | N | Mean | | Diff. | % of Change | SD | SE | T | P |
|---|---|---|---|---|---|---|---|---|---|
| | | BT | AT | | | | | | |
| WBC | 30 | 7.15 | 7.24 | -0.09 | 1.31 | 0.19 | 0.03 | 2.70 | <0.0114 |
| RBC | 30 | 3.75 | 3.76 | -0.02 | 0.41 | 0.03 | 0.01 | 2.95 | <0.0057 |
| HB | 30 | 11.12 | 11.74 | -0.62 | 5.57 | 0.31 | 0.06 | 10.91 | < 0.0001 |
| HCT | 30 | 30.84 | 30.97 | -0.13 | 0.42 | 0.19 | 0.04 | 3.63 | <0.0007 |
| MCV | 30 | 79.53 | 79.46 | 0.07 | 0.09 | 0.22 | 0.04 | 1.73 | <0.0941 |
| MCH | 30 | 29.85 | 29.91 | -0.06 | 0.19 | 0.27 | 0.05 | 1.14 | <0.2619 |
| MCHC | 30 | 36.12 | 36.16 | -0.05 | 0.13 | 0.22 | 0.04 | 1.15 | <0.2599 |
| RDW | 30 | 13.49 | 13.44 | 0.05 | 0.37 | 0.14 | 0.03 | 3.04 | <0.0787 |
| PLT | 30 | 223.93 | 224.23 | -0.30 | 0.13 | 1.26 | 0.23 | 1.30 | <0.2037 |
| ESR | 30 | 15.33 | 12.40 | 2.93 | 19.13 | 2.15 | 0.39 | 7.48 | < 0.0001 |

**Table 4.Effect of Group B drug (*Plihari vati*) on Objective Parameters**

## References


1. Lee GR, Herbert V. Nutritional factors in the production and function of erythrocytes. In: Lukens J, Paraskevas P, Greer JP et al. (eds.). Wintrobe's clinical hematology. *Baltimore, Maryland USA: William & Wilkins*, 1998: 228-66.
2. Shah SN. API Text book of medicine. 7th ed. *JPB publishers*, 2003: 931.
3. Yadavji Trikamji Acharya. Agnivesh, Caraka Samhita, Sutrastana 10/28. *Chaukhambha Orientalia*. p 179.
4. Yadavji Trikamji Acharya. Susruta, Susruta Samhita, Uttarastana 3/44. *Chaukhambha Surbharati Prakashan, Varanasi*. p 729.
5. Dr Shivaprasad Sharma. Vagbhata, Astanga Sangraha, Sutrastana 21/1. *Chaukhambha Sanskrit series office, Varanasi*. p 6.
6. Yadavji Trikamji Acharya. Agnivesh, Caraka Samhita, Cikitsa sthana 4,5,6/16. *Chaukhambha Orientalia, Varanasi*. p 526.
7. Dr Shivaprasad Sharma. Vagbhata,Astanga Sangraha, Sutrastana 21/19. *Chaukhambha Sanskrit series office, Varanasi*. p 153.
8. Yadunandana Upadhyaya. Madhukosha, Madhava nidāna 8/1. *Chaukhambha Prakashan, Varanasi*. p 245.