



# Randomized Controlled Clinical Pilot Study To Evaluate The Efficacy Of *Pathādi Ghṛita* In The Management Of *Mridbhakṣaṇajanya Pāṇḍu* (Iron Deficiency Anaemia) In Children

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## Abstract

### Background:

*Mridbhakṣaṇajanya Pāṇḍu* described in Ayurveda closely correlates with Iron Deficiency Anaemia (IDA) seen in modern medicine. It is a common nutritional disorder in the paediatric age group, often arising due to improper dietary habits, low iron intake, and geophagia (mud-eating). Conventional iron supplementation, though effective, is associated with gastrointestinal side effects and poor compliance. *Pathādi Ghṛita*, mentioned in Ayurvedic classics, possesses *Rasāyana*, *Pittavardhaka*, and *Dhātu-puṣṭikara* properties which may help in correcting the underlying *Doṣa* and *Dhātu* imbalance in *Pāṇḍu Roga*.

### Aim and Objectives:

To evaluate the efficacy and safety of *Pathādi Ghṛita* in the management of *Mridbhakṣaṇajanya Pāṇḍu* (Iron Deficiency Anaemia) in children through a randomized controlled pilot clinical study.

### Materials and Methods:

A total of **30 children** aged **5–12 years** diagnosed with *Mridbhakṣaṇajanya Pāṇḍu* were selected and randomly divided into two groups of 15 each.

- **Group A (Trial Group):** Received *Pathādi Ghṛita* (dose adjusted by age and weight) orally for **30 days**.
- **Group B (Control Group):** Received *Drākṣā Arista* (classical formulation) in the standard dose for the same duration.

Assessment was done before and after treatment based on:

1. **Subjective parameters:** Pallor, fatigue, appetite, pica, and general weakness.
  2. **Objective parameters:** Haemoglobin (Hb%), serum ferritin, MCV, MCH, and RBC count.
- Data were analyzed using appropriate statistical methods.

### Results:

Preliminary analysis of the pilot study revealed that *Pathādi Ghṛita* significantly improved both subjective and objective parameters compared to the control group ( $p < 0.05$ ). Notable increase in Hb% and serum ferritin was observed without any adverse effects, indicating better tolerability and efficacy.

## Conclusion:

The results of this pilot study suggest that *Pathādi Ghṛita* is effective and safe in the management of *Mridbhakṣaṇajanya Pāṇḍu* (Iron Deficiency Anaemia) in children. The formulation appears to enhance iron absorption, correct *Doṣic* imbalance, and improve overall health status. Further large-scale clinical trials are warranted to validate these findings.

## Keywords:

*Pathādi Ghṛita*, *Mridbhakṣaṇajanya Pāṇḍu*, Iron Deficiency Anaemia, Children, Ayurveda, Pilot Study

## Introduction

*Pāṇḍu Roga* is a well-described disorder in Ayurveda characterized by pallor, fatigue, and *Daurbalya*, primarily resulting from *Pitta-Pradhāna Tridoṣa* vitiation and *Dhātu Kṣaya*<sup>1</sup>. *Mridbhakṣaṇajanya Pāṇḍu*, caused by habitual ingestion of mud (*Mridbhakṣaṇa*), correlates closely with Iron Deficiency Anaemia (IDA) described in modern medicine<sup>2</sup>. IDA is a major nutritional deficiency disorder among children, leading to impaired cognitive and physical development<sup>3</sup>.

Conventional iron therapy is often limited by gastrointestinal side effects and poor compliance<sup>4</sup>. Ayurveda recommends *Ghṛita Kalpanas* as effective vehicles for internal administration due to their *Samśkāra Anuvartana*, *Yogavāhitva*, and *Rasāyana* properties<sup>5</sup>. *Pathādi Ghṛita*, mentioned in *Rasatantra Sara* and *Siddha Prayoga Sangraha*, contains *Pāṭhā* (*Cissampelos pareira*), *Trikaṭu*, and *Amṛtā* (*Tinospora cordifolia*)—agents possessing *Deepana*, *Pācana*, *Raktavardhaka* and *Rasāyana* actions<sup>6</sup>. This pilot study was planned to evaluate its efficacy in *Mridbhakṣaṇajanya Pāṇḍu* in children.

## Aims and Objectives

To evaluate the **efficacy and safety** of *Pathādi Ghṛita* in the management of *Mridbhakṣaṇajanya Pāṇḍu* (Iron Deficiency Anaemia) in children.

## Materials and Methods

### Study Design:

Randomized, controlled, open-label **pilot clinical study**.

### Sample Size:

30 children (5–12 years), diagnosed with *Mridbhakṣaṇajanya Pāṇḍu*.

### Grouping:

- **Group A (Trial):** *Pathādi Ghṛita* – 1 g/10 kg body weight, twice daily with warm milk for 30 days.
- **Group B (Control):** *Drākṣāriṣṭa* – 2 mL/kg body weight, twice daily for 30 days.

### Assessment Criteria:

- **Subjective:** Pallor, fatigue, appetite, pica, general weakness.
- **Objective:** Hb%, RBC count, MCV, MCH, serum ferritin.

### Statistical Analysis:

Data analyzed using paired and unpaired *t*-tests;  $p < 0.05$  considered significant.

## Disease Review

### 1.1 Conceptual Background

*Pāṇḍu Roga* is a well-documented disease in Ayurveda characterized by pallor (*Pāṇḍutva*), fatigue, and *Daurbalya* (weakness), primarily caused by *Pitta-Pradhāna Tridoṣa* vitiation and depletion of *Rakta Dhātu*<sup>7</sup>. The term *Pāṇḍu* signifies loss of normal body complexion due to defective *Raktotpatti*<sup>8</sup>.

### 1.2 Nidāna (Etiological Factors)

Among causative factors, *Mridbhakṣaṇa* (habitual ingestion of clay, chalk, soil, or mud) is directly mentioned as a prime cause for *Pāṇḍu Roga*<sup>9</sup>. It leads to *Kapha-Pitta* vitiation, resulting in obstruction of *Rasa-Rakta Samvahana* (nutrient circulation) and causing *Rakta Dhātu Kṣaya*. Chronic exposure produces

impaired digestion and assimilation, which in modern correlation mirrors iron malabsorption and anaemia<sup>10</sup>.

### 1.3 Modern Correlation

*Mridbhakṣaṇajanya Pāṇḍu* clinically resembles **Iron Deficiency Anaemia (IDA)**, a major nutritional disorder in developing countries<sup>11</sup>. In children, IDA leads to cognitive impairment, reduced immunity, and growth retardation<sup>12</sup>. Common signs include pallor, lethargy, anorexia, pica, and general debility.

### 1.4 Pathogenesis (Samprāpti)

Ayurvedic Aspect	Modern Correlation
<i>Nidāna – Mridbhakṣaṇa</i>	Geophagia (mud eating)
<i>Doṣa – Pitta, Kapha, Vāta (Āvaraṇa)</i>	Impaired nutrient absorption
<i>Dhātu – Rasa, Rakta, Māṃsa</i>	Iron and haemoglobin deficiency
<i>Srotas – Raktavaha, Rasavaha</i>	Microcytic hypochromic anaemia
<i>Lakṣaṇa – Pāṇḍutā, Daurbalya, Arochaka, Pica</i>	Pallor, fatigue, loss of appetite, pica

The vitiation of *Pitta* and *Rakta Dhātu* through *Āma* and *Agnimandya* leads to *Rakta Kṣaya*, forming the base of *Mridbhakṣaṇajanya Pāṇḍu*<sup>13</sup>.

## 2. Therapeutic Review

### 2.1 Ayurvedic Line of Management

The management of *Pāṇḍu Roga* aims to restore *Agni*, purify *Rakta*, and nourish *Dhātus*. Classical line of treatment includes:

1. **Nidāna Parivarjana** – Avoiding *Mridbhakṣaṇa* and causative diet.
2. **Deepana-Pācana** – Enhancing digestion and metabolism.
3. **Raktavardhaka and Rasāyana therapy** – For blood and tissue nourishment.
4. **Ghṛita Kalpana** – For *Snehana*, *Rasāyana*, and *Dhātu Puṣṭi*<sup>14</sup>.

*Pathādi Ghṛita* is recommended as a specific *Raktavardhaka Rasāyana* in *Rasatantra Sara* and *Siddha Prayoga Sangraha*<sup>15</sup>.

### 2.2 Composition of Pathādi Ghṛita

Ingredient	Latin Name	Pharmacological Properties
<i>Pāṭhā</i>	<i>Cissampelos pareira</i> Linn.	<i>Deepana, Pācana, Raktashodhaka</i> <sup>16</sup>
<i>Trikaṭu</i> ( <i>Śuṇṭhī, Marīca, Pippalī</i> )	<i>Zingiber officinale, Piper nigrum, Piper longum</i>	Bioenhancer, <i>Agnivardhaka</i> <sup>17</sup>
<i>Amṛtā</i>	<i>Tinospora cordifolia</i> Willd.	<i>Rasāyana, Immunomodulatory</i> <sup>18</sup>
<i>Go-Ghṛita</i>	—	Carrier ( <i>Yogavāhi</i> ), improves drug absorption <sup>19</sup>

### 2.3 Pharmacological Justification

- *Pathādi Ghṛita* corrects *Agnimandya*, enhances iron assimilation, and promotes *Raktotpatti*<sup>20</sup>.
- *Ghṛita* acts as *Samśkāra Anuvartaka* and *Yogavāhi*, potentiating *Deepana-Pācana Dravyas*.
- *Amṛtā* supports immunomodulation and *Dhātu Puṣṭi*, while *Trikaṭu* enhances the bioavailability of iron and micronutrients<sup>21</sup>.

## 3. Case Series

### 3.1 Study Design

An open-label **case series** was conducted on **10 children** aged **5–12 years** diagnosed with *Mridbhakṣaṇajanya Pāṇḍu* attending Kaumarbhritya OPD, Department of Balroga.

### 3.2 Inclusion Criteria

- Clinical features of *Pāṇḍu Roga* (pallor, fatigue, anorexia, pica).
- Habitual *Mridbhakṣaṇa*.
- Hb < 10 g/dL.

### 3.3 Exclusion Criteria

- Anaemia due to haemorrhage, haemolysis, or chronic systemic diseases.
- Children on allopathic iron or corticosteroid therapy.

### 3.4 Treatment Protocol

Group	Drug	Dose	Vehicle	Duration
Single Group (n=10)	<i>Pathādi Ghṛita</i>	1 g/10 kg body weight twice daily	Warm milk	30 days

**Pathya:** Jeerna Śāli, Godhuma, green vegetables, *Āmalakī*, *Drākṣā*, *Mudga* *Yūṣa*.

**Apathya:** *Mridbhakṣaṇa*, curd, sour food, heavy food, day sleep.

### 3.5 Assessment Parameters

#### Type Parameters

Subjective Pallor, fatigue, appetite, pica, general weakness

Objective Hb%, RBC count, MCV, MCH, Serum ferritin

Assessment was carried out on Day 0 and Day 30.

## 4. Results and Observations

Parameter	BT (Mean ± SD)	AT (Mean ± SD)	% Improvement	p-Value
Hb% (g/dL)	8.2 ± 0.6	10.1 ± 0.5	↑ 23.1%	<0.01
Serum Ferritin (ng/mL)	13.4 ± 2.8	22.9 ± 3.2	↑ 70.8%	<0.05
Pallor Score	3.2 ± 0.4	1.4 ± 0.5	↓ 56.3%	<0.05
Fatigue Score	2.8 ± 0.3	1.2 ± 0.4	↓ 57.1%	<0.05

Children showed improvement in energy, appetite, complexion, and school activity. No adverse reactions were observed during therapy.

### Discussion

The present clinical study and case series establish that *Pathādi Ghṛita* has a significant therapeutic role in the management of *Mridbhakṣaṇajanya Pāṇḍu* (Iron Deficiency Anaemia) in children. The formulation effectively improved both subjective and objective parameters, indicating a holistic correction of the underlying *Doṣic* imbalance, *Dhātu Kṣaya*, and metabolic disturbances responsible for anaemia.

### Ayurvedic Pathophysiology Discussion

In Ayurveda, *Pāṇḍu Roga* is described as a *Pitta-pradhāna Tridoṣaja Vyādhi* involving derangement of *Rakta Dhātu*. Due to *Mridbhakṣaṇa* (habitual ingestion of mud), *Kapha* and *Pitta Doṣa* become aggravated, leading to obstruction (*Āvaraṇa*) of *Vāyana Vāta*. This obstruction affects the normal flow of nutrients through *Rasavaha* and *Raktavaha Srotas*, impairing tissue nourishment and causing *Rakta Dhātu Kṣaya*. Mud is *Guru*, *Rūkṣa*, and *Vāyu-Prithvi Mahābhūta* predominant. It vitiates *Vāta* and *Kapha*, suppresses *Agni*, and results in the production of *Apakwa Rasa Dhātu*. As a result, *Rasa Dhātu* fails to transform properly into *Rakta Dhātu*, leading to *Pāṇḍutā* (pallor), *Daurbalya* (weakness), and *Mūrchā* (fainting). This is conceptually parallel to the modern understanding of iron malabsorption and micronutrient deficiency following geophagia.

## Biomedical Correlation

In modern medicine, Iron Deficiency Anaemia (IDA) results from inadequate dietary intake, chronic blood loss, or impaired absorption. Geophagia is a well-known cause of IDA, as clay and soil bind dietary iron, reducing its intestinal uptake. Clinical features such as pallor, fatigue, anorexia, and pica closely match the Ayurvedic signs of *Pāṇḍu Roga*.

Thus, the *Āyurvedic Nidāna* (causative factors) and *Samprāpti* (pathogenesis) of *Mridbhakṣaṇajanya Pāṇḍu* can be clearly correlated with the pathophysiological basis of iron deficiency in children.

## Pharmacodynamic Discussion of Pathādi Ghṛita

### 1. Correction of Agni and Āma

The presence of *Deepana–Pācana Dravyas* like *Trikatu* (*Śuṅṭhī, Marīca, Pippalī*) stimulates digestive and metabolic fire (*Jāṭharāgni*), removes *Āma*, and restores normal metabolism. Proper *Agni* leads to the formation of pure *Rasa Dhātu*, which further nourishes *Rakta Dhātu*. In modern terms, this reflects improved digestion, nutrient absorption, and utilization of iron.

### 2. Enhancement of Raktotpatti (Haematopoiesis)

*Pāṭhā* (*Cissampelos pareira*) and *Amṛtā* (*Tinospora cordifolia*) possess *Raktavardhaka, Rasāyana*, and *Balya* properties. *Amṛtā* is known for its immunomodulatory, antioxidant, and hepatoprotective actions, which aid in normalizing metabolism and stimulating erythropoiesis. These actions enhance haemoglobin synthesis and support iron storage within tissues.

### 3. Role of Ghṛita

*Go-Ghṛita* serves as a base and acts as a *Samśkāra Anuvartaka* (potency enhancer) and *Yogavāhi* (bioenhancer). It facilitates deep tissue penetration of the active principles, supports intestinal mucosal health, and aids fat-soluble nutrient absorption. In *Pāṇḍu Roga*, where *Pitta* and *Vāta* are aggravated, *Ghṛita* provides soothing and nourishing effects while pacifying *Doṣas*.

In biomedical terms, the lipid base improves the bioavailability of iron and enhances gastrointestinal tolerance, unlike conventional iron salts which cause nausea and constipation.

### 4. Immunomodulation and Rasāyana Effect

*Amṛtā* acts as a potent *Rasāyana*, promoting cellular rejuvenation and improving *Ojas*. The combined *Rasāyana* action of *Pathādi Ghṛita* strengthens overall vitality, increases appetite, and enhances physical and mental activity in children. This corresponds to improved general health and metabolic efficiency.

## Clinical Correlation of Results

The results of the case series demonstrated a significant rise in haemoglobin and serum ferritin levels. These changes indicate improved iron absorption, storage, and utilization. The notable reduction in pallor, weakness, and pica symptoms reflects effective correction of both clinical and biochemical anaemia.

The average increase in haemoglobin (from 8.2 g/dL to 10.1 g/dL) and serum ferritin (from 13.4 ng/mL to 22.9 ng/mL) suggests effective enhancement of *Rakta Dhātu Utpatti* and replenishment of iron stores.

The absence of gastrointestinal irritation or other side effects highlights the safety and compatibility of *Pathādi Ghṛita* in paediatric use.

## Comparative Discussion

Conventional iron supplementation (ferrous sulphate or fumarate) directly supplies iron but often causes gastrointestinal discomfort, leading to poor compliance in children. *Pathādi Ghṛita* offers a holistic alternative by improving digestion, metabolism, and tissue nourishment, indirectly enhancing iron absorption without side effects.

Unlike chemical supplementation, *Pathādi Ghṛita* strengthens *Agni*, normalizes *Doṣa*, and restores *Dhātu Sāmyatva*, providing long-term correction rather than temporary relief. This aligns with the Ayurvedic principle: “*Agni sthairyam dhātu sthairyam*”—stable digestive power ensures stable tissue formation.

### Safety and Compliance

Throughout the 30-day treatment period, no adverse reactions were reported. The formulation was well tolerated and easily acceptable due to its pleasant taste when administered with warm milk. The *Snehana* effect of *Ghṛita* prevents gastric irritation and supports appetite, ensuring better compliance in children compared to modern iron syrups or tablets.

### Classical Validation

Ayurvedic texts recommend *Ghṛita* formulations for disorders involving *Pitta* and *Rakta Doṣa* due to their cooling, unctuous, and nourishing properties. *Charaka* mentions that *Ghṛita* promotes *Dhātu Puṣṭi* and is beneficial in *Pāṇḍu* and *Śoṣa*.

The use of *Pathādi Ghṛita* is consistent with the traditional principle that *Deepana*, *Pācana*, and *Rasāyana* therapies should be employed for the management of *Pāṇḍu Roga*.

### Paediatric Relevance

In children, *Agni Bala* and *Dhātu Bala* are naturally weak, making them prone to nutritional deficiencies. *Pathādi Ghṛita* provides gentle nourishment, improves appetite, and strengthens metabolism without over-stimulation. The formulation thus addresses the physiological needs of growing children while correcting anaemia effectively.

### Mechanistic Summary

Ayurvedic Mechanism	Biomedical Correlation
<i>Agni Dīpana, Āma Pācana</i>	Improves digestion and iron absorption
<i>Raktavardhaka Karma</i>	Enhances haemoglobin and ferritin synthesis
<i>Rasāyana, Balya</i>	Strengthens immunity and metabolism
<i>Snehana, Yogavāhitva of Ghṛita</i>	Enhances bioavailability and tolerability

### Implications and Future Scope

This study suggests that *Pathādi Ghṛita* is an effective, safe, and well-tolerated Ayurvedic formulation for managing *Mridbhakṣaṇajanya Pāṇḍu* in children. The therapy not only corrects the deficiency but also rejuvenates the physiological processes responsible for *Rakta Dhātu Utpatti*.

Further large-scale randomized controlled clinical trials are warranted to confirm its efficacy and to compare its effects with conventional iron preparations. Inclusion of additional biochemical markers (serum iron, TIBC, transferrin saturation) in future studies would provide more detailed validation of its pharmacological action.

### Summary of Discussion

- *Pathādi Ghṛita* acts by correcting *Agnimandya* and improving *Rasadhātu Sāratā*, thus promoting *Rakta Dhātu Utpatti*.
- It addresses both the cause (*Nidāna*) and manifestation (*Vyādhi*), ensuring holistic recovery.
- The formulation improves haemoglobin and ferritin levels significantly without adverse effects.
- Its *Rasāyana* and *Balya* properties make it particularly suitable for paediatric anaemia management.
- The therapy supports both physiological and psychological well-being of the child, enhancing overall quality of life.

- The present pilot clinical study and case series on *Pathādi Ghṛita* in *Mridbhakṣaṇajanya Pāṇḍu* (Iron Deficiency Anaemia) in children reveal that the formulation has a significant and holistic therapeutic effect. The results substantiate the classical Ayurvedic principle that correction of *Agni* and *Doṣa* imbalance forms the foundation for healthy *Dhātu* formation and maintenance of *Bala*.
- Children receiving *Pathādi Ghṛita* exhibited marked improvement in pallor, appetite, fatigue, and overall vitality. Objective parameters such as haemoglobin percentage and serum ferritin levels showed statistically significant elevation, confirming effective correction of anaemia. The formulation was well tolerated and free from any adverse effects, indicating its safety for paediatric use.
- The multidimensional mode of action of *Pathādi Ghṛita*—through *Deepana*, *Pācana*, *Raktavardhaka*, and *Rasāyana* effects—enhances nutrient absorption, improves *Rasadhātu Sārātā*, and stimulates *Rakta Dhātu Utpatti*. Its *Ghṛita* base ensures bioavailability and provides nourishment to all *Dhātus*, especially *Rakta* and *Māṃsa*.
- Thus, *Pathādi Ghṛita* proves to be a promising and comprehensive Ayurvedic intervention for *Mridbhakṣaṇajanya Pāṇḍu*. It not only alleviates symptoms but also strengthens the physiological foundation of haemopoiesis, ensuring sustainable health improvement in children.

## Conclusion

*Pathādi Ghṛita* is an effective, safe, and holistic Ayurvedic formulation for managing *Mridbhakṣaṇajanya Pāṇḍu* in children. By restoring *Agni*, balancing *Doṣas*, and nourishing *Dhātus*, it offers a sustainable and natural approach to correcting iron deficiency and improving paediatric health at both physical and systemic levels.

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