ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Review Article

PROBABLE MODE OF ACTION OF AN INDIGENOUS DRUG FORMULATION IN *GARBHINI PANDU* WSR IRON DEFICIENCY ANEMIA

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Article info

Article History:
Received: 19-10-2023
Accepted: 17-11-2023
Published: 10-12-2023

KEYWORDS:
Garbhini Pandu, Anemia, Hemoglobin, Indigeneous drug formulation.

ABSTRACT

Pregnancy marks a significant milestone in a woman's life, transitioning her from a woman to a mother. While it is a joyous journey, it brings about numerous physical and physiological changes that can lead to certain health challenges. Iron deficiency anemia is a prevalent health concern during pregnancy, particularly widespread in developing nations, necessitating urgent intervention to safeguard the lives of both the mother and the child. About 4 to 16% of maternal deaths are due to anemia. In contemporary science, to prevent complications like maternal and fetal mortality and morbidity, increased risk of infection, spontaneous abortion, intrauterine growth retardation, intrauterine death, premature delivery, low birth weight, postpartum hemorrhage etc during antenatal and postnatal period, various haematinic drugs are prescribed from 3rd month onwards. In Ayurveda this condition is considered as *Garbhini Pandu*. The *Rasa* and *Rakta* of the mother are carried to the fetus for its proper growth and development. If not, it leads to *Rasa dhatu kshaya* in *Garbhini* which finally leads to *Garbhini Pandu*. Ayurveda highlights the contradiction of *Shodana* in pregnant ladies, hence *Shamana chikitsa* can be followed judiciously. Considering the necessity of utilizing a safe and beneficial drug for *Garbhini Pandu* during pregnancy, certain indigenous drugs such as *Agasthya*, *Amalaki*, *Draksha*, *Musta*, *Pippali*, *Sigru*, *Shuddha Kasisa*, and *Bhavana dravyas* like *Dadima*, *Bhringaraja*, and *Mandukaparni* have been incorporated. This article highlights about the probable mode of action of indigenous drug formulation in *Garbhini Pandu*.

INTRODUCTION

Motherhood is a remarkable gift bestowed by nature, offering expectant women a captivating world filled with anticipation, wonder, anxiety, vulnerability, and unending curiosity. Pregnancy is a phase during which all physiological processes are heightened to accommodate the needs of the developing fetus. The ongoing physical adjustments are made to meet and anticipate the requirements of the growing fetus, creating a stable environment for its healthy growth as the primary objective of a safe pregnancy. Ensuring both the mother's health and the baby's well-being hinges on excellent prenatal care. Pregnancy comes with elevated nutritional demands, with iron being a crucial component that experiences increased demand from the mother, fetus, and placenta. Failure to meet this heightened demand can lead to the development of anemia [1].

Anemia during pregnancy stands as a significant public health issue, contributing to a considerable percentage of maternal fatalities, ranging from 4 to 16%. Additionally, it escalates maternal morbidity and substantially raises the risks of fetal and neonatal mortality and morbidity. Indeed, anemia is a recognized risk factor for a range of maternal-fetal complications, including preterm labor, an increased susceptibility to infections, postpartum hemorrhage (PPH), and fetal issues like low birth weight and growth retardation [2].

As per Acharya Charaka[3], *Pandu roga* is characterized by *Pitta* dominance. In discussions about *Masanumasika garbha* vruddhi, it's noted that *Mamsa* and *Shonita* increase during the 5th month and escalate further by the 6th month. Consequently,

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https://doi.org/10.47070/ijapr.v11i11.3011

Balavarnahani arises during the 6th month of pregnancy, leading to a potential decline in strength and skin radiance, along with symptoms primarily indicating the loss of *Rakta* and *Mamsa* components. This description can be referenced for *Garbhini Pandu*, correlating it with anemia during pregnancy.

As said by Acharya Charaka, *Garbhini* should be treated like *Poornameva tailapatram* and since *Shodhana karma* is contraindicated in pregnancy, only *Shamana oushadhas* can be formulated and advised. So, considered the necessity to have a drug which is efficacious in *Pandu roga* and without having any untoward effect on pregnancy. An indigenous drug formulation owing to its properties like *Raktavardhaka*, *Yakrututtejaka*, *Deepana*, *Medhya*, *Rasayana* and *Krimigna* is considered.

Literature

Kashyapa explained *Pandutva* as a symptom of *Garbhini* in the context of *Raktagulma.* [4] So in *Garbhini Pandu, Nidana panchaka* and *Chikitsa* of *Panduroga* may be adopted. Description of the *Nidanapanchaka* and *Chikitsa* of *Panduroga* have been elaborated in Caraka *Samhita, Ashtanga Samgraha, Ashtanga Hridaya. Amalaki, Musta, Pippali, Draksha* and *Dadima* are mentioned in *Panduroga adhikara* by *Caraka Acharya* in *Chikitsasthana.*[5] *Agasthya* and *Shigru* is mentioned in *Kaiyadeva nighantu* under *Aushadhi varga*. [6] *Mandukaparni* and *Bhringaraja* explained in *Bhavaprakasha nighantu* under *Guduchyadi varga* [7] *Shuddha Kasisa* mentioned in *Rasataragini* in the context of *Upadhatvadi Vijyaniya Taranga.*[8]

Ingredients

- *Amalaki*
- *Musta*
- *Pippali*
- *Draksha*
- *Agasthya*
- *Shigru*
- *Shuddha Kasisa*
- *Bhavana dravyas* like *Dadima, Mandukaparni* and *Bhringaraja*

Table 1: Containing Name of Ingredients

Drug	Botanical name	Family
Amalaki	*Phyllanthus emblica* Linn	Euphorbiaceae
Agastya	*Sesbania grandiflora* (L.) Poiret	Fabaceae
Musta	*Cyperus rotundus* Linn	Cyperaceae
Draksha	*Vitis vinifera* L.	Vitaceae
Pippali	*Piper longum* L.	Piperaceae
Sigru	*Moringa oleifera* Lamk.	Moringaceae
Dadima	*Punica granatum* Linn.	Punicaceae
Mandukaparni	*Centella asiatica* Linn.	Apiaceae
Bhringaraja	*Eclipta alba*	Asteraceae
Shudha Kasisa	Green Vitriol	

Table 2: Containing Pharmacological properties of Herbal ingredients

S.No	Drug	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Karma*
1	*Amalaki [9]*	*Madhura, Amla, Kashaya, Tikta, Katu*	*Laghu, Ruksha*	*Sheeta*	*Madhura*	*Medhya, Balya, Deepana, Yakriduttejaka, Hrdya, Shonitha-sthapana, Vrishya, Garbhasthapana, Rasayana*
2	*Agastya [10]*	*Tikta*	*Ruksha, Laghu*	*Sheeta*	*Katu*	*Shothahara, Medhya, Deepana, Krimigna, Raktapittashamaka, Balya, Garbhashayashothahara, Vishagna, Pandugna*.
3	*Musta [11]*	*Tikta, Katu, Kashaya*	*Laghu, Ruksha*	*Sheeta*	*Katu*	*Twagdoshahara, Shothahara, Medhya, Deepana, Pachana, Krimigna, Rakta-prasadana, Stanyajanana, Balya, Vishaghna*.
4	*Draksha [12]*	*Madhura*	*Mrdu, Snigdha,*	*Sheeta*	*Madhura*	*Medhya, Kanthya, Hridya, Rakta-prasadana, Raktapittashamaka,*

			guru			*Vrishya, Garbhasthapana, Jivaniya, Balya, Brimhana, Jwaragna*
5	*Pippali* [13]	*Katu*	*Laghu, Snigdha, Tikshna*	*Anushna sheeta*	*Madhura*	*Raktotklesa, Medhya, Deepana, Vatanulomana, Yakriduttejaka, Rakta-vardhaka, Raktashodaka, Balya, Rasayana*
6	*Sigru* [14]	*Madhura, Katu, Tikta*	*Lagu, Ruksha, Tikshna*	*Ushna*	*Katu*	*Vidahi, Shothahara, Vedanasthapana, Deepana, Pachana, Grahi, Krimigna*
7	*Dadima* [15]	*Madhura, Amla, Kashaya*	*Laghu, Snigdha*	*Anushna*	*Madhura, Amla*	*Shothahara, Pandughna, Medhya, Deepana, Trishnanigrahana, Jwaraghna, Balya, Hrdya*
8	*Mandukaparni*[16]	*Tikta, Kashaya, Madhura*	*Laghu, Sara*	*Sheeta*	*Madhura*	*Medhya, Vayasthapana, Agnivardhaka, Hridya, Raktashodhaka, Raktapitta-shamaka, Shothaghna, Balya*
9	*Bhringaraja* [17]	*Katu, Tiktha*	*Ruksha, Laghu*	*Ushna*	*Katu*	*Shothahara, Pandughna, Kesha-vardhana, Deepana, Pachana, Yakriduttejaka, Amapachana, Pittarechaka, Krimighna, Rakta-prasadana, Raktavardhaka, Rasayana, Balya.*
10	*Shudha Kasisa* [18]	*Kasaya, Amla*	*Ushna, Snigdha*	*Ushna*	*Katu*	*Vata-kaphahara, Keshya, Netrya, Keshya Ranjana, Balya, Rakta vardhak*

DISCUSSION

Mode of Action of Drug

Pandu roga is explained under the *Rasa pradoshaja vikara*. According to *Acharya Charaka*, the manifestation of the disease is caused due to the *Dusti* of *Pitta* which expels from its normal site and travels all over the body, leads to *Agni dusti* which causes the formation of *Ama*, leading to *Agni mandhya* which causes vitiation of *Rasa dhathu*, further vitiating the *Dhatvagni* and *Dusti* of the *Raktha dhatu*. The *Dushitha pitta* along with *Vata* circulates all over the body and gets lodged between the *Twak* and *Mamsa* and does the *Dushana* of other *Dhathu* causing the *Lakshanas* like *Vaivarnya* of the *Twak*, *Pandu*, *Haridra*, *Haritha varnatha*. The indigenous drug formulation i.e., *Agasthya, Amalaki, Draksha, Musta, Pippali, Sigru, Shuddha Kasisa* and *Bhavana dravyas* like *Dadima, Bhringaraja* and *Mandukaparna* act through its properties like *Pitta shamaka*, *Deepana*, *Pachana*, *Raktavardhaka*, *Krimighna* and *Rasayana*. Also these drugs- *Amalaki, Musta, Agasthya, Sigru, Mandukaparni* and *Bhringaraja* contain *Tikta rasa* and *Dadima, Sigru, Amalaki, Draksha, Mandukaparni* contain *Madhura rasa*. The *Tikta rasa* is believed to be *Deepana, Amapachaka, Arochakagna, Sita* and *Pittashamaka* and *Madhura rasa* is *Aajanmasaatmaya* and mitigates *Pitta*. These properties of *Tikta rasa* and *Madhura rasa* may be helpful in the *Samprapti vighatana* of *Panduroga* in which *Jataragni mandya* is present. The *Ama pacaka* and *Agni deepana* will hence help in bringing the *Dushitha pitta* to normalcy.

Agasthya is having *Tikta rasa*, *Sheeta virya*, *Laghu guna* and act as *Pittashamaka* and possesses *Karmas* like *Deepana*, *Krimighna*, *Balya* and *Pandughna*. *Tikta rasa* improves function of *Yakrut* which results in the proper formation of *Rakta dhatu* from *Rasa dhatu* with the help of *Ranjak pitta*. *Agathi* leaves contains iron, calcium, phosphorus, proteins, etc helps in improving hemoglobin concentration.[19]

Draksha is *Madhura rasa* and has *Madhura vipaka*, *Sheeta veerya*, *Snigdha*, *Mrdu gunas* and act as *Pittashamaka*. *Draksha* has got *karmas* like *Raktaprasadana*, *Garbhasthapana*, *Jeevaniya*, *Balya*. Thus by *Karmas* of *Draksha*, it is known that drug *Draksha* cures *Pandu* and is an effective drug which can be used during pregnancy, which can prevent uneventful situations during antenatal period. The chemical composition of the drug *Draksha* fruit contains dehydro ascorbic acid i.e., oxidised form of ascorbic acid, which helps in the absorption of the available iron. The drug contains arginine which is a semi-essential amino acid, improves the circulation and oxygen supply of the coronary and peripheral vessels through the release of nitric oxide.[20]

Pippali is having *Katu rasa* and *Yakrututtejaka* property which improve liver function which is the *Mula* of *Raktavahasrotas*. Furthermore, *Pippali* has *Deepana* and *Pachana* properties that aid in improving digestion and reduces *Amautpatti*. This counteracts

digestive capacity in *Pandu*. *Katu rasa* has been said as *Marga vivrunoti* (penetrates obstruction in channels) and reach even minutes level and increase micro circulation of the *Rasa* all over the body. *Pippali* contain piperine, acts as bioenhancer to vitamins (A, B1, B2, B6, C, D, E, K), amino acids, minerals such as iodine, calcium, iron, zinc, copper, selenium, magnesium, potassium, manganese.[21]

Musta is having *Tikta* and *Kashaya rasa*, *Sheeta veerya* and having *Krimighna* property. As *Purishaja krimi* is one of the cause of *Pandu* according to *Acharya Susruta* and also worm infestation is one of the etiology of anemia, *Musta* is good in expelling the *Krimi*. Nutgrass contain copper and magnesium, play an important role in increasing iron metabolism and Hb synthesis in body. Copper appears to be required for the absorption and utilization of iron. [22]

Amalaki has all *Rasa* except *Lavana*, *Laghu ruksha guna*, *Sheeta veerya* and *Pittashamaka* properties. It acts as *Rasayana*, *Yakrut uttejaka*, *Deepana*, *Balya*, *Raktaprasadana*. Its *Laghu ruksha* and *Deepana karma* helped in cleaning the obstruction of *Srotas* and thereby clearing minute channels within body and increases the function of *Dhatwagni*, *Pachakagni* and *Ranjaka pitta* thus increasing the absorption and assimilation of iron along with better utilization in *Raktha dhatu* and increases hemoglobin concentration. Vitamin C present in *Amalaki* is the most potent enhancer of iron absorption by its reduction to ferrous form.[23]

Sigru possesses *Madhura tikta rasa*, *Laghu ruksha guna*, *Deepana pachana* which improves status of *Agni*. Moringa leaf have the potential for large enough nutrients, amino acids and contains a wide range of micronutrients, especially iron is quite high at 28.29mg. Additionally, it encompasses various essential nutrients, including vitamin C (at 220mg), which play a vital role in facilitating iron absorption within the body. The content of vitamin C in Moringa leaf extract expedites the process of iron absorption.[24]

Kasisa is the only iron preparation of Ayurveda to have iron in ferrous state. [25]

Iron in this dissociable ferrous form has good absorption into the system. Owing to its chemical composition this drug is best absorbed into the gut. More over this drug is also mentioned in treatment of *Pandu roga* in the Ayurvedic classics.

Bhavana dravyas like *Mandukaparni, Bhringaraja* and *Dadima* are a rich source of dietary iron [26-28].

Takra is used as *Anupana. Takra* is included under *Pathyakalpana.* It is *Laghu, Dipana,* and useful in diseases like *Arsha, Grahani, Pandu* etc*.* Iron absorption is facilitated by acidic media which lowers the pH of the proximal duodenum from where it generally absorbed. Organic acids promote iron absorption. Buttermilk is also organic acid. Thus buttermilk is simple easily available organic acid which aids in iron absorption and thereby aids in treatment of *Pandu*. Buttermilk even contains vit B12 which also has a crucial role in erythropoiesis.

CONCLUSION

Pregnancy makes the women more susceptible to develop *Pandu* not only because of extra demand of the growing fetus but also due to the deficient diet. *Garbhini Pandu* is not directly described in Ayurvedic classics as a separate *Vyadhi*, but with different references in *Ayurvedic Samhitas*, the concept of *Garbhini Pandu* can be illustrated easily.

The line of treatment in *Panduroga* is *Shodhana* but as it is contraindicated during pregnancy, hence appropriate *Shamana chikitsa* has to be adopted. The drug by virtue of its properties like *Tikta-madhura rasa*, *Sita virya*, *Laghu guna*, *Pitta shamaka*, *Deepana* and *Pachana* action would possibly have brought about the *Amapachana*, *Poshana* of *Dhatu* and *Raktavardhaka*. Hence this drug formulation can be effectively used to enhance the hematinic effect in *Garbhini Pandu.*

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Cite this article as:
Neethu, Vidya Ballal, Mamatha KV. Probable Mode of Action of an Indigenous Drug Formulation in Garbhini Pandu wsr Iron Deficiency Anemia. International Journal of Ayurveda and Pharma Research. 2023;11(11):92-96.
https://doi.org/10.47070/ijapr.v11i11.3011
Source of support: Nil, Conflict of interest: None Declared

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