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A REVIEW OF *PATHYA-APATHYA* AND SUPPORTIVE DIETARY MANAGEMENT IN *PANDU ROGA* (IRON DEFICIENCY ANEMIA)

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ABSTRACT

Pandu Roga is a disease described extensively in Ayurvedic classics and is characterized primarily by pallor of the body along with symptoms such as fatigue, weakness, dyspnea, anorexia, and diminished vitality.[1,2,3] The clinical presentation of *Pandu* closely resembles anemia described in modern medicine. Anemia remains a major global public health problem affecting approximately one-third of the world's population, particularly women and children.[4,5] Ayurveda considers improper dietary habits, impaired digestive fire (*Agnimandya*), and vitiation of *Doshas* as the main etiological factors responsible for the development of *Pandu*.[1] These factors lead to the depletion of *Rasa Dhatu* and improper formation of *Rakta Dhatu*. Although several herbal and Herbo-mineral formulations are described for the treatment of *Pandu*, dietary management is emphasized as a fundamental therapeutic principle. The concept of *Nidana Parivarjana* (avoidance of causative factors) and *Pathya Ahara* (wholesome diet) is highlighted in classical Ayurvedic texts as an essential component of treatment. [1,2,3] The present review

aims to analyze the role of supportive dietary management in *Pandu Roga* and correlate Ayurvedic dietary recommendations with modern nutritional principles for anemia management. Proper dietary practices not only improve digestive function but also enhance the absorption and bioavailability of essential nutrients required for hemoglobin synthesis and erythropoiesis.[6,7] Integrating Ayurvedic dietary guidelines with modern nutritional approaches may offer a holistic and sustainable strategy for the treatment of *Pandu Roga*.[8]

KEYWORDS: *Pandu Roga*, Anemia, Ayurveda, *Pathya*, *Ahara*, Dietary management, *Rasa*, *Agni*

INTRODUCTION

Pandu Roga is one of the significant diseases described in Ayurvedic literature. The term *Pandu* originates from the Sanskrit word meaning pale, whitish, or yellowish discoloration of the body. In Ayurveda, *Pandu* is considered a systemic disorder affecting the entire body due to improper nourishment of tissues.

According to *Acharya Charaka*, *Pandu* occurs when the vitiated *Doshas*, particularly *Pitta*, affect the *Rasa* and *Rakta Dhatu* and produce discoloration of the skin and other tissues.[1] The disease is associated with symptoms such as pallor, fatigue, weakness, giddiness, dyspnea, anorexia, and diminished physical strength.

According to *Sushruta Samhita*, *Pandu Roga* is a disease characterized by pallor or yellowish-whitish discoloration of the body, especially seen in the skin, eyes, nails, and mucous membranes, due to vitiation of *Pitta* along with *Vata* and *Kapha*, leading to impairment of *Rasa* and *Rakta Dhatu*.[2]

According to *Vagbhata*, *Pandu Roga* is a disorder in which the body develops a pale, yellowish-white discoloration (*Pandu Varna*) due to the vitiation of *Pitta* and *Rakta* along with involvement of other *Doshas*.[3,9] The hallmark of the disease is loss of normal body color and strength.

In modern medicine, anemia is defined as a reduction in hemoglobin concentration or red blood cell mass, resulting in decreased oxygen-carrying capacity of blood.[10,11] The World Health Organization estimates that approximately 1.6 billion people globally suffer from anemia, with iron deficiency being the most common cause.[4,12]

Ayurveda attributes the pathogenesis of *Pandu* primarily to improper dietary habits, incompatible food combinations, and impaired digestive fire (*Agni*). These factors lead to the formation of improperly digested metabolites (*Ama*), which interfere with tissue metabolism and result in inadequate formation of *Rasa Dhatu* and *Rakta Dhatu*.[1,13,14]

Although numerous medicinal formulations are described for the treatment of *Pandu*, Ayurvedic texts emphasize the importance of dietary regulation as a fundamental therapeutic measure.[8,15] The principle of *Nidana Parivarjana*, which refers to the avoidance of causative factors, is considered the first step in treatment. Therefore, proper dietary management plays a vital role in both the prevention and treatment of *Pandu Roga*.

AIM

To review the importance of supportive dietary management in *Pandu Roga*.

OBJECTIVES

- To understand the Ayurvedic concept and pathogenesis of *Pandu*.
- To analyze the role of *Pathya Ahara* in the management of *Pandu*.
- To correlate Ayurvedic dietary principles with modern nutritional concepts of anemia.

MATERIALS AND METHODS

The present review study was conducted using both classical Ayurvedic literature and modern scientific publications.

Classical sources

- *Charaka Samhita*[1]
- *Sushruta Samhita*[2]
- *Ashtanga Hridaya*[3,9]
- *Madhava Nidana*[4]
- *Sharangadhara Samhita*[16]
- *Bhava Prakasha Nighantu*[17]

Modern sources

Electronic databases including PubMed, Google Scholar, DHARA database, and ResearchGate were searched. Keywords used included: *Pandu*, Anemia, Ayurveda, *Pathya*

Ahara, Dietary management. Relevant information from classical texts and modern studies was compiled and analyzed.

Ayurvedic Concept of *Pandu*

Definition

Pandu is defined as a disease characterized by pallor of the body due to impairment in the formation and functioning of blood. According to *Acharya Charaka*, *Pandu* is caused by vitiation of *Doshas* that affect the normal color and quality of blood, leading to discoloration of skin and tissues.[1]

Nidana (Etiological Factors)

The causes of *Pandu* can be categorized into three major groups.

1. Dietary Causes (*Ahara*)

Improper dietary habits are the primary cause of *Pandu*.[1,2] Important dietary factors include

- *Asatmya Bhojana* (unwholesome food)
- *Viruddha Ahara* (incompatible food combinations)
- Excess intake of sour, salty, and pungent foods
- Excess intake of alkaline and hot foods
- Intake of *Nishpava*, *Masha*, *Matsya*
- Alcohol consumption
- *Mridbhakshana* (consumption of soil)

2. Lifestyle Causes (*Vihara*)

Lifestyle factors contributing to *Pandu* include excessive physical exertion, carrying heavy loads, irregular sleep patterns, and mental stress.[1,3] These activities lead to *Dhatu Kshaya* and *Vata* aggravation.

3. Nidanarthakara Roga

Certain diseases may lead to *Pandu* as a complication, including menorrhagia, peptic ulcer, hemorrhoids, chronic bleeding disorders, and liver and spleen disorders.[13,18]

Table No. 1: Samprapti Ghataka of Pandu.

Component	Description
Dosha	*Pitta* dominant with involvement of *Vata* and *Kapha*
Dushya	*Rasa* and *Rakta Dhatu*
Agni	*Mandagni*
Ama	Present
Srotas	*Rasavaha* and *Raktavaha Srotas*
Srotodushti	*Sanga*
Udbhava Sthana	*Amashaya*
Adhisthana	*Twak* and *Rakta*
Rogamarga	*Bahya*

Samprapti (Pathogenesis)

Nidana Sevana (Improper diet, incompatible food, excessive exertion) → *Dosha Prakopa* (Predominantly *Pitta*) → *Agnimandya* (Impaired digestive fire) → Formation of *Ama* (Undigested metabolic toxins) → Impaired *Rasa Dhatu* Formation → Defective *Rakta Dhatu* Production → Reduction in *Rakta* Quality and Quantity → Loss of normal skin complexion → ***PANDU ROGA*** [1,3,18]

Purvarupa (Premonitory Symptoms)

Early signs of *Pandu* include palpitations, dryness of skin, fatigue, cracking of skin, indigestion, loss of appetite, desire to eat mud, and general weakness.[1,2] Recognition of these symptoms helps in early management.

Rupa (Clinical Features)

Important clinical features include pallor of skin, fatigue, general weakness, dyspnea, giddiness, body ache, fever, anorexia, hair fall, and tinnitus.[1,2,3]

Classification of Pandu

According to *Acharya Charaka*, *Pandu* is classified into five types[1]

- *Vataja Pandu*
- *Pittaja Pandu*
- *Kaphaja Pandu*
- *Tridoshaja Pandu*
- *Mridbhakshanajanya Pandu*

Table No. 2: Modern classification of anemia and its causes.

Type	Cause
Iron deficiency anemia	Iron deficiency
Megaloblastic anemia	Vitamin B12 or folate deficiency
Hemolytic anemia	RBC destruction
Aplastic anemia	Bone marrow failure
Anemia of chronic disease	Chronic illness

Iron deficiency anemia is the most prevalent nutritional deficiency worldwide, accounting for the majority of anemia cases globally.[4,5,10,19]

Pathya Ahara in *Pandu*

Ayurvedic texts describe a range of foods that are beneficial (*Pathya*) for patients suffering from *Pandu Roga*.[1,20,21] These are foods that improve digestive fire (*Agni*), enhance tissue nutrition, and support *Rakta Dhatu* formation

Table No. 3: *Pathya Ahara* in *Pandu*.

Food Group	Examples	Benefit
Cereals	Aged rice, wheat, barley	Easily digestible
Pulses	Moong dal, masoor dal	Protein source
Vegetables	Spinach, cabbage, carrot	Iron and vitamins
Fruits	Pomegranate, orange, mango	Improve iron absorption
Animal foods	Meat soup, poultry	Heme iron
Dairy	Buttermilk, ghee	Improves digestion

Apathya Ahara in Pandu

Foods contraindicated (*Apathya*) in *Pandu* include those that aggravate *Pitta*, impair digestive function, or inhibit iron absorption.[1,2,20]

Table No. 4: *Apathya Ahara* in *Pandu*.

Food Type	Examples
Heavy pulses	Urad dal, rajma
Fried foods	Deep fried snacks
Beverages	Tea, coffee with meals
Alcohol	*Madya*
Processed food	Junk food

Dietary Factors Affecting Iron Absorption

Modern nutritional science has identified several dietary components that significantly influence iron bioavailability.[6,22,23]

Enhancers of Iron Absorption

The following dietary components enhance non-heme iron absorption.[6,7]

- **Vitamin C**: Ascorbic acid converts ferric iron to the more absorbable ferrous form and forms a soluble complex, substantially increasing absorption.[6]
- **Vitamin A**: Supports erythropoiesis and mobilization of stored iron.
- **Folic acid**: Essential for DNA synthesis in red blood cell precursors; deficiency leads to megaloblastic anemia.[10]
- **Amino acids**: Meat-derived peptides and certain amino acids enhance non-heme iron absorption by forming soluble complexes.[22]

Inhibitors of Iron Absorption

Substances that impair iron absorption should be avoided at mealtimes by anemic patients:[6,7]

- **Tea and coffee**: Contain polyphenols and tannins that bind iron and reduce its absorption by up to 60%.[7]
- **Excess milk**: Calcium in dairy products competes with iron for intestinal transporters.
- **Phytates**: Present in whole grains and legumes; bind iron strongly and reduce bioavailability.[6,22]

Table No 5: Iron content of vegetables and dairy products.

Food Item	Iron (mg/100 g)	Form	Iron Type	Notes
VEGETABLES				
A. Leafy Green Vegetables				
Spinach (Palak)	2.71	Raw	Non-heme	Excellent source; high oxalate reduces absorption[24,25]
Spinach (Palak)	3.57	Cooked	Non-heme	Concentration effect on cooking[24,26]
Amaranth leaves (Chaulai)	3.40	Raw	Non-heme	Traditional leafy green, rich in iron[25,26]
Fenugreek leaves (Methi)	1.93	Raw	Non-heme	Also contains folic acid[25,26]
Drumstick leaves (Moringa)	7.00	Raw	Non-heme	One of highest plant iron sources[25,26,27]
Mustard greens (Sarson)	1.64	Raw	Non-heme	Good source of folate and iron [24,25]
Curry leaves	0.93	Raw	Non-heme	Used as flavoring; moderate iron content[26]
Coriander leaves	1.77	Raw	Non-heme	Common garnish; iron present in significant amounts[24,26]
Mint leaves (Pudina)	11.87	Dried	Non-heme	Dried form; much higher concentration[24]

Bathua (Chenopodium)	4.20	Raw	Non-heme	Seasonal leafy greens used in North India[26]
B. Leguminous / Pod Vegetables				
Peas (Matar)	1.47	Raw, fresh	Non-heme	Good combined with vitamin C sources [24,25]
Cowpea leaves	4.30	Raw	Non-heme	Leaves richer in iron than seeds [27]
Drumstick pods (Sahjan)	0.36	Raw	Non-heme	Lower than leaves but widely consumed [25,26]
Broad beans (Sem)	1.50	Raw	Non-heme	Good dietary source [25]
C. Root Vegetables				
Lotus stem (Kamal kakdi)	1.16	Raw	Non-heme	Traditional Ayurvedic food item [26]
Beetroot	0.80	Raw	Non-heme	Often promoted; moderate iron content [24,25]
Carrot	0.30	Raw	Non-heme	Low iron; valuable for beta-carotene [24,26]
Sweet potato	0.61	Raw	Non-heme	Also provides vitamin A precursor [24]
Yam	0.54	Raw	Non-heme	Root crop; moderate iron [24,26]
Radish (Mooli)	0.34	Raw	Non-heme	Common salad vegetable [25,26]
Turnip	0.30	Raw	Non-heme	Low iron content [24]
D. Other Vegetables				
Bitter gourd (Karela)	0.43	Raw	Non-heme	Recommended in Ayurveda for Pandu [25,26]
Tomato	0.27	Raw	Non-heme	Vitamin C aids iron absorption from other foods [24,25]
Brinjal (Baingan)	0.23	Raw	Non-heme	Low iron; moderate overall nutrition [25,26]
Capsicum (green)	0.43	Raw	Non-heme	Vitamin C content enhances absorption [24]
Capsicum (red)	0.46	Raw	Non-heme	Higher vitamin C than green variety [24]
Bottle gourd (Lauki)	0.20	Raw	Non-heme	Very low iron; mostly water [25,26]
Ridge gourd	0.36	Raw	Non-heme	Light, easily digestible vegetable[26]
Cluster beans (Guar)	1.08	Raw	Non-heme	Good iron source among gourds[25,26]
Lotus seeds (Makhana)	1.53	Dried	Non-heme	Ayurvedic tonic food; concentrated nutrition[26,27]
Jackfruit (young, raw)	0.60	Raw	Non-heme	Commonly used as vegetable when unripe[26,27]
Banana flower (Kela phool)	0.60	Raw	Non-heme	Traditional iron-rich vegetable in South India[26]

E. Dried / Concentrated Vegetables				
Dried fenugreek (Kasuri Methi)	33.53	Dried	Non-heme	Highly concentrated; small amounts used[24]
Dried tomato	9.09	Sun-dried	Non-heme	Concentrated; iron increases with drying[24]
Drumstick leaves (dried)	28.29	Dried powder	Non-heme	Moringa powder; supplement form[27]
DAIRY PRODUCTS				
A. Fresh Milk				
Cow's milk (whole)	0.03	Liquid	Non-heme	Very low iron; not a significant source[24,25,28]
Buffalo milk (whole)	0.19	Liquid	Non-heme	Slightly higher than cow milk [25,26]
Goat milk	0.05	Liquid	Non-heme	Comparable to cow milk[24,28]
Human breast milk	0.03	Liquid	Non-heme	Low iron but highly bioavailable (~50%)[29,30]
B. Fermented & Processed Milk				
Curd / Yogurt (whole)	0.11	Fermented	Non-heme	Fermentation may slightly improve bioavailability[24,25,26]
Buttermilk (Takra)	0.03	Liquid	Non-heme	Diluted curd; very low iron content[25,26]
Skimmed milk	0.02	Liquid	Non-heme	Even lower than whole milk [24,28]
Kefir	0.10	Fermented	Non-heme	Probiotic milk drink; trace iron[28]
C. Concentrated & Dried Milk Products				
Full cream milk powder	0.47	Dried	Non-heme	Concentrated form; iron increases[24,28]
Skimmed milk powder	0.52	Dried	Non-heme	Higher iron concentration than whole milk powder[24,28]
Condensed milk (sweetened)	0.19	Processed	Non-heme	High sugar content; low iron [24,28]
Evaporated milk	0.19	Processed	Non-heme	Slightly concentrated; moderate reduction in water[24,28]
D. Cream				
Heavy cream	0.07	Liquid	Non-heme	Very low iron; high fat content[24,28]
Sour cream	0.06	Fermented	Non-heme	Minimal iron contribution[24]
E. Cheese				
Paneer (Indian cottage cheese)	0.21	Solid	Non-heme	Common Indian cheese; moderate iron [25,26]
Cheddar cheese	0.14	Hard	Non-heme	Calcium may inhibit iron absorption[24,28]
Mozzarella cheese	0.27	Semi-soft	Non-heme	Low moisture variety higher in iron[24,28]
Ricotta cheese	0.38	Soft/fresh	Non-heme	Higher iron among soft cheeses[24,28]

Feta cheese	0.65	Soft/brined	Non-heme	Higher iron; possibly from brine minerals[24,28]
Parmesan (Parmigiano)	0.82	Hard/aged	Non-heme	Highest iron among common cheeses; aging concentrates[24,28]
Cream cheese	0.44	Soft	Non-heme	Moderate iron for a soft cheese[24]
Processed cheese	0.61	Processed	Non-heme	Added ingredients may contribute to iron[24,28]
F. Fats (Ghee / Butter)				
Ghee (clarified butter)	0.00	Solid fat	—	Essentially zero iron; pure fat[25,26]
Butter (salted)	0.02	Solid fat	Non-heme	Negligible iron content[24,28]
Butter (unsalted)	0.02	Solid fat	Non-heme	Negligible iron content[24,28]
G. Indian Milk Concentrates & Desserts				
Ice cream (vanilla)	0.09	Frozen	Non-heme	Very low iron; primarily fat and sugar[24]
Khoa (Mawa)	1.25	Reduced milk solid	Non-heme	Concentrated milk product; more iron than fresh milk[25,26]
Chenna (fresh)	0.20	Fresh curd solid	Non-heme	Used for sweets; similar to paneer[26]

Iron type: 'Non-heme' iron is the form present in all plant foods and dairy products. Heme iron (not present in the above) occurs only in animal flesh (meat, poultry, fish) and is absorbed 2–3× more efficiently than non-heme iron.

Bioavailability enhancers: Vitamin C (ascorbic acid), meat/poultry/fish peptides, and organic acids increase non-heme iron absorption. Serving iron-rich vegetables alongside citrus fruits or tomatoes is recommended.

Bioavailability inhibitors: Phytates (whole grains, legumes), tannins (tea, coffee), calcium (dairy), and polyphenols reduce non-heme iron absorption. These should be consumed separately from iron-rich meals where possible.

Dairy and iron: Dairy products are generally poor sources of iron. However, calcium in dairy can inhibit iron absorption from co-consumed plant foods. In Pandu (iron deficiency anemia) management, excessive dairy intake at mealtimes should be avoided.

Ayurvedic correlation: Drumstick leaves (Moringa / Shigru), Amaranth (Chaulai), Fenugreek (Methi), Lotus seeds (Makhana), and Pomegranate (Dadima) are specifically

mentioned in classical texts as beneficial in Pandu Roga and align with their high iron content documented in modern nutritional databases.

Cooking impact: Cooking generally concentrates iron content per 100 g due to water loss. However, boiling and discarding cooking water may reduce water-soluble vitamins that aid iron absorption. Preferred cooking methods include steaming and stir-frying.

DISCUSSION

Pandu Roga described in Ayurvedic texts closely resembles anemia described in modern medicine.[8,13,14] Both conditions involve reduction in hemoglobin levels resulting in pallor, fatigue, weakness, and decreased physical capacity. Ayurveda explains the pathogenesis of *Pandu* mainly through impairment of *Agni* leading to improper formation of *Rasa Dhatu* and *Rakta Dhatu*.[1,3] Modern medical science also recognizes that nutritional deficiencies and impaired absorption are major causes of anemia.[10,11,33]

Dietary management is therefore considered a fundamental aspect of treatment in both systems of medicine.[8,15] Ayurvedic texts emphasize consumption of easily digestible and nutrient-rich foods that improve digestive function and support blood formation.[1,20,21] Modern nutritional science highlights the importance of iron-rich foods, vitamin C intake, and avoidance of substances that inhibit iron absorption.[6,7,34] Interestingly, many Ayurvedic dietary recommendations correspond closely with these modern guidelines.

For example, Ayurvedic texts recommend fruits such as pomegranate and citrus fruits, which are rich in vitamin C and help improve iron absorption.[6,20] Similarly, cooking food in iron utensils is traditionally recommended and has been shown to increase the iron content of food.[21,35] Epidemiological data confirm that anemia disproportionately affects women of reproductive age and children in low- and middle-income countries, making dietary interventions particularly important in public health.[4,5,19,36] Integrating Ayurvedic dietary principles with modern medical treatment can provide a holistic approach to managing anemia. [8,37,38]

CONCLUSION

Pandu Roga is an important disease described in Ayurveda that closely resembles anemia in modern medicine. The disease primarily results from improper dietary habits and impaired digestive metabolism leading to depletion of *Rakta Dhatu*.[1,2,3] Dietary management plays a

crucial role in both prevention and treatment of *Pandu*. Proper *Pathya Ahara* improves digestion, enhances nutrient absorption, and supports healthy blood formation.[8,20,21]

The dietary principles described in Ayurvedic classics align closely with modern nutritional recommendations for anemia management.[6,7,22] Therefore, integration of Ayurvedic dietary guidelines with modern medical treatment may offer an effective and holistic strategy for the management of anemia. Further clinical research is needed to scientifically validate these traditional dietary practices and develop evidence-based integrative treatment protocols.[15,38,39]

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