

PILOT STUDY

Changes in Hemoglobin Concentration Following *Drakshapanak* Administration in Adults with Previously Diagnosed Iron Deficiency Anemia

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ABSTRACT

Background: Iron deficiency is a major contributor to anemia globally. Ayurveda describes *Pandu Roga* with clinical features that overlap with anemia, and dietary formulations (*Ahara Kalpana*) may have a supportive role. *Drakshapanak* is a polyherbal beverage containing fruit-based, sweetening, and aromatic ingredients and was investigated in a pilot clinical study.

Materials and Methods: This prospective, single-arm, pre-post interventional pilot study enrolled 10 adults aged 18–45 years at the National Institute of Ayurveda, Jaipur, India. Participants had previously diagnosed iron deficiency anemia, with baseline hemoglobin concentrations within the study-defined mild-to-moderate range. *Drakshapanak* was administered daily for 60 days, with follow-up visits on days 15, 30, 45, and 60. The primary outcome was the change in hemoglobin concentration from baseline to day 60. Baseline and post-intervention values were compared using a paired t-test.

Results: All 10 participants completed the study. Mean hemoglobin concentration increased from 11.05 ± 1.14 g/dL at baseline to 11.63 ± 1.32 g/dL on day 60. The mean paired increase was 0.58 ± 0.38 g/dL (95% confidence interval, 0.31–0.85), representing a 5.25% increase from baseline ($t = 4.83$; $P = 0.0009$).

Discussion: The statistically significant mean increase of 0.58 g/dL in hemoglobin suggests a potential supportive effect of *Drakshapanak*; however, the small sample size, absence of a control group, and lack of iron-status biomarkers limit definitive interpretation of the findings.

Conclusion: *Drakshapanak* administration was associated with a modest increase in hemoglobin concentration over 60 days. Larger controlled studies incorporating iron-status biomarkers are required.

1. INTRODUCTION

Anemia remains an important public health concern, with iron deficiency contributing substantially to its burden. Hemoglobin thresholds used to define anemia vary according to age, sex, and

physiological status, as outlined in the World Health Organization guideline.^[1] However, a reduced hemoglobin concentration alone does not establish iron deficiency. Assessment of iron stores, particularly serum ferritin interpreted in the context of inflammation, is necessary to distinguish iron deficiency anemia (IDA) from other causes of anemia.^[2] IDA can result from inadequate dietary iron intake, impaired absorption, increased physiological requirements, or chronic blood loss. Its management requires identification and treatment of the underlying cause alongside appropriate iron replacement.^[3]

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In Ayurveda, *Pandu Roga* is characterized by *Panduta* (pallor or altered complexion), *Daurbalya* (weakness), *Shrama* (fatigue), *Aruchi* (reduced appetite), *Hridspandana* (palpitations), and *Shwasa* (breathlessness). The *Charaka Samhita* describes its pathogenesis as predominantly involving aggravated *Pitta Dosha*, together with disturbances of *Vata*, *Kapha*, *Rakta*, *Mamsa*, and *Twak*. The aggravated *Pitta*, propelled through the *Dhamanis* by vitiated *Vata*, impairs normal complexion, strength, and tissue nourishment, resulting in *Dhatu Shaithilya* and the clinical manifestations of *Pandu*. Impairment of *Agni* may further disturb the formation and nourishment of *Rasa* and *Rakta Dhatu*.^[4]

Drakshapanak is a polyherbal Ayurvedic *Ahara Kalpana* mentioned in *Kaiyadev Nighantu*.^[5] It is a dietary beverage containing fruit-based ingredients, sweeteners, water, and aromatic substances. Its selection for the present pilot study was based on the traditional dietary rationale described in the study protocol. Nevertheless, this rationale requires clinical evaluation and does not, by itself, establish an effect on hemoglobin synthesis, iron absorption, or iron stores.

The present prospective, single-arm pilot study therefore evaluated changes in hemoglobin concentration following 60 days of *Drakshapanak* administration in adults with previously diagnosed IDA. The study aimed to generate preliminary data on the observed hematological response to inform the design of subsequent controlled investigations.

1.1. Objectives

This study aimed to evaluate the change in hemoglobin concentration following administration of *Drakshapanak* in adults with previously diagnosed IDA.

2. MATERIALS AND METHODS

2.1. Trial Design

Prospective, interventional, single-group pre-post pilot study conducted through the outpatient/inpatient services of the National Institute of Ayurveda (NIA), Jaipur. For the study, 16 individuals were screened, 6 were excluded, and 10 participants were enrolled and completed the study. The enrolled participants received 100 mL of *Drakshapanak* administered once daily in the morning, 15–20 min after the meal. The intervention period, including follow-up, was 60 days, with follow-up on days 15, 30, 45, and assessments on the 60th day.

2.2. Eligibility Criteria for Participants

2.2.1. Inclusion criteria

- Age group 18–45 years of either sex who are previously diagnosed with IDA
- Serum hemoglobin levels analysis to identify the patient as mild-to-moderate anemic (S. Hb levels 9–12 g/dL).

2.2.2. Exclusion criteria

- Severe anemic patients
- Lactating and pregnant women
- Women planning pregnancy
- Using vitamin and mineral supplements
- Frequent blood donors
- Have had major surgeries in the past 3 months
- Plan of surgery in course of study

- Alcohol consumption
- Known cases of ulcerative colitis, chronic kidney disease, diverticular bleeding, irritable bowel syndrome, *Helicobacter pylori*, hookworm infestation, blood clotting disorders
- Using non-steroidal anti-inflammatory drugs, antacids, corticosteroids, and antiviral drugs.

2.3. Setting

The study was conducted in the outpatient department and inpatient department of the NIA, Jaipur.

2.4. Intervention

100 mL of *Drakshapanak* once daily in the morning, administered 15–20 min after the meal for 60 days.

2.5. Diagnosis Criteria

- A clinical diagnosis based on signs and symptoms.
- Serum hemoglobin level analysis to identify the patient as mild-to-moderate anemic (S. Hb levels 9–12 g/dL).

Hemoglobin thresholds used to identify anemia are summarized in Table 1, and the anemia grading criteria are presented in Table 2. Hemoglobin concentration alone does not establish iron deficiency.

2.6. Outcome Measures

- Outcome: Change in serum hemoglobin level before and after the completion of the study
- Sample size: The sample size was 10.

2.7. Ethics and Consent to Participation

This study commenced after securing clearance from the Institutional Ethics Committee (IEC). Before the initiation of the research, informed written consent was obtained from the subjects involved. The study was also registered with the Clinical Trials Registry of India (CTRI) Registration was also been done. IEC no is IEC/ACA/2024/01/22, on date October 23, 2024, and CTRI trial registration No. CTRI/2025/04/083859.

2.8. Statistical Analysis

Statistical calculations were performed using GraphPad Prism version 10.6.1. Baseline and post-intervention hemoglobin concentrations were compared using a paired *t*-test. The mean paired change and corresponding 95% confidence interval were calculated from individual participant data. Statistical significance was defined as $P < 0.05$.

3. OBSERVATIONS AND RESULTS

3.1. Observations

Among the 10 participants who completed the study, all were female, Hindu, and postgraduate educated ($n = 10$ [100%] each), with a mean age of 31.4 years (range: 25–45 years. Most followed a vegetarian diet ($n = 7$ [70%]), whereas three consumed a mixed diet ($n = 3$ [30%]). Seven belonged to the middle socioeconomic group ($n = 7$ [70%]), and three belonged to the upper-middle group ($n = 3$ [30%]). No substance use was reported. *Sama Agni* was observed in five participants ($n = 5$ [50%]), followed by *Vishama Agni* ($n = 4$ [40%]) and *Manda Agni* ($n = 1$ [10%]). Taste preferences included *Lavana* ($n = 7$ [70%]), *Katu* ($n = 6$ [60%]), *Madhura* and *Amla* ($n = 5$ [50%] each), *Kashaya* ($n = 2$ [20%]), and *Tikta* ($n = 1$ [10%]). Sound sleep was reported by

four participants ($n = 4$ [40%]), disturbed sleep by three ($n = 3$ [30%]), interrupted sleep by two ($n = 2$ [20%]), and nighttime wakefulness by one ($n = 1$ [10%]). Most reported complete bowel evacuation ($n = 7$ [70%]), whereas three reported incomplete evacuation ($n = 3$ [30%]). Most participants had regular menstrual cycles ($n = 8$ [80%]), whereas two reported irregular cycles ($n = 2$ [20%]). Hemoglobin increased in all participants, from a mean of 11.05 g/dL at baseline to 11.63 g/dL after treatment, representing a mean increase of 0.58 g/dL (5.25%). Participant-wise changes in hemoglobin concentration from baseline to day 60 are presented in Table 3.

4. RESULTS

4.1. Outcome: Change in Hemoglobin Concentration

Mean hemoglobin concentration increased from 11.05 g/dL at baseline to 11.63 g/dL on day 60, corresponding to a mean paired increase of 0.58 g/dL (5.25%; paired t-test, $t = 4.83$; $P = 0.0009$) (Table 4).

5. DISCUSSION

5.1. Mode of Action of *Drakshapanak*

Drakshapanak is an Ayurvedic dietary preparation comprising *Draksha* (*Vitis vinifera*), *Parushaka* (*Grewia asiatica*), *Kharjoora* (*Phoenix dactylifera*), *Kola* (*Ziziphus jujuba*), *Guda* (jaggery), *Ikshu Rasa* (sugarcane juice), and water, supplemented with *Chaturjata*, *Karpura*, *Maricha* (*Piper nigrum*), *Twaka* (*Cinnamomum zeylanicum*), *Ela* (*Elettaria cardamomum*), *Patra* (*Cinnamomum tamala*), and *Nagakesara* (*Mesua ferrea*) [Table 5]. The formulation combines nourishing fruit and sweetening ingredients with aromatic components traditionally used to support digestion. The Ayurvedic attributes of its ingredients are presented in Table 6.

In Ayurveda, *Pandu Roga* is described in terms of predominantly aggravated *Pitta Dosha*, involvement of other *Doshas*, and disturbances affecting the *Dhatus*, with manifestations including pallor, weakness, fatigue, and reduced appetite. Within this framework, the proposed role of *Drakshapanak* can be understood through the complementary actions of *Brimhana*, *Balya*, and *Deepana-Pachana*. *Draksha*, *Kharjoora*, *Guda*, and *Ikshu Rasa* predominantly possess *Madhura Rasa* and *Guru-Snigdha Guna*, which may promote *Brimhana*, improve *Dhatu Poshana*, and alleviate *Daurbalya* associated with *Pandu*. The *Shita Virya* and *Pitta-shamaka* properties of *Draksha*, *Parushaka*, *Kharjoora*, and *Ikshu Rasa* may help pacify aggravated *Pitta*, which has an important role in the pathogenesis of *Pandu Roga*. The *Vata-shamaka* actions of *Parushaka*, *Kharjoora*, *Kola*, and *Guda* may further support nourishment and strength. The aromatic ingredients, particularly *Maricha* and the components of *Chaturjata*, may complement these nourishing constituents through their *Laghu*, *Ruksha*, *Tikshna*, and *Ushna* properties. These attributes may support *Deepana* and *Pachana*, improve *Agni*, and facilitate the digestion and assimilation of the predominantly *Guru-Snigdha* ingredients. Thus, the combined action of *Drakshapanak* may promote *Agni Deepana*, proper formation and nourishment of *Rasa Dhatu*, and subsequent *Rakta Dhatu Poshana*. This proposed Ayurvedic mechanism may explain its supportive role in improving *Panduta*, *Daurbalya*, and other manifestations of *Pandu Roga*. However, this interpretation is based on the classical properties of the ingredients and requires confirmation through studies assessing iron status and related hematological parameters.

Modern studies on its constituent drugs, such as *Draksha* (*Vitis vinifera*), show that it contains polyphenolic constituents, including flavonoids and proanthocyanidins, whose distribution varies between the fruit, skin, and

seeds. Their effects on iron availability require consideration alongside their antioxidant properties. Boato *et al.* (2002) reported that red grape juice inhibited iron availability in an *in vitro* digestion-intestinal cell model.^[6] Ma *et al.* (2011) similarly demonstrated inhibition of heme-iron absorption by grape-seed polyphenols in cultured intestinal cells.^[7] *Parushaka* (*Grewia asiatica*) contains phenolic compounds, flavonoids, and anthocyanins associated with its antioxidant activity. Khattab *et al.* (2015) reported antioxidant and anti-inflammatory effects of its fruit extract in streptozotocin-induced hyperglycemic rats.^[8] Imran *et al.* (2021) quantified phenolics, flavonoids, and anthocyanins in berry-juice preparations and demonstrated free-radical-scavenging activity alongside effects in experimental neurobehavioral models.^[9] *Kharjoora* (*Phoenix dactylifera*) contains phenolic compounds with antioxidant activity, together with sugars and other nutritional constituents. Vayalil (2002) demonstrated antioxidant and antimutagenic activities of aqueous date-fruit extract in experimental assays.^[10] Amorós *et al.* (2009) documented nutritional and antioxidant characteristics of date fruits and showed variation with maturation and fruit phenotype.^[11] *Kola* (*Ziziphus jujuba*): Chen *et al.* (2014) demonstrated that jujube-fruit extract increased erythropoietin expression through hypoxia-inducible factor-1 α in cultured Hep3B cells, suggesting a possible influence on signaling involved in red blood cell production.^[12] *Guda* (jaggery) contains predominantly carbohydrates, together with phenolic constituents and variable quantities of minerals. Harish Nayaka *et al.* (2009) demonstrated antioxidant and cytoprotective activities of jaggery in laboratory assays.^[13] Elbagory *et al.* (2026) characterized the carbohydrate, mineral, and potentially toxic-element composition of traditionally produced sugarcane jaggery.^[14] *Ikshu Rasa* (*Saccharum officinarum* juice) contains phenolic acids and flavonoids, including derivatives of apigenin, luteolin, and tricetin, alongside its carbohydrate constituents. Duarte-Almeida *et al.* (2006) identified these phenolic compounds and demonstrated antioxidant activity in sugarcane-juice preparations.^[15] Kadam *et al.* (2008) also reported antioxidant activity and protection against radiation-induced DNA damage in experimental systems.^[16] *Twaka* (*Cinnamomum zeylanicum*) contains volatile constituents, particularly cinnamaldehyde and cinnamyl acetate. Alizadeh Behbahani *et al.* (2020) characterized cinnamon-bark essential oil and demonstrated antioxidant and antimicrobial activities in laboratory assays.^[17] *Ela* (*Elettaria cardamomum*) contains volatile phytoconstituents, notably α -terpinyl acetate and 1,8-cineole, as identified in analytical investigations of cardamom extracts. Jamal *et al.* (2006) demonstrated gastroprotective effects of cardamom-fruit preparations in rats.^[18] Kazemi *et al.* (2017) reported improvements in inflammatory and oxidative-stress biomarkers following supplementation in overweight or obese women with prediabetes and hyperlipidemia.^[19] *Patra* (*Cinnamomum tamala*) contains phenolic and flavonoid constituents associated with antioxidant activity. Devi *et al.* (2007) demonstrated free-radical-scavenging activity and inhibition of lipid peroxidation by leaf preparations using rat-brain synaptosomes as an experimental model.^[20] Rao *et al.* (2008) reported antidiarrheal activity of a standardized extract in rats.^[21] *Nagakesara* (*Mesua ferrea*) contains biologically active constituents that vary according to the plant part; mesuol is one compound isolated from its seed oil. Chahar *et al.* (2012) demonstrated antioxidant and immunomodulatory activities of isolated mesuol in experimental animals.^[22] Chakraborty *et al.* (2023) investigated the biological activities of *M. ferrea* seed extracts.^[23] *Maricha* (*Piper nigrum*) contains piperine, a major bioactive alkaloid investigated for its effects on intestinal permeability and compound bioavailability. Khajuria *et al.* (2002) demonstrated that piperine altered intestinal brush-border membrane characteristics associated with permeability.^[24] Shoba *et al.* (1998) reported increased curcumin bioavailability following coadministration with piperine in animals and human volunteers.^[25]

6. CONCLUSION

In this small, single-arm pilot study, daily administration of *Drakshapanak* for 60 days was associated with a statistically significant mean increase of 0.58 g/dL in hemoglobin concentration among 10 adults with previously diagnosed IDA. The result supports further investigation but should not be interpreted as proof of efficacy because there was no control group and biochemical iron status was not documented at the participant level. Future randomized controlled studies should use standardized product preparation and dosing, confirm iron deficiency using ferritin with appropriate inflammatory assessment, record dietary and menstrual confounders, and evaluate hemoglobin together with ferritin, transferrin saturation, and red-cell indices.

6.1. Limitations of the Study

This study was limited by its small sample size, single-arm design, and absence of a control group, which restrict causal interpretation and generalizability. All participants were female, further limiting the applicability of the findings to other populations. Iron deficiency was not reassessed using ferritin, transferrin saturation, or other iron-status biomarkers, and potential influences such as dietary iron intake and menstrual blood loss were not systematically evaluated. Furthermore, the formulation was not characterized for its iron content, phytochemical profile, or batch-to-batch consistency. Larger controlled trials incorporating biochemical confirmation of iron deficiency, standardized product characterization, dietary assessment, and longer follow-up are required to validate these preliminary findings.

6.2. Use of Artificial Intelligence in Manuscript Preparation

Generative artificial intelligence (ChatGPT, OpenAI) was used solely for language editing, grammatical correction, and improvement of manuscript readability. The authors critically reviewed and revised the generated text and accept full responsibility for the accuracy, integrity, and final content of the manuscript.

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8. AUTHOR CONTRIBUTIONS

- Writing original draft of manuscript: Dr. Kamla R. Nagar
- Required updates in manuscript: Dr. Suman Rulaniya
- Writing review and editing: All authors
- Final approval: All authors.

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10. ETHICAL STATEMENT

The study commenced after obtaining approval from the Institutional Ethics Committee (IEC), National Institute of Ayurveda, Jaipur (approval no. IEC/ACA/2024/01/22, dated 23 October 2024).

11. CONFLICT OF INTERESTS

The authors declare no conflicts of interest regarding the publication of this paper.

12. DATA AVAILABILITY STATEMENT

The data analyzed in this review were obtained from publicly available sources, including peer-reviewed articles, observational studies, and surveys accessible through databases.

13. DISCLAIMER/VIEW AND OPINIONS

The opinions expressed in this article are solely those of the authors and do not reflect the views of the International Research Journal of Ayurveda and Yoga or its editorial board.

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Table 1: Diagnostic criteria for iron deficiency anemia (IDA)

Serum markers	Diagnosis for IDA
Hemoglobin	<13 g/dL males <12 g/dL females

Table 2: Diagnostic criteria for anemia (National Cancer Institute)

S. no.	Grade	Hemoglobin levels
1.	Mild	10.0 g/dL to lower limit of normal
2.	Moderate	8.0–10.0 g/dL
3.	Severe	6.5–7.9 g/dL
4.	Life threatening	Hemoglobin<6.5 g/dL

Table 3: Participant-wise change in hemoglobin concentration from baseline to Day 60

Participant	Baseline Hb (g/dL)	Day-60 Hb (g/dL)	Change (g/dL)
1	8.7	8.8	0.1
2	11.5	12.3	0.8
3	11.4	12.1	0.7
4	9.9	10.5	0.6
5	11.9	12.5	0.6
6	11.6	12.9	1.3
7	12.0	12.9	0.9
8	9.9	10.4	0.5
9	11.6	11.7	0.1
10	12.0	12.2	0.2

Table 4: Statistical comparison of hemoglobin concentration before and after treatment

Variables	Mean		Mean difference	Percentage Relief	SD		SE		t-value	P-value
	BT	AT			BT	AT	BT	AT		
S.HB (gm/dL)	11.05	11.63	0.5800	5.25	1.137	1.324	0.3594	0.4187	4.8333	0.0009

SD: Standard deviation, SE: Standard errors

Table 5: Ingredients of *Drakshapanak*

S. No.	Name of ingredient	Latin name	Part used	Quantity (ratio)
1.	<i>Draksha</i>	<i>Vitis vinifera</i>	Fruit	1 part
2.	<i>Parushaka</i>	<i>Grewia asiatica</i>	Fruit	1 part
3.	<i>Kharjoor sara</i>	<i>Phoenix dactylifera</i>	Fruit	1 part
4.	<i>Kola (Badar bheda)</i>	<i>Ziziphus jujuba</i>	Fruit	1 part
5.	<i>Jala</i>	-	N.A.	1 part
6.	<i>Guda</i>	<i>Saccharum officinarum</i>	N.A.	1 part
7.	<i>Ikshu Rasa</i> (Sugarcane Juice)	<i>Saccharum officinarum</i>	N.A.	1 part
8.	<i>Chaturjata Twaka</i>	<i>Cinnamomum zeylanicum</i>	Leaf	Q.S.
	<i>Ela</i>	<i>Elettaria cardamomum</i>	Fruit	
	<i>Patra</i>	<i>Cinnamomum tamala</i>	Leaf	
	<i>Nagkesara</i>	<i>Mesua ferrea</i>	Fruit	
9.	<i>Karpura</i>	<i>Cinnamomum camphora</i>	Extract	Q.S.
10.	<i>Maricha</i>	<i>Piper nigrum</i>	Fruit	Q.S.

Table 6: *Rasa panchak* of *drakshapanak*

S. No	Name of Ingredient	Rasa	Guna	Virya	Vipaka	Karma
1.	<i>Draksha</i>	<i>Madhur</i>	<i>Guru, Snigdha</i>	<i>Shita</i>	-	<i>Pitta-Kapha Shamak</i>
2.	<i>Parushaka</i>	<i>Madhur, Amla</i>	<i>Laghu</i>	<i>Shita</i>	<i>Madhur</i>	<i>Vata-Pitta Shamak</i>
3.	<i>Kharjoor sar</i>	<i>Madhur</i>	<i>Guru, Snigdha</i>	<i>Shita</i>	<i>Madhur</i>	<i>Tridosha-shamak</i>
4.	<i>Kola (Badar bhed)</i>	<i>Madhur</i>	<i>Guru, Sara</i>	<i>Usna</i>	-	<i>Vata-Shamak, Pitta-var dhak</i>
5.	<i>Jala</i>	-	-	-	-	-
6.	<i>Guda (Jaggery)</i>	<i>Madhur, Sakshar</i>	<i>Guru, Snigdha</i>	<i>Na-atishit</i>	-	<i>Vata Shamak, Kinchit Pitta Shamak, Kapha Vardhak</i>
7.	<i>Ikshu Rasa</i>	<i>Madhur</i>	<i>Guru, Sara, Snigdha</i>	<i>Shita</i>	<i>Madhur</i>	<i>Pitta Shamak, Kapha Vardhak</i>
8.	<i>Twaka</i>	<i>Madhur, Tikta</i>	<i>Laghu, Ruksha and Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vata-Pitta Shamak</i>
9.	<i>Patra</i>	<i>Katu, Madhur, Tikta</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vata-Kapha Shamak, Pitta</i>
10.	<i>Nagkesara</i>	<i>Kashaya, Tikta</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kapha-Pitta Shamak</i>
11.	<i>Ela</i>	<i>Katu</i>	<i>Laghu</i>	<i>Shita</i>	<i>Katu</i>	<i>Vata-Kapha Shamak</i>
12.	<i>Karpura</i>	<i>Tikta, Katu, Madhura</i>	<i>Laghu, Ruksha</i>	<i>Shita</i>	<i>Katu</i>	<i>Kapha-Pitta Balancing</i>
13.	<i>Maricha</i>	<i>Katu</i>	<i>Laghu, Tikshna, Ruksha</i>	<i>Ushna</i>	-	<i>Vata Kapha Shamak, Pittavardhak</i>