

---

## ANEMIA IN ADOLESCENT GIRLS AND AYURVEDA

<sup>1</sup>Dr. Sonal A. Shah, <sup>2</sup>Dr. Vinay Chavhan

<sup>1</sup>. Professor, Dept. of Kayachikitsa, <sup>2</sup>Asso. Professor, Dept. of Panchakarma,  
LRP Ayurveda College and Research Centre, Islampur, Maharashtra

---

### ABSTRACT

*The main aim of this ayurvedic medical science is to protect the human beings from various diseases by following rules and regulations of swasthviritta to form healthy society. Doshasdhatus and malas in the body remains balanced is called swastha. If the doshas are vitiated then they create an unhealthy condition in the body. The concept of Panduroga is not new for Ayurveda. It is clearly stated that pittapradhanvatadidoshas are the main causes to produce panduroga. According to similarities in the symptoms we can compare Panduroga with anemia as described by modern science.*

*Iron deficiency anemia is the most common health problem in children and adolescents. Adolescent girls are at high risk of iron deficiency anemia due to poor nutrition and accelerated increase in requirements for iron. The present study aims to assess the prevalence of anemia in adolescent girls and to find its correlations.*

---

### Introduction

Anemia is the most prevalent nutritional problem in the world<sup>1</sup>. More than 2.1 billion people are anemic worldwide<sup>2,3</sup>. Nutritional anemia, according to the World Health Organization (WHO), is a state in which the hemoglobin concentration in the blood is lower for the age, gender, physiologic state and altitude. As a consequence of shortage of essential nutrients, independent of the cause of this deficiency<sup>4,5</sup>. Nutritional anemia includes a lack of nutrients, such as iron, folic acid, vitamin B12, copper and vitamins C, E, and A. Iron deficiency Anemia is the most prevalent form of nutritional disorder in infancy. It also affects communities not only in developing nations but also in highly industrialized countries<sup>6</sup>. In the developing era 42% of children are less than 5 years of age and 53% of children 5–14 years of age are anemic<sup>7</sup>. Anemia is a serious public health problem in India<sup>8</sup>.

Adolescence has been defined by the World Health Organization as the period of life span in the ages between 10 to 19 years. This is the formative period of life when the maximum amount of physical, psychological and behavioral changes take place. This is a vulnerable period in human life cycle for the development of nutritional anemia, which has been constantly neglected by public health program.

Ayurveda and Charak Samhita in India contain descriptions of Anemia and its various types. Although anemia was known since the days of Hippocrates (BC 460) who found that 'Gross appearance of blood differs between healthy and unhealthy people.

Anemia has originated from the Greek word 'Ahimia' (A = Not, Hima = Blood). Anemia is an extremely prevalent condition common in all humans, of all ages, living in all conditions and continents.

A high prevalence of anemia has been reported amongst adolescent Indian girls. Anemia reported among adolescent girls from public and government schools in India is 50.8%. Studies indicate that the prevalence of anemia among those 5–14 years of age is in the range of 66.7%–77%.<sup>13,14</sup> Vasanthi

et al.<sup>15</sup> reported that anemia and iron deficiency were higher in rural girls as compared to urban slum adolescent girls. A study conducted on 1513 rural adolescent girls in Gujarat indicated that 61% of the girls were anemic. A multicentric study carried out in 16 districts of India indicated that the overall prevalence of anemia ranged from 33% to 89% among pregnant women and more than 60% among adolescent girls. Under the anemia prevention and control program of the Government of India, iron and folic acid tablets are distributed to pregnant women, but no such program exists for adolescent girls.

There is a high prevalence of anemia in school-going adolescents in India. Hence, the present investigation was planned to take an initiative and study the sustainable effect of the non-iron-containing Ayurvedic preparations improving nutritional anemia in school-going adolescent girls.

### **NEED FOR THE STUDY**

Available studies on prevalence of nutritional anemia in India show that 65% infant and toddlers, 60% 1-6 years of age, 88% adolescent girls (3.3% had hemoglobin < 7.0 g/dl; severe anemia) and 85% pregnant women (9.9% having severe anemia) were anemic. In a study it was found that among adolescent girls (n = 4,337) from 16 districts, the overall prevalence of anemia (defined as hemoglobin < 12.0 g/dl) was 90.1%, with 7.1% having severe anemia (hemoglobin < 7.0 g/dl).

Adolescent girls need additional requirements of iron up to 15% to compensate the physiological blood loss during menstruation. Stunted and undernourished girls are more likely to have complications during pregnancy and give birth to low birth weight babies.<sup>10</sup>

In a study to estimate the prevalence of anemia among adolescent females and to study the socio-demographic factors associated with anemia, the prevalence of anemia was found to be 35.1%. A significant association of anemia was found with socio-economic status and literacy status of parents. Mean height and weight of subjects with anemia was significantly less than subjects without anemia. A high prevalence of anemia among adolescent females was found, which was higher in the lower socio-economic strata and among those whose parents were less educated. It was seen that anemia affects the overall nutritional status of adolescent females.

Adolescents face a series of serious nutritional challenges not only affecting their growth and development but also their livelihood as adults. The reproductive cycles of pregnancy, childbirth and lactation are nutritionally demanding and adolescent mothers face these demands while they themselves are still growing and developing. Yet adolescents remain largely neglected, difficult-to-measure, and hard-to-reach population, in which the needs of adolescent girls in particular are often ignored<sup>12</sup>.

A study conducted in Bangladesh regarding knowledge of anemia among adolescent girls with various demographic variables, in Bangladesh 16.4 million children, 3.2 million pregnant women, 9.2 million non pregnant, 3.9 million adolescent girls are affected by iron deficiency anemia. The project covered 68,813 adolescent girls were selected for the study. Among that 60.8 % of adolescent girls were having no knowledge of anemia signs and symptoms. Comparing to married, unmarried girls were having more incidence. 64.8% of adolescent girls having signs and symptoms.<sup>13</sup>

Coming to adolescent girls, they are very conscious towards their beauty now-a-days. There are many studies which show that they suffered from anorexia nervosa. They eat less and say that they are dieting for a perfect figure but the reality is, by doing this, they suffer from many health problems. In this period they also attain menarche. So every month there is blood loss, thus due to this and the faulty dietary pattern, they come close to the condition called anemia.<sup>14</sup>

Hence the investigator believes that the problem related to anemia can be because of inadequate knowledge among the adolescent girls. So that the particular topic has been selected for the study.<sup>15</sup>

### REVIEW OF LITERATURE

A literature review is written summary of the state of existing knowledge on research problem. The talk of reviewing research literature involves the identification, selection, critical analysis and written description of existing information on a topic.<sup>16</sup>

Literature reviews serve a number of important functions in the research process. By examining some of their specific functions, we hope to clarify their value. Studies related to review of literature

- General information regarding anemia
- Causes of anemia
- Signs, symptoms and investigations of anemia
- Management of adolescent anemia
- Side effects of iron supplements.
- Complications of anemia.
- Knowledge of adolescent girls.
- Ayurvedic treatment.

### OBJECTIVES OF THE STUDY

- To assess the knowledge of adolescent girls regarding anemia by knowledge score.
- To develop health educational guide sheet regarding anemia.
- To study result of ayurvedicdrugs in anemia.

### CAUSES

A study was conducted on lifestyle associated risk factors in adolescents. Reported that about one-third of the adolescents 29.4% girls eat fast food more than three times a week. In addition 16.5% girls agreed to having added extra salt to their food/salads. An extremely low consumption of fruits and vegetables across all groups was also found. Only 39.4% adolescents had fruits daily. It did not seem to contribute in any way as a risk factor.

A study conducted on seasonal variation in iron status of adolescent girls. It revealed that there is considerable seasonal variation in the iron status of adolescent girls. The frequency of consumption of foods rich in blood forming nutrients by adolescents was higher during rainy and winter compared to summer. Correspondingly, the adolescent girls recorded higher mean hemoglobin level during rainy and winter season compared to summer. Majority of the subjects were having mild or moderate anemia and only few of them were normal as they consumed iron rich foods less frequently, i.e., fortnightly or occasionally. However, seasonal variations were not recorded in any of anemia symptoms. By studying these seasonal changes it is possible to suggest intervention trials during summer to improve the iron status.

**.Age:** Age take between the 11-18 On statistical analysis relationship between age and anemia was found non-significant ( $P>0.05$ ). Some of the studies support this relationship.<sup>18</sup>

**Socio Economic Status:** The cause for anemia in lower class may be the ignorance to proper diet due to poverty and inadequate resources. Statistically this association was found non-significant ( $P>0.05$ ).

**Habitat:** Significant association was found between habitat and anemia in girls ( $p < 0.05$ ). The cause may be the ignorance to diet due to poor literacy and poor income group, which is again inability to afford proper diet. Previous studies also support the fact.<sup>19</sup>

**Family Status:** Girls were from joint family and from nuclear family. Majority of girls were found anemic from joint families. There was highly significant association between family type and anemia in girls in large families.

**Risk Factors:** Frequent illness was the most prevalent problem in daily routine in girls. However, prevalence of anemia was more common in girls with problem of inadequate food. Frequent illness and inadequate food leads to deficiency of nutrition which is the most common cause of iron deficiency anemia in India.<sup>12</sup> Heavy menstrual bleeding was found second most common contributing factor for anemia. Blood loss in adolescent girls leads to blood loss and increased demand, the fact is supported by studies also (Beard, 2000)<sup>13</sup>. Worm infestation was also common observation found in anemic girls. Statistically significant relation was found between anemia and risk factors of anemia ( $p = 0.0507$ ).

**Receiving Food from National Program:** Most of the girls were not receiving food from National Program. No significant relation was found between anemia and girls receiving food from National Program. Other studies report that iron fortification of mid-day meal was effective in significantly reducing the prevalence of anemia among school children.<sup>20</sup>

**Diet:** Girls were taking vegetarian diet and girls were taking mixed diet. Majority of girls found anemic were vegetarian. Highly significant association was found between vegetarian type of diet and anemia in girls ( $p = 0.0068$ ). This association has been proved in a study that anemia is more prevalent in vegetarians.<sup>15</sup> Vegetarian diet tends to be lower than the average requirements for riboflavin and vitamin B12 deficiencies.<sup>16</sup> Researches also report that vegetarian diet is low in iron and vitamin B12.<sup>21</sup>

**Menarche:** Anemia was found more prevalent in girls who achieved menarche. Statistically non-significant ( $p > 0.05$ ) association was observed between anemia and menarche. Few studies also reported no association between status of menarche and anemia which supports the present study<sup>122,23</sup>

**Immunization Status:** Girls were completely immunized while maximum numbers of girls were found incompletely immunized. Statistical analysis revealed significant association between anemia and immunization status ( $p < 0.05$ ). The finding supports ignorance towards the health care which may also be reason for anemia in these girls.

**Receiving IFA Tablets under National Program:** Girls were receiving IFA tablets under National Program in the survey area at the time of study. Statistically extremely significant ( $p < 0.0001$ ) association was found between anemia and girls receiving IFA under National Program. Previous studies also support the present findings<sup>24,25</sup>.

**De-worming:** The provided history of de-worming during last six months is also valuable at the time of study. Extremely significant association was found between anemia and H/O de-worming ( $p < 0.0001$ ). Previous studies also support the present finding<sup>22,23</sup>

In ayurvedakrimi types and its causes are also described. Krimikutarras is a drug given to adolescent girls.

**Symptom:** Most prevalent symptom found in girls was fatigue. The symptom of fatigue is most prominent in panduroga (anemia in Ayurveda), the reason behind this may be dhatukshaya

(Emaciation), ojekshaya (immune-compromised), as well as presence of raktalpatha (reduced hemoglobin), in the subjects. Fatigue of anemic subject is due to decreased supply of oxygen to the body/tissue/muscular mass/cellular level, this hypoxic condition causes anaerobic oxidation and lactic acid formation, this lactic acid if not cleared within due time, present as fatigue sensation in the body. Statistically non-significant ( $p>0.05$ ) association was found between anemia and symptoms of anemia.

Type of Anemia

- Mild- 10 to  $<12$  g/dl<sup>3</sup>
- Moderate- 7 to  $<10$  g/dl<sup>3</sup>
- Severe-  $<7$  g/dl<sup>3</sup>

This study shows that mild variety of anemia is more prevalent among adolescent girls.

### Formulations for treatment of anemia among general population

Four studies were focused on the general population<sup>28-31</sup>. The Ayurvedic formulations studied in these four studies for their efficacy against IDA among general population include NavayasaLauha, PunarnavadiMandura, DhatriLauha, PradarantakaLauha, SarvaJvara Hara Lauha, BrihatYakrdariLauha, DadimadiGhrita and TrikatrayadiLauha. There are several explanations regarding the efficacy of Ayurvedic formulations in combating IDA in general population. It is observed that a substantial portion of these Ayurvedic formulations contain organic matter that includes ascorbic acid, sugars, amino acids and organic acids, which cause better absorption of non haem iron.<sup>28</sup> Furthermore, most of the Ayurvedic formulations are administered with some Anupana (vehicle) as in the case of NavayasaLauha and DhatriLauha. These two formulations are administered with honey as Anupana which is a mixture of glucose and fructose and iron may combine with these sugars for absorption. This is also advocated in Allopathic medicine as iron formulations are combined with sugars such as iron polymaltose complex and ferrous gluconate.<sup>32</sup> PunarnavadiMandura and DhatriLauha are also administered with buttermilk and the mechanism of action and iron absorption has been explained in this draft. BrihatYakrdariLauha is being administered with ginger extract which also helps in iron absorption owing to its carbohydrate and protein contents.<sup>33</sup>

**Rasayanachikitsa:** Ayurveda rasayana therapy has given powerful contribution and rejuvenates the body and the mind.

Vardhamanpippalirasayana

Guduchi

Shatavari

Laghmalinivasant

Dhatriavleha

### PATHYA-APATHYA:

zÉÉÍsÉIÉçxÉrÉaÉÉâkÉÑqÉÉIÉçrÉÔwÉxÉÇÌWûiÉÉIÉç |  
qÉÑaÉRûMüĐqÉxÉÑUæ¶ÉeÉÉ...;ûsÉæ¶ÉUxÉæÌWûiÉæ: ||  
cÉ.xÉÔ16/41

**Pathyahara:** Food - old wheat, rice (shashtika), barley, jowar, greengram and pea.

**Vegetables** - Dudhi, patola, bimbi, chakvat, palak, shepu, jeevanti, Haridra, punarnava

**Non-veg** - Shingada fish, goat meat, jangal meat

**Fruits** - Amla, grapes, anjeer, chikoo, banana, mango,

khajur, pomogranate, papaya

**Roots** - Shingada, kamalakunda, lasuna, ginger.

**Milk products** - Cow milk, ghee, navneetakra.

**Liquids** - gomutra, lajamanda, koshnajala, laghu panchamula siddha jala.

Madyavarga - Sauvira and tushodaka.

Ksharavarga - yavakshara

Vihara: Light exercise

**Apathyahara:**

Shakavarga - Except the above mentioned shakavarga

Shimbivarga - Matara, masha, pinyaka

Dal - Til, sharshapa

Tail varga - Bijowar tail

Drava varga - Atyambupana, madyapana

**Vihara:**

Diwaswapna, atapseva, ativyayama, vegavidharana, chinta, shoka, krodha.

Agni, atapa, pittakaraaharasevana, maithun, ayasa, krodha.

**Search strategy**

The review of literature was carried out in two phases using PUBMED and hand search. Here, the term hand search is meant for searching the articles from cross references of the articles selected for review and is a process of purposeful selection of articles at the stage of eligibility and inclusion which did not typically undergo the process of identification and screening. Key words used for the purpose of this literature review include "PanduRoga," "Iron Deficiency Anemia," and "Ayurveda". Of 37 articles obtained from both PubMed (n = 34) and hand search (n = 3), 10 articles were finally selected for this review. This study adopted a narrative review approach instead of a quantitative approach as used in meta analysis. Hence, no statistical analysis was carried out in this review. Figure 1 is a flowchart showing the selection of articles for this review.

### **KNOWLEDGE OF ADOLESCENT GIRLS**

For eliciting the knowledge of the study subjects a pre-designed and pre-tested, structured, self-administered, modified Hindi version of the questionnaire prepared by Susan M.Moore was used. This questionnaire contains 14 questions related to puberty and menstruation, out of which, six were multiple choice questions with three alternatives each, and eight questions were true and false statements. Once score was allocated to each correct answer and no score was given for incorrect answer. Therefore, possible range of obtainable scores will be between 0-14.

In ayurveda classic types of mridbhakshanjanyapandu, due to mud intake. have treatment of shodhanchikista i.e. vamanvirechanwhich is prescribed to the girls.

Table 2: Dosage, duration and Anupana of important Ayurvedic formulations for iron deficiency anemia

Name of the drug	Dosage	Anupana (vehicle)	Duration of treatment as per studies
PunarnavadiMandura	250 mg twice daily	Buttermilk	30 days

The dosage and the duration of treatment reported in various studies were in accordance with the need and design of the studies, however the same can be customized according to the need of the patients. In addition, multiple studies have used multiple dosages, however the convenient dosages have only been mentioned here where the results are statistically significant which helps in avoiding prolonged treatment unnecessarily.

Table 3: Dosage, duration and formulations Anupana of important Ayurvedic drugs for iron deficiency anemia

Name of the drug	Dosage	Anupana (vehicle)	Duration of treatment as per studies
DhatriLauha	500 mg thrice daily	Buttermilk/honey	30 days
DadimadiGhrita	10 ml twice daily	Luke warm water	84 days
Pandughnivati	500 mg thrice daily	Luke warm water	90 days
TrikatrayadiLauha (suspension form)	0.5 ml/kg body weight	Not mentioned	10 weeks
TrikatrayadiLauha (tablet)	250 mg 4 times daily	Not mentioned	60 days
NavayasaLauha	250 mg twice daily	Honey	30 days

### Conclusion

From this review, it is clearly evident the most of the Ayurvedic formulations studied for their efficacy against Anemia in adolescent girl. All these studies showed statistically significant results in both subjective and hematological parameters. Another advantage of these Ayurvedic formulations is that they are safe and effective against anemia in all ages and groups. The efficacy is evident from various hematological parameters such as plasma iron, percent saturation, plasma ferritin and Hb%. As most of these Ayurvedic formulations are found effective against anemia, their usage should be fostered at all levels in addition to modern allopathic medicines.

### REFERANCES

1. DeMaeyer E, Adiels-Tegman M. The prevalence of anemia in the world. *World Health Stat Q* 1985;38:302–316.
2. Jackson RT, Al-Mousa Z, Al-Raqua M, Prakash P. Effect of short-term weekly iron and folic acid supplementation on anemia and symptoms in adolescent Kuwaiti girls. *Kuwati Med J* 2003;35:275–280.
1. Viteri F. A new concept in the control of iron deficiency: Community-based preventive supplement of at-risk groups by the weekly intake of iron supplement. *Biomed Environ Sci* 1998;11:46–60.
4. World Health Organization. Nutritional anemia: Report of a WHO scientific group. *Technical Report Series, no. 405*. Geneva: WHO, 1968.
5. DeMaeyer EM, Dallman P, Gurney JM, et al. Preventing and controlling iron deficiency anemia through primary health care: A guide for health administrations and programme managers. Geneva: WHO, 1989:8–9.

7. Coutinho GGPL, Goloni-Bertollo EM, Bertelli ECP. Iron deficiency anemia in children: A challenge for public health and for society. *Sao Paulo Med J* 2005;123:88–92.
8. Tolentino K, Friedman JF. An update on anemia in less developed countries. *Am J Trop Med Hyg* 2007;77:44–51.
9. Muthayya S, Thankachan P, Zimmermann MB, et al. Low anemia prevalence in school-aged children in Bangalore, South India: Possible effect of school health initiatives. *Eur J Clin Nutr* 2007;61:865–869.
10. Gulani Krishna Kumari: *Community Health Nursing Principles and Practices*, 1st edition, 456, Kumar publishing house. 2008.
11. Asokan J. S. et. al.: Prevention of anemia among adolescent girls, *Indian journal pediatrics*: 532-536, 2000.
12. Kapur D. Agrawal: *Nutritional anemia and its control*. *Indian journal pediatrics* 69(7):607-16, 2002.
13. Kaur S. et. al: *Nutritional anemia in adolescent girls*. *Indian journal of Community Medicine*, vol. 31, no.4:255-257, 2006.
14. Goel S. and B.P. Gupta: *Low anemia prevalence among adolescents*. *Indian journal of community medicine*, Vol.32 no.1:325-326, 2007.
15. ChaudharySanjeev, M. et. al: *Anemia among Adolescent Females*, *Indian Journal of Community Medicine*, Vol. 33: 243-245, 2008.
16. Polit D.F. and C.T. Beck: *Nursing Research; Generating and Assessing Evidence for Nursing Practice*, 8th edition, 142, Wolters Kluwer Health/Lippincott Williams and Wilkins, New Delhi.2008.
17. Potter P.A. and A.G. Perry: *Fundamentals of Nursing*, 6th edition, Mosby, St. Louis, Missouri.2006.
18. Rajini S et al. *Prevalence of anemia and factors among rural adolescent girls*. *Indian journal of maternal and child health*; 2010.
19. Rajini S et al. *Prevalence of anemia and factors influencing among rural adolescent girls*. *Indian journal of maternal and child health*; 2010.
20. Rita Singh, *Sociodemographic factors causing anemia in adolescent girls in Meerut*. *Health and Population- Perspectives and Issues* 2008; 38: 198-203.
21. Kotecha et al. *Adolescent girls' anaemia control programme in Gujarat*. *Indian J Med Res* 130, November 2009, pp 584-589
22. Goel S, Gupta BP, *Low anemia prevalence among adolescents of an urban hilly community*, *Indian J of Community Medicine* 2007; 32(1); 67-68.
23. A.K. Das. *Medical Physiology Vol. II, Books and Allied (p) Ltd., Calcutta- 9*.
24. Beard, J. L. *Iron requirements in adolescent females*. *J. Nutr* 2000; 130: 440S – 442S.
25. *Population Association of America 2015 Annual meeting. Mid Day School Meals as Social Safety Nets: An evaluation of the Impact of Iron Fortification of Mid Day Meals on the prevalence of Anemia among Children in Odisha, India.* [cited 2013, Feb 18] Available from <http://http://paa2015.princeton.edu/abstracts/151979>
26. Rajini S. *Prevalence of anemia and factors influencing among rural adolescent girls*. *Indian journal of maternal and child health* 2010.
27. Perry, C. L., McGuire, M. T., Neumark-Sztainer, D., & Story, M. *Adolescent vegetarians. How well do their dietary patterns meet the Healthy People 2010 Objective?* *Arch Pediatr Adolesc Med*.2002; 156.431-437.
28. Obeid, R., Geisel, J., Schorr, H., Hubner, U., & Herrmann, W. *The impact of vegetarianism on some haematological parameters*. *European Journal of Haematology* 2002. 69. 275-279.
29. Choudhary SM, Dhage VR. *A study of anemia among adolescent females in urban area of Nagpur*. *Indian J Community Med*.2008; 33:243-245.