



AYURVEDIC MANAGEMENT OF IRON DEFICIENCY ANEMIA IN CHILDREN – A REVIEW STUDY

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ABSTRACT:

Background: Anemia is an important public health problem in India. It is defined as a reduction in hemoglobin concentration below the age-related norms. Complementary and alternative systems/traditional medicines can also be explored for the control of anemia apart from the existing platforms. *Panduroga* is clinical entity with great resemblance to iron deficiency anemia. *Panduroga* is a condition where in *pittapradhana tridoshas* affect the *dhatu*s causing deterioration of *varna* and *Bala* leading to *twak vaivarnyata* or *panduta*. Interventions with various herbal and iron formulations have been reported in Ayurveda. **Aims:** To explore the effect of various ayurvedic drugs on anemia from the existing literature. **Materials & methods:** Classical textbooks of ayurveda, journal publications, various internet resources and clinical experiences were considered as the source of information **Results:** Multimodal management approach of an ayurveda comprising which assessed the effectiveness of ayurvedic drugs on improvement in hemoglobin as well as subjective parameters such as weakness, anorexia, and pallor. **Conclusion:** Ayurvedic formulations lead to modification of metabolism, iron absorption, improve blood formation which helps to cure the disease. In many studies Ayurvedic formulations are found safe and effective against iron deficiency anemia in children.

Key words: *Trikatrayadi Lauha*, Anemia, *Panduroga*, Ayurveda.

INTRODUCTION

Anemia is an important public health problem throughout the world. Globally, around 1.62 billion people are affected by anemia which corresponds to one-fourth of the world's population.^[1] The World Health Organization (WHO) defines anemia as “a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs.”^[2] The global prevalence of anemia 2011 estimated that the prevalence of anemia among children (42.6%) Iron deficiency is the most common cause of anemia in LMICs, however micronutrient deficiencies such as folate, Vitamin B12 and Vitamin A deficiencies and other conditions such as inflammation, parasitic infections and inherited disorders can also cause anemia.^[3] Anemia can be caused due to multiple factors but one of the major factors is nutritional deficiency. Consumption of diet rich in iron could be the ideal way for control of anemia in the majority of the population. However, poor intake of dietary iron and the presence of iron absorption inhibitors necessitates iron supplementation.^[4] In India, oral Iron-Folic Acid (IFA) tablets are supplemented to high-risk populations such as pregnant and lactating women, under-five children (IFA syrup), children of 6–10 years, adolescents and women of reproductive age group.^[5] However,

the undesirable side effects of oral IFAs, such as epigastric discomfort, nausea, gastritis, diarrhoea, or constipation, leads to poor adherence to oral IFA supplements. The poor adherence to IFA tablets was evidenced by studies conducted in various parts of India and also in NFHS-4 where only 30% of the pregnant women consumed at least 100 IFA tablets.^[6] Hence there is need to look for newer agents which have better therapeutic utility. Complementary and Alternative Medicines or Traditional Medicines, which includes Ayurveda, Unani, Siddha, and Homeopathy (AYUSH) has been widely in India since the ancient period. Acknowledging the wider acceptance of AYUSH, Government of India has integrated the traditional systems of medicine (AYUSH) with the allopathic system, especially in rural areas. Each public health sector facility has a separate department for AYUSH and the AYUSH medical officer manages a wide range of diseases.^[7] Among the AYUSH system of medicines, Ayurveda refers to “Science of life” or “Science of longevity,” which is being practiced in India since 2500 BC. Around 70% of the rural population in India follows the Ayurvedic system of medicine. Hence, the Ayurvedic system can be explored for control of high burden of anemia in India.

Nutritional anemia is defined as the anemia due to deficiency of one or more micronutrients required for normal erythropoiesis and includes iron deficiency anemia and megaloblastic anemia, due to vitamin B12 or folic acid deficiency. Iron is the most important micronutrient in children, distributed in RBC (60%), bone marrow, reticuloendothelial system and various iron containing enzymes. IDA is the commonest cause of nutritional anemia, present in >50% of preschool and adolescent children.

Ayurvedic classical texts defines the *Panduroga* as one of the disease which resembles the anemia. In anemia the hemoglobin level is decreased and hence the colour of skin changes to white which is similar to symptoms of *Panduroga* and hence the treatment protocols of the *Panduroga* are applicable in treatment of IDA. There are certain Ayurvedic medicines which are helpful to improve the iron level in the body which can be definitely use in the treatment of IDA.

AIMS:

To explore the effect of various ayurvedic drugs on anemia from the existing literature.

MATERIALS & METHODS:

Classical textbooks of ayurveda, journal publications, various internet resources and clinical experiences were considered as the source of information. Keywords used for the

purpose of this literature review include *Panduroga*, Ayurveda and Iron deficiency anemia.

Panduroga can be understood as *Pitta dosha Pradhan vyadhi* associated with *Rasa* and *Rakta dhatu*. *Bhrajaka Pitta* is responsible for normal colour of *Twak* (skin). There is impaired *prasad bhaga* of *rasa dhatu* which leads to depletion in quality of *uttarottara dhatus*, especially *Rakta dhatu*.

Causative factors - Irregular and faulty *Pitta prakopaka* dietary habits and lifestyle like *Amla, Lavana, Katu Rasa Atisevana, Kshara, ushna, tikshna, ruksha ahara atisevana* impairs the digestion, leading to *mandagni*. *Pitta dosha* further gets aggravated and causes vitiation of *Rasa dhatu* like *Gauravata* and *Shaithilyata* in *dhatu* and *bala, varna, Sneha* of *twak* gets affected.

Dosha-dushya involvement-

Dosha- Pitta, Vata and *Kapha*

Dushya- Skin, blood and muscle tissue.

Symptoms - Any of the varieties of *Panduroga* leads to below listed general symptoms^[8] –

1. *Karnashweda* - ringing sensation in both ears
2. *Hata anala* – low appetite
3. *Daurbalya* - general debility
4. *Sadana* – pain in body
5. *Anna dwishta* - anorexia
6. *Shrama* - tiredness

7. *Bhrama* - vertigo
8. *Gatra shoola* - pain in extremities
9. *Shwasa* - breathlessness
10. *Gaurva* - heaviness in body
11. *Aruchi* - no sensation of tastes
12. *Mrudita gatra* - churning kind of pain in extremities
13. *Shunakshikoota* – swelling around eyes
14. *Harita* – greenish skin colour
15. *Sheerna Loma* – weakens skin hairs
16. *Hata prabha* - reduction in lustre of body
17. *Kopana* – anger
18. *Pindikodweshtana* - twisting pain in calf muscles
19. *Shishiradweshi* – heat for cold atmosphere and eatables
20. *Nidralu* – sleepy
21. *Sthivana* – increase in oral salivation
22. *Alpavak* – speaks less
23. *Kati Ura Pada Ruk Sadana* – pain in lower back, chest and legs

Symptoms of *Panduroga* are *Karnakshveda* (tinnitus), *Ajeerna* (loss of digestive power), *Daurbalya* (debility), *Sadana* (malaise), *Annadvesha* (aversion to food), *Shrama* (exhaustion), *Ruk* (pain in whole body) are also seen.

The ayurvedic system has also indicated the use of various iron-containing and noniron containing herbal formulations for the management of anemia. Hence, this review

aims to explore the effect of various ayurvedic preparations in management of anemia. Both iron containing and non-iron containing Ayurvedic preparations were studied to assess their effect on anemia.

DISCUSSION

A literature review conducted by Prajapati and Acharya found that there are around 176 Ayurvedic formulations with 37 different dosage forms are available for management of anemia (*Pandu*).^[9] Around 17 Ayurvedic preparations with different dosage have been used in the studies included in the current review. The mode of action of Ayurvedic preparations and their components were mentioned in all the 15 studies. However, few studies which included iron-containing Ayurvedic preparations have not mentioned the iron content explicitly. Studies have mentioned that the vehicle which is administered along with the Ayurvedic preparation has substantial role on the effect of the drug. However, the effect of vehicle has not been explored in any of the studies.

Samal J had conducted a similar review on Ayurvedic preparations on the management of anemia, included studies published till 2014.^[10] The newer studies included in the current review has relatively shorter intervention period (30–90 days) and tried to compare the effectiveness of iron-containing

and noniron-containing iron preparations with oral IFA tablets. Ayurvedic drugs were found to have similar effects as IFA tablets with less side effects. Ayurvedic preparations such as *Kasisa bhasma*, *Navayasa Curna*, *Punarnavadi Mandura*, *Dhatri Lauha*, *Pradarantaka*, *Lauha*, *Sarva-Jwara-Hara Lauha*, *Vrihat Yakrdari Lauha*, *Sootshekhar Rasaooshekhar* plus *Sitopaladi Churna*, *Amaranthus viridis*, *Vajravatakmandura*, *Trikatrayadi Lauha*, and *Amalaki Rasayana* reported significant improvement in hematological parameters compared to the baseline values or control group. The noniron containing Ayurvedic preparation *Dhatri avaleha*, also showed significant improvement in hematological parameters after the intervention. However, *Punarnava Mandura*, *Pandughnivati*, and *Dhatrilauhavati*, which are iron-containing Ayurvedic preparations have not shown significant improvement in hematological parameters.

Formulations for treatment of anemia among pediatric age group Two studies were focused on pediatric anemia. In these two studies, three different drugs have been studied for their clinical efficacy against anemia among pediatric age group; *Punarnavadi Mandura*, *Dadimadi Ghrita*^[11] and *Trikatrayadi Lauha*.^[12] Statistically significant results were obtained in both these studies in subjective as well as the

hematological parameters.^[11,12] In addition to the significant efficacy of these drugs, the probable mode of action have also been delineated. *Punarnavadi Mandura* is preferably administered with buttermilk which is having acidic pH and contains lactic acid. Iron absorption is aided by decreased pH. Furthermore, it might be possible that iron combines with lactic acid to form ferrous lactate before absorption which is used by modern allopathic medicine for the management of IDA. Alternatively, it may also happen that the proteins of buttermilk or the amino acids released after digestion may combine with iron before the absorption takes place. This point of view is also supported by the WHO as it supports the use of meat and other proteins for the absorption of iron. However, Ayurveda has a different view on the role of *Punarnavadi Mandura* in controlling anemia which is primarily directed toward *Agni* (Digestive factors). However, this concept is also indirectly related to the mechanism of absorption of iron in the gastrointestinal tract by the process of *Deepana* and *Pachana*. This explanation of the action of *Punarnavadi Mandura* is not only applicable for the management of anemia among children but also in other age groups in which the mechanism remains the same. *Punarnavadi Mandura* is currently used as an anemia

correcting agent at the community level promoted by National Rural Health Mission and is included in the Accredited Social Health Activist's drugs kit.^[13]

Trikatrayadi Lauha is a herbomineral formulation that contains *Triphala*, a rejuvenating, *Trikatu*, an appetizer and *Trimada*, a digestive. These herbal ingredients increase the bioavailability of *Mandura bhasma* and *Lauha bhasma* are important contents of *Trikatrayadi Lauha*. During treatment of IDA in children, a significant improvement was observed in *Aruchi*. Study shows that the herbomineral formulation *Trikatrayadi Lauha* suspension is an effective, well tolerated and clinically safe formulation for the treatment of IDA in children.^[12]

Punarnavadi Mandura also reported for the management of IDA in children. *Punarnava* is a diuretic, hepatoprotective and antioxidant agent and *Mandura bhasma* possess significant hematinic activity. It is preferably administered with buttermilk which has acidic pH and contains lactic acid, iron absorption is added by decreased pH. Ayurveda has a view on the role of *Punarnavadi Mandura* in controlling anemia which was primarily directed toward Agni. However, this concept is indirectly related to the mechanism of absorption of iron in gastrointestinal tract by the process of *deepana* and *pachana*. This

explanation of the action of *Punarnavadi Mandura* is not only applicable for the management of anemia among children but also in other age groups in which the mechanism remains the same.^[14]

CONCLUSION

Clinical features of *Panduroga* are mainly due to quantitative and qualitative reduction of hemoglobin and less oxygen supply in the tissues. With the aid of ayurvedic interventions, when there is increase hemoglobin levels, body tissues get adequate oxygen, metabolism improves and ultimately relief in clinical symptoms. From this review, it is clearly evident that most of the ayurvedic formulations studied for iron deficiency anemia in children proved effective. All these studies showed statistically significant result in both subjective and objective parameters. It can be considered as a better alternative to the modern treatment modality in the management of Iron deficiency anemia in children.

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