

“A Clinical Study of *Amalaki Avaleha* On *Pandu Roga* (Iron Deficiency Anaemia) In Pediatric Age Group”

Dr. Sukhdev Chandel^{1*}, Dr. Neeraj Agrawal², Dr. Satyawati Rathia³, Dr. Sanjay Kumar⁴, Dr. Yasmin Bano⁵, Dr. Vandana Agrawal⁶

¹MD Scholar, Specialization: Kaumarabhritya-Blaroga, University/Institution Name: Shri N.P.A. Government Ayurved College Raipur (C.G.), Pincode: 492010, ORCID ID: 0009-0006-2262-8503, Email ID: chandelsukhdev4@gmail.com

²Professor and HOD, Specialization: Kaumarabhritya-Blaroga, University/Institution Name: Shri N.P.A. Government Ayurved College Raipur (C.G.), Pincode: 492010, Email ID: Neeraj2001in@Yahoo.Co.In

³Assistant Professor, Specialization: Kaumarabhritya-Blaroga, University/Institution Name: Shri N.P.A. Government Ayurved College Raipur (C.G.), Pincode: 492010, ORCID ID: 0009-0000-1547-4362, Email ID: satirathiya@gmail.com

⁴MD Scholar, Specialization: Kaumarabhritya-Blaroga, University/Institution Name: Shri N.P.A. Government Ayurved College Raipur (C.G.), Pincode: 492010, ORCID ID: 0009-0004-8190-8914, Email ID: vaidyasanjayverma@gmail.com

⁵MD Scholar, Specialization: Kaumarabhritya-Blaroga, University/Institution Name: Shri N.P.A. Government Ayurved College Raipur (C.G.), Pincode: 492010, ORCID ID:0009-0003-4846-3792, Email ID: ybano321@gmail.com

⁶MD Scholar, Specialization: Swasthavritta evam Yoga, University/Institution Name: Shri N.P.A. Government Ayurved College Raipur (C.G.), Pincode:492010, ORCID ID:0009-0000-7020-6424, Email ID: vandanaagrawal1999@gmail.com

Corresponding Author: - Dr. Sukhdev Chandel,

*MD Scholar, Dept. of Kaumarabhritya GAC Raipur, Chhattisgarh, India, **Email:** - chandelsukhdev4@gmail.com

ABSTRACT

Anemia, particularly iron deficiency anemia (IDA), remains one of the most prevalent nutritional disorders among children in India. It is characterized by pallor, fatigue, giddiness, palpitation, and weakness, which correlate in Ayurveda with *Pandu Roga*, a condition arising due to *Rasa* and *Rakta Dhatu Ksaya*. In Chhattisgarh, the prevalence of childhood anemia is high due to nutritional deficiency, poor dietary habits, and low socio-economic status. The present clinical study entitled “A Clinical Study of *Amalaki Avaleha* in the Management of *Pandu Roga* (Iron Deficiency Anemia) in Pediatric age group” was undertaken to evaluate and compare the therapeutic efficacy of these two classical Ayurvedic formulations.

Material and Method- A clinical trial was carried out on children between the ages of 5-12 years who were diagnosed with *Pandu roga* (Iron deficiency anemia). Total 60 patients who met the inclusion criteria were chosen and divided into 2 groups. One group received *Amalaki avaleha* (n=30), while other group *Punarnava mandoor* over a span of 3 month. Evaluation was conducted based on the improvement of clinical features such as pallor, fatigue, dizziness, and palpitation, as well as objective parameters such as hemoglobin levels, RBC indices and Iron profile.

Result: - Out of 60 enrolled children, the majority belonged to the 5–8 years age group (60%) followed by 9–12 years (40%), with slightly higher prevalence in males (51.66%) than females (48.33%). Higher incidence was observed among middle socio-economic group (51.67%) and vegetarian children (53.33%). Clinically, the most common symptoms were *Panduta* (83.33%), *Sadana* (83.34%), and *Pindikodvestana* (73.33%). After treatment, *Punarnava Mandoor* showed highly significant improvement in subjective symptoms and hematological parameters with hemoglobin rising from 9.22 g/dl to 10.93 g/dl (p<0.001), whereas *Amalaki Avaleha* showed minimal improvement. Overall results indicate that *Punarnava Mandoor* is significantly more effective in the management of *Pandu roga* (Iron Deficiency Anemia) in children. Both formulations produced significant clinical and hematological improvement.

Conclusion- Both drugs were effective in the management of *Pandu Roga*, but *Punarnava Mandoor* showed superior clinical and hematological improvement compared to *Amalaki Avaleha*.

Keywords: -*Pandu*, Iron deficiency anemia, *Amalaki Avaleha*, *Punarnava Mandoor*.

How to cite this article: Chandel S, Agrawal N, Rathia S, Kumar S, Bano Y, Agrawal V. A Clinical Study of *Amalaki Avaleha* On *Pandu Roga* (Iron Deficiency Anaemia) In Pediatric Age Group. *Int J Drug Deliv Technol.* 2026;16(53s): 153-157. DOI: 10.25258/ijddt.16.53s.16

1. INTRODUCTION

Pandu roga is a disease described in *Ayurvedic* classic as not only an individual disease but sign, symptoms and complication of disease. It is characterized by the changes in the skin color to white (*sweta*), yellowish (*pitta*), greenish (*harita*), etc. and is typically characterized by *ketaki dhuli sannibham* (It means a mixture of white and yellow color which resembles the

pollen grain of *ketaki* flower).¹Consuming excessive amounts of alkaline, sour, salty, overly hot, incompatible, and unsuitable foods, along with the overuse of *nirvapa*, black gram, oil, and tila, poor management of evacuation methods and seasonal changes, and suppressing natural urges, alongside emotions such as anxiety, fear, anger, and grief, can aggravate *pitta* located in the heart and intensify the

Research paper

strong *vayu* throughout the ten arteries spreading across the body. The *pitta* positioned between the skin (*twaka*) and the muscles (*mamsa*) influences *kapha* and *vata*, as well as the skin and muscles, leading to various skin discolorations such as pale, yellow, and green. This condition is referred to as *pandu roga*.²

In the *Kashyapa Samhita*, *Pandu Rog* is described in the *Vednadhya*. As per his observations, the characteristics of *Pandu Rog* include swelling around the navel (*nabhyam samantatshotha*), whiteness of the eyes (*swetakshi*), deformity of the nails (*nakhvakrata*), loss of appetite (*agnisada*), and swelling of both eye pits (*shvayathu akshikutayo*).³ According to modern the clinical presentation of *Pandu Roga* closely related to anemia, particularly iron deficiency anemia, which is one of the most common nutritional disorders in children. *Pandu roga* can be correlate with Iron deficiency anaemia in modern science. Anaemia is a reduction in the blood hemoglobin concentration two standard deviation below the mean for the normal population with respect to age, gender and altitude of residence is known as anemia. This will result in 2.5% of the normal population classified as anemic. Some individual with hemoglobin value apparently in the normal range may be deficient as can be shown by an increase in Hb following iron intake.⁴ The prevalence of anaemia among girls (Hb <12 g%) and boys (Hb <13 g%) is alarmingly high as per the reports of NFHS-3 and the National Nutrition Monitoring Bureau Survey (NNMBS). As indicated over 55 per cent of adolescent girls are anaemic.⁵ In Chhattisgarh is leading the country in anemia cases among 6 to 59-month-olds, with a notable increase from 58.6% in NFHS-4 to 67.1% in NFHS-5 (a 9.5% increase) [18,19]. In contrast, anemia rose to 52.2% from 50.4% in pregnant women (a 4% increase) and to 57.2% from 53.2% in non-pregnant women (a 1.8% increase).⁶

2. AIM OF THE STUDY

- To evaluate the efficacy of *Amalaki Avaleha* on *Pandu Roga* (Iron Deficiency Anaemia) in Pediatric age group.⁷

3. OBJECTIVES

- Physicochemical and Phytochemical study of *Amalaki Avaleha*.
- To evaluate the effect of *Amalaki Avaleha* in the management of *Pandu Roga* in pediatric patients.
- To compare the therapeutic effect of *Amalaki Avaleha* with *Punarnava Mandoor*.
- To assess important in clinical symptoms and hematological parameters.

4. MATERIAL AND METHOD

5. ANALYTICAL STUDY OF TRIAL DRUGS

Table no.1 Organoleptic Evaluation of *Amalaki Avaleha*

S.N.	Parameters	Result
1.	Appearance	Semisolid

Description of the type of Study -Prospective, Randomized, Interventional, Open single arm clinical study.

Description of population-5 to 12 years of age group.

Centre – The research work will be done in Shri Khudadad Dungaji Government Ayurvedic Hospital Raipur (C.G.)

No. of intervention – 02

Blinding – Open Trial

Preparation of Medicine-Under the guidance of department of *Rasashastra* and *Bhaishajyakalpana*.

Selection of patients-60 patients.

Institutional Ethical Clearance: -This trial has been approved by Shri NPA Govt. Ayurvedic College, Raipur (Chhattisgarh) 492010. Its letter No.-IEC/2024/12 Date-05/02/2024.

CTRI registration-This trial was registered in clinical Trial Registry India (CTRI), Reg. No. CTRI/2023/05/052470 Date on 10/05/2023.

A. Inclusion Criteria:

- 1) Patients Age from 5 to 12 years.
- 2) Both sex-male and female.
- 3) Children will be selected Mild to Moderate Hb% level.
- 4) Microcytic Hypochromic Anemia and Normocytic Hypochromic on Peripheral blood smear (PBSs)
- 5) After obtaining written consent from parents.

B. Exclusion Criteria:

- 1) Children suffering from any systemic disease like kidney disease, heart disease, skin disease etc.
- 2) Chronic malnutrition.
- 3) HB Level <7.5 gm/dl
- 4) Iron Deficiency Aneamia with any associated Severe complication,
- 5) Other type of anaemia i.e. Sickle cell anaemia, thalassemia etc.

ASSESSMENT CREITERIA

A. Subjective parameters⁸

- 1) *Panduta* (Pallor)
- 2) *Aruchi* (Anorexia)
- 3) *Daurbalya* (Weakness, impaired growth)
- 4) *Gatra shula* (Bodyache)
- 5) *Pindikodweshtana* (Leg cramps)
- 6) *Sadana* (Fatigue)
- 7) *Bhrama* (Giddiness)
- 8) *Hridspandana* (Palpitation)

B. Objective parameters⁹

- 1) CBC
- 2) Peripheral Blood Smear
- 3) Serum Iron Profile

Research paper

2.	Colour	Blackish
3.	Odour	Odorless
4.	Teste	Sour

Table no.2 Physicochemical Parameters of *Amalaki Avaleha*¹⁰

Parameter studied	Result
Loss on drying (%)	12%
Total Ash	1.6%
Acid- insoluble ash	0.33%
Water- soluble extractive	28.8 %
Acid soluble extractive	0.33%
pH	3.32

6. OBSERVATION AND RESULTS

In the present clinical study, a total of 60 children suffering from *Pandu Roga* (Iron Deficiency Anemia) were enrolled. Age-wise distribution showed that the majority of cases were in the 5–8 years age group (60%), followed by 9–12 years (40%), indicating that younger children are more vulnerable due to rapid growth and higher nutritional requirements. Gender distribution revealed a slightly higher prevalence in males (51.66%) compared to females (48.33%). Socio-economic analysis demonstrated that anemia was most common in the middle socio-economic group (51.67%), followed by the lower class (25%) and upper-middle class (13.33%), suggesting a strong relationship between nutritional status and economic conditions. Dietary pattern showed slightly higher prevalence among vegetarian children (53.33%) compared to non-vegetarians (46.66%), possibly due to lower bioavailability of non-heme iron in plant-based diets. Personal hygiene assessment indicated higher incidence among children with moderate hygiene (45%) and poor hygiene (18.33%) compared to good hygiene (36.67%), which may be related to parasitic infections and poor sanitation. Appetite assessment revealed that 60% of children had poor appetite, 26.66% moderate, and 13.33% good appetite, reflecting inadequate nutritional intake. On clinical examination, coated tongue was observed in 63.33%, while pale conjunctiva was present in 90.33%, confirming anemia clinically. Regarding digestive capacity, *Madhyama Ahar Shakti* was observed in 46.66%, *Avara* in 40%, and *Pravara* in 13.33%, indicating impaired digestion in most children. Additionally, 80% of children consumed tea and 20% coffee, which may inhibit iron absorption due to tannins. The most common clinical symptoms observed were *Panduta* (83.33%), *Sadana* (83.34%), *Pindikodvestana* (73.33%), *Hridayaspandana* (46.67%), and *Bhrama* (30%), reflecting the classical features of *Pandu Roga*

associated with reduced hemoglobin and tissue hypoxia. Further evaluation of treatment response showed that *Punarnava Mandoor* produced highly significant improvement in subjective symptoms, including *Panduta* (80.68%), *Sadana* (67.36%), *Pindikodvestana* (65.81%), *Hridayaspandana* (85.07%), and *Bhrama* (71.25%), whereas *Amalaki Avaleha* showed comparatively lesser improvement. Objective parameters also demonstrated better results with *Punarnava Mandoor*, with hemoglobin increasing from 9.22 g/dl to 10.93 g/dl, RBC count from 3.49 to 3.73, and significant improvement in MCV, MCH, MCHC, HCT, serum iron, serum ferritin, TIBC, and transferrin saturation, while *Amalaki Avaleha* showed only minimal or statistically insignificant changes. These findings indicate that *Punarnava Mandoor* is more effective than *Amalaki Avaleha* in improving both clinical symptoms and hematological parameters in children suffering from *Pandu Roga* (Iron Deficiency Anemia).

In this clinical study, 60 children diagnosed with *Pandu Roga* (Iron Deficiency Anemia) were included. The age distribution indicated that most of the participants fell within the 5–8 years age category (60%), followed by those aged 9–12 years (40%), highlighting that younger children are more susceptible due to their rapid growth and greater nutritional needs. The gender distribution showed a slightly higher occurrence in males (51.66%) than in females (48.33%). The socio-economic assessment revealed that anemia was most prevalent in the middle socio-economic group (51.67%), followed by the lower class (25%) and upper-middle class (13.33%), indicating a strong correlation between nutritional status and economic circumstances. The dietary analysis indicated a slightly higher prevalence in vegetarian children (53.33%) compared to non-vegetarians (46.66%), likely due to the lower bioavailability of non-heme iron.

Subjective parameters

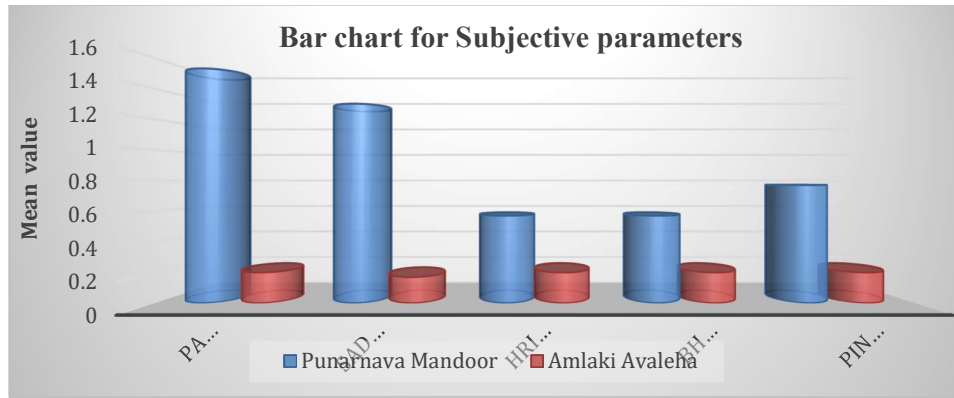


Figure 1: Group-wise assessment of subjective parameters in children with *Pandu Roga* (Iron Deficiency Anemia). The figure shows the mean scores of symptoms *Panduta (pallor)*, *Sādana (fatigue)*, *Hridaya Spandana (palpitation)*, *Bhrama (giddiness)*, and *Pindikodwesthana (calf pain)* in two treatment groups: *Punarnava Mandoor* and *Amalaki Avaleha*. The Z-values and p-values indicate **highly significant (HS, $p < 0.01$) improvements** in all symptoms in the *Punarnava Mandoor* group compared to *Amalaki Avaleha*

Objective parameters

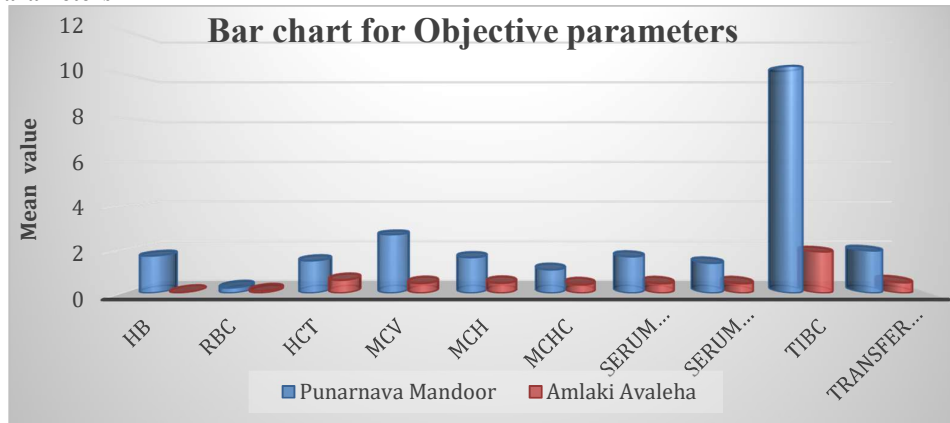


Figure 2: Group-wise assessment of objective hematological and biochemical parameters in children with *Pandu Roga* (Iron Deficiency Anemia) treated with *Punarnava Mandoor* and *Amalaki Avaleha*. The results show a **highly significant ($p < 0.01$) improvement** in major hematological indices Hb, RBC count, HCT, MCV, MCH, MCHC, Serum Ferritin, Serum Iron, and Transferrin Saturation in the *Punarnava Mandoor* group compared to *Amalaki Avaleha*. A significant ($p < 0.05$) reduction in TIBC further supports enhanced iron utilization.

Group-wise Assessment of PBS

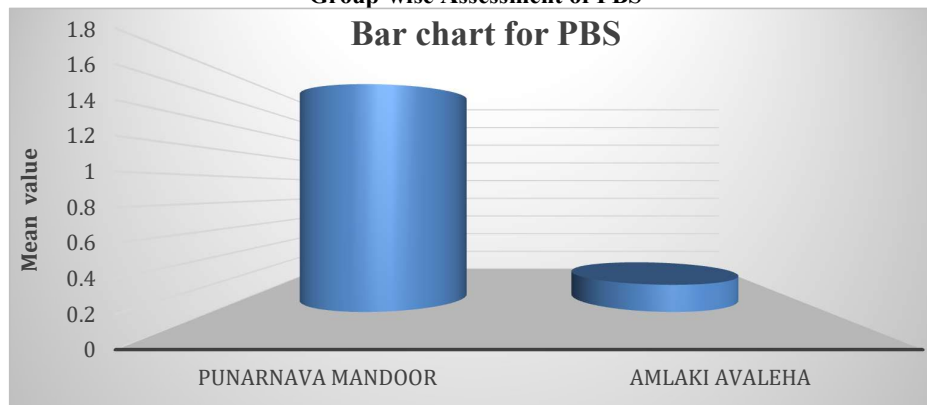


Figure No.3: - Group-wise assessment of the **Peripheral Blood Smear (PBS)** findings in children with *Pandu Roga* (Iron Deficiency Anemia) treated with *Punarnava Mandoor* and *Amalaki Avaleha*. The *Punarnava Mandoor* group showed a **highly significant improvement ($p < 0.01$)** in red cell morphology, with normalization from microcytic hypochromic patterns toward normocytic normochromic forms.

DISCUSSION

Research paper

Pandu Roga, described in Ayurvedic classics, is a *Rakta Dhatu* related disorder characterized by Pallor (*Panduta*), Fatigue (*Sadana*), Palpitations (*Hridayaspandana*), Giddiness (*Bhrama*), and Muscle Weakness (*Pindikodvesthana*). It is considered a *Raktapitta-pradhana Vyadhi*, arising mainly due to *Dhatu Kshaya* (depletion of blood tissue), *Agnimandya* (weak digestive fire), and improper *Ahara* (dietary intake). Based on contemporary medical understanding, *Pandu Roga* closely resembles iron deficiency anemia (IDA), which is the most common blood disorder among children and is caused by insufficient iron consumption, inadequate absorption, or excessive loss. Clinically, IDA manifests as pallor, fatigue, weakness, and in severe cases, cardiovascular and neurodevelopmental complications, mirroring the classical Ayurvedic symptoms of *Pandu*. In this study two classical ayurvedic formulation *Amalaka Avaleha* and *Punarnava mandoor* were evaluated for their therapeutic effect in *Pandu roga*. *Amalaki Avaleha* mainly acts as a supportive *Rasayana* and absorption enhancer, providing mild improvement in hematological parameters, but lacking the direct *Raktavardhaka* potency of *Punarnava Mandoor*. The therapeutic results showed that *Punarnava mandoor* produced significant improvement in both subjective and objective parameters. Marked relief was observed in symptoms such as pallor, weakness, palpitation, giddiness and muscle cramp including objective parameters such as hemoglobin, RBC count, *MCV*, *MCH*, *MCHC*, serum iron, and serum ferritin also showed significant improvement. *Amalaki Avaleha* showed only mild to moderate improvement, mainly acting as a supportive therapy by enhancing iron absorption. Overall, the study indicates that both formulations are beneficial in the management of *Pandu roga* (Iron deficiency anemia). However, *Punarnava mandoor* showed Comparatively superior results due to its direct hematinic action to improve iron metabolism while *Amalaki Avaleha* acts mainly as a supportive *rasayana* effect.

7. CONCLUSION

The clinical study entitled “A clinical study of *Amalaki Avaleha* in the management of *Pandu Roga* (Iron deficiency anaemia) in Pediatric age group” was conducted to evaluate the efficacy of two Ayurvedic formulation on the basis of subjective and objective parameters. From the observations and results obtained, it can be concluded that both *Punarnava Mandoor* and *Amalaki Avaleha* were effective in the management of *Pandu Roga*, producing significant improvement in clinical symptoms such as *Panduta* (pallor), *Sadana* (fatigue), *Hridayaspandana* (palpitations), *Bhrama* (giddiness), and *Pindikodvesthana* (muscle weakness). However, the magnitude of improvement was more pronounced with *Punarnava Mandoor*, which showed highly significant increases in hemoglobin, hematocrit, *MCV*, *MCH*, *MCHC*, serum iron, ferritin, and transferrin saturation, indicating a strong hematopoietic and iron-corrective action. *Amalaki Avaleha*, on the other hand, demonstrates a mild yet

consistent improvement, which can be attributed to its rejuvenating (*Rasayana*) and digestive stimulant (*Agnivardhana*) properties that enhance iron absorption and utilization within the body. Therefore, *Punarnava Mandoor* can be identified as an effective formulation for enhancing iron levels, resulting in a swift correction of hemoglobin levels, whereas *Amalaki Avaleha* serves as a supportive treatment that aids in improving nutrition and immune function in children. This study reinforces the concept of *Pandu Roga* as a *Rakta Dhatu Kshaya* (deficiency in blood tissue) and promotes the application of Ayurvedic formulations for managing iron deficiency anemia, particularly in pediatric care. In this research, since most parameters displayed $p < 0.05$, it can be concluded that *Punarnava Mandoor* was considerably more effective than *Amalaki Avaleha* in improving both the clinical symptoms and hematological indices of *Pandu Roga* (Iron Deficiency Anemia).

REFERENCE

1. Vachaspatya, Shri Taranatha tarka Vachaspati Bhattacharyena, Part-4, Chaukhambha Sanskriti Series Office Varanasi, edition-2002, P.No.4294
2. Agnivesha, Charaka Samhita of Acharya Charaka, Dridhabala krit, edited by Pt. Kashinatha Sastri and Dr. Gorakhanath Chaturvedi. Chikitsasthana, Chapter 16/26., Part 2, Chaukhambha Bharti Academy, Varanasi, reprint 2012, p-489.
3. Kasyapa Samhita/ vridhjhivakiya Tantra, edited by Prof.P.V. Tiwari, Sutrasthana. Chap-25/34. Chaukhambha Visvabharti Varanasi, reprint 2016, P.No.-57.
4. Ghai Essential Pediatrics 9th Edition, by Editors, Vinod K Paul, Arvind Bagga, Chapter 13, Hematological Disorders, CBS Publishers & Distributors Pvt Ltd, page no. 329.
5. Guidline for controle iron deficiency anaemia.
6. Ref, A Comparative Study of National Family Health Survey-4 and National Family Health Survey-5 of Nutritional Indicators in Chhattisgarh Anupriya Jha 1, Aditi Chandrakar 1.
7. Sushruta. Sushruta Samhita of Maharshi Sushruta, edited by Kaviraja Ambikadutta Shastri, Uttartanatra, Chapter 44/7, Part 2, Chaukhambha Sanskrit Sansthan, Varanasi, edition 2012, p-367.
8. Agnivesha, Charaka Samhita of Acharya Charaka, Dridhabala krit, edited by Pt. Kashinatha Sastri and Dr. Gorakhanath Chaturvedi. Chikitsasthana, Chapter 16/26., Part 2, Chaukhambha Bharti Academy, Varanasi, reprint 2012, p-489.
9. Ghai Essential Pediatrics 9th Edition, by Editors, Vinod K Paul, Arvind Bagga, Chapter 13, Hematological Disorders, CBS Publishers & Distributors Pvt Ltd, page no. 330.
10. Anonymous, The Ayurvedic Pharmacopoeia of India, Part-1, volume 1, new delhi, Gov of India Publication, Appendices 2.2.2. Reprint, 2001, page-5.