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UNDERSTANDING THE *NIDANAS* OF *PANDUROGA* – AN OBSERVATIONAL STUDY IN STUDENTS

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ABSTRACT:

The concept of prevention, often ignored by society, has shown to play a major role in individual as well as public health care systems. It is thereby important to understand and convey efficiently to the health seeker about specific and general causes of various pathologies. *Pandu* (anemia), a disease condition that relates to Iron deficiency anemia, affects more than half of the women in India. The causes are generally presumed to be excessive work or diet deficient in enough nutrition. Other factors like the nature of food are not usually taken into consideration as such concepts are alienated from the science of food. This article assesses the role of dietary factors as explained in the *samhitas* in the pathogenesis of anemia. It is observed that most of the diagnosed cases are found to be indulging in the said etiological factors to different extents.

Keywords: prevention, *Panduroga*, diet, anemia

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INTRODUCTION:

The entity which projects itself as a symptom, a disease by itself, also a complication. In *Ayurveda Pandu* has been named based on the changes it causes in the general appearance of the patient. It has been derived from the *Dhatu* "*Padi*" which means "*Nashana*" (destroy)[1]. Here it depicts loss of complexion resulting in pale looks. This attribute is a result of deranged *Pitta Dosha* (energy of digestion and metabolism) in *Rakta dhatu* (blood). Based on the similarity in the symptomatology, the nearest correlation is Iron deficiency anemia. It is characterized by lower level of Haemoglobin in the RBCs of the human body. The word Anemia in Greek directly means insufficiency of blood. The commonest type of Anemia observed in clinical practice is Iron Deficiency Anemia. Anemia could be a consequence of numerous causes, including nutritional deficiencies, acute or slow loss of blood due to trauma or other pathologies, destruction of red blood cells due to various metabolic and immunological abnormalities or toxins, disease of the bone marrow, general systemic diseases like infections, malignancies and renal failure.

According to *Acharya Charaka*[2] – *Nidana's* (cause) of *Pandu* can be classified as *Aharaja* (food), *Viharaja* (lifestyle) and *Manasika* (psychological) *Nidana*.

In *Aharaja Nidana* excessive consumption of *Kshara* (alkali), *Amla* (sour), *Lavana* (salt), *Atiushna padartha sevana* (excessive hot foods), *Viruddha* and *Asatmya Bhojana* (unwholesome food), *Pramitashana Nishpava* (cowpea), *Masha, Pinyaka* (paste of sesame), *Tilataila atisevana* (sesame oil), *Tikshna Padartha sevana, vidagdha anna sevana* (burnt food), *Atimadya sevana* (excessive alcohol), *Matsya sevana* (fish consumption), *Sneha sevana, Sneha vibhrama* and *Mrit sevana* (mud eating). *Sushruta – Pishta, Paya* (milk), *Ikshu* (sugarcane).

Viharaja Nidana – Ativyayama (excessive excersises), *Diwaswapna* (day sleep), *Atimaithuna* (excessive intercourse), *Vegadharana* (suppression of natural urges) *(Chardi* – vomiting*), Panchakarma vishama prayoga* (improper administration of panchakarma).

Manasika Nidana – Kāma (lust), *Chinta* (worry), *Bhaya* (fear), *Krodha* (anger), *Shokagrasta* (grief).

According to ***Harita***, consumption of *Katu* (pungent) and *Kashaya rasa* (astringent) can also lead to *Pandu.*

Pandu is a disease which appear as *Purvarupa* (prodromal features), *Lakshana* (clinical features) and as a *Upadrava* (complications). *Panduta* occurs approximately in 40 diseases. Some of them are listed here –

Raktārsha (bleeding piles), *Shotha* (edema), *Raktapitta* (Internal/External Haemorrhage), *Udararoga* (abdominal disorders), *Udarakrimi* (worm infestation), *Grahani Dosha* (IBS), *Vishama jwara* (intermittent fever), *Jeerna Jwara* (chronic fever), *Raktapadara* (menorrhagia), *Raktārbuda* (blood tumor), *Vrana* (wound), *Rājayakshma* (tuberculosis), *Pittaja Pratishyaya* (common cold), *Prameha* (diabetes), *Gulma* (tumor), *Ashmari* (renal calculi), *Kāmala* (jaundice) etc. *Upadravas* of *pandu* are *Aruchi* (anorexia), *pipasa* (thirst), *chardi*, *jwara*, *murdharuja* (headache), *agnisada* (low digestion power), *shopha*, *kanthagatabala* (weakness in throat), *murcha*, *klama* (exhaustion), *hrit avapeedana* (squeezing pain in heart)[3]

Anemia –

Anemia is the inability of the blood to carry enough oxygen to meet body needs. Usually this is because there are low levels of hemoglobin in the blood, but sometimes it is due to production of faulty hemoglobin [4].

Generally, reduction in RBC count, hemoglobin content and PCV occurs because of decreased production of RBC, increased destruction of RBC and excess loss of blood from the body[5].

Anemia is classified by two methods:

1. Morphological classification
2. Etiological classification.

Table No.1 – Classification of anemia [5]

Morphological classification	Etiological classification
Normocytic Normochromic Anemia	Hemorrhagic anemia
Macrocytic Normochromic Anemia	Hemolytic anemia
Macrocytic Hypochromic Anemia	Nutrition deficiency anemia
Microcytic Hypochromic Anemia	Aplastic anemia
	Anemia of chronic diseases

Nutrition Deficiency Anemia[6]

Anemia that occurs due to deficiency of a nutritive substance necessary for erythropoiesis is called nutrition deficiency anemia. The substances which are necessary for erythropoiesis are iron, proteins and vitamins like C, B12 and folic acid. The types of nutrition deficiency anemia are: Iron deficiency anemia, Protein deficiency anemia, Pernicious anemia or Addison's anemia, Megaloblastic anemia.

Iron deficiency anemia –

This is the most common form of anemia in many parts of the world. Dietary iron comes mainly from red meat and highly coloured vegetables. Daily iron requirement in men is about 1–2 mg. Women need 3 mg daily because of blood loss during menstruation and to meet the needs of the growing foetus during pregnancy. Children require more than adults to meet their growth requirements [4].

30% of the world's population is anaemic and 600 million of these, or half of the total, have iron deficiency anemia. Iron deficiency anemia is the most common type but its prevalence is higher in the developing countries. It develops due to inadequate availability of iron for haemoglobin synthesis. RBCs are microcytic and hypochromic.

Causes of iron deficiency anemia:

i. Loss of blood

ii. Decreased intake of iron

iii. Poor absorption of iron from intestine

iv. Increased demand for iron in conditions like growth and pregnancy.

Features of iron deficiency anemia: Features of iron deficiency anemia are brittle nails, spoon-shaped nails **(**koilonychias**),** brittle hair, atrophy of papilla in tongue and dysphagia (difficulty in swallowing)[6].

Diagnosis of iron deficiency anemia is made by complete blood count (CBC), haemoglobin levels, blood iron levels and ferritin levels.

In this article the focus lies on analysing the aetiology of this disease through a questionnaire circulated on an online platform.

AIMS AND OBJECTIVES:

- To understand the *Nidana* of *Pandu* in adult girls.
- To understand the significance of *Nidana Parivarjana* in *Pandu Chikitsa* (treatment).

MATERIALS AND METHODS:

Source of data:

Questionnaire answered by 100 subjects of diagnosed cases of anemia belonging to the age group of 19 – 40 years.

Method of collection of data:

100 subjects diagnosed as anaemic fulfilling the diagnostic criteria were selected and the data was collected by Google forms.

Study Sample: 100

Diagnostic criteria:

- Anaemic adult girls aged between 16 to 25 years.
- Subjects having classical symptoms of *Pandu*.

Design of study:

The questionnaire was prepared on the basis of *Nidana* explained by *Acharya Charaka* in *Panduroga Chikitsa* and it was made available to the participants through Google forms.

OBSERVATION:

Table no. 2 – Questionaries and answers of the study

Sl. No	Questions	Yes	No	Sometimes
1	Do you partake more sour tasting articles in your everyday food?	29.4%	19.6%	51%
2	Do you prefer more salt in food?	24.5%	66.7%	8.8%
3	Do you add more spices?	28.4%	46.1%	25.5%
4	How often do you prefer spicy foods?	42.2%	7.8%	50%
5	Do you intake *Viruddha ahara*?	28.4%	71.6%	
6	How often do you take black gram?	29.4% (Frequently)	54.9% (Occasionally)	15.7% (Rarely)
7	Do you prefer pickles?	52%	16.7%	31.4%
8	Do you use sesame / sesame oil?	9.8%	75.5%	14.7%
9	Do you sleep during the day time?	44.1%	55.9%	
10	Frequency and duration of day sleep	48% (occasionally)	24.5%	21.6% (2-3 times/week)
11	Do you exercise / physically strain immediately after food or within 3 hours of intake of food?	8.8%	66.7%	24.5%
12	Do you suppress your urges? (urine, motion, coughing, sneezing, yawning, thirst, hunger etc)	36.3%	63.7%	

13	How do you rate your stress level?	25.5% (fairly often))	16.7% (very often)	51%
14	How often do you get angry?	50% (frequently)	38.2% (occasionally)	11.8%(rare)
15	How often do you feel sad/ fear/ depressed?	41.2% (Frequently)	46.1% (occasionally)	12.7% (rare)

DISCUSSION:

Amla Rasa –

80% of the subjects are taking sour foods among which 29.4% are compulsively including it in their diet. In the classics, there is direct reference that excessive consumption of *Amla Rasa* causes *Pandu Roga*[7]. Sour foods like Curd, Buttermilk, Tamarind, Lemon, Indian gooseberry etc.

Evidence suggests that excessive citric acid within the body may enhance aluminum absorption [8]. Aluminum toxicity mostly affects the Liver and Kidney in turn leading to Anemia[9]. This could be one of the reasons as to why anemia could get developed in the event of excess citrus levels. It also causes *Dantaharsha* (tingling of teeth), *Trishna* (thirst), *Akshinmilana* (contraction of eyes), *Samvejayati lomani* (piloerection), *Kapha vilapayati* (aggravates *kapha dosha* through dilution), *Pittam abhivardhayati* (increases *pitta dosha*), *Raktam dushayati* (vitiates blood), *Mamsadhatu vidaha* (wasting of muscular tissue), *Sharira shaithilya* (looseness of body), *Durbalanam swayathu apadayati* (edema in emaciated persons), *shaithilya* (loss of strength), *timira* (blindness), *bhrama* (giddiness), *kandu* (itching), *pandu, visarpa* (herpes), *visphota* (small pox), *jwara, Doshapachana* of *Kshata, Dagdha, Bhagna, Shotha* (suppuration in wounds, burns, fracture or swelling), *Paridahati kantamurohridaya* (burning sensation in throat, heart and chest)[10].

Lavana Rasa –

33.3% of the subjects are in the habit of excessive salt consumption among which 24.5% are taking it as a compulsory aspect in their diet. In classics, it is told that excessive use of *Lavana Rasa* causes *Bala Kshaya*[7] (loss of strength) and *Vaivarnata* (discolouration) and *Raktapittakara.* It causes *shotha* which is one of the *lakshana* of *Pandu Roga*. It vitiates *Rakta Dhatu* and *Vata Dosha* in-turn causing *Pandu* [11].

The absorption of sodium chloride in hypertonic solution from the intestines by the blood is accompanied by a diffusion of water

from the tissues into the blood as well as salt from the blood into the tissues. The exchange of salt and water between the blood and the tissues tends to temporarily increase the volume of blood resulting in blood dilution. Iversen discovered that providing a normal guy 10 grams of sodium chloride in 200 cc. of water, boosted his blood volume by five per cent. Others have described observations that are similar to this. Because an increase in blood volume is linked to a drop in blood solids, the goal of this research is to see what extent the absorption of sodium chloride affects the haemoglobin concentration in the blood. The study involved twenty healthy, male and female, ranging in age from eight and thirty-two years old. One hour after a light breakfast, 5 to 15 grams of sodium chloride in 500 cc. of water were administered[12].

Katu rasa –

92.2% of the subjects prefer spicy foods among which 42.2% are taking it compulsorily in their diet. If used in excess *trishna*, *deha-shitilata*, *shukra* (semen) & *bala kshaya*, *murcha* (fainting), *kampa*, *kati* & *prishta-vyatha* (tremors and pain in waist, back region), *ati-karshana* (excessive emaciation)[13].

Chillies, particularly red chillies, contain a lot of vitamin C and little bit of carotene (provitamin A). They are also high in the majority of B vitamins. They also contain a lot of potassium, magnesium, and iron. Because of their very high vitamin C concentration, they can significantly boost the intake of non-haem iron from other foods, such as beans and grains. However, polyphenols and phytate, which are the major inhibitors of iron absorption, are abundant in vegetables and fruits, including chillies[14]

Katu, amla, lavana rasa singly or combined produce the *Pandu Roga*.

***Viruddha ahara*:**

28.4% of the subjects are taking *Viruddha Ahara* in their diet. Any procedure, combinations, dose, amount of food, opposite properties of food if consumed in a regular fashion can lead to number of disorders. *Charaka* has mentioned that such types of wrong combinations can lead to even death[15]. Diseases occurring due to *viruddha ahara* are *napumsakata*, *visarpa* (erysipelas), *andhyatwa* (blindness), *jalodara* (ascites), *visphota* (bullus), *unmada* (insanity), *bhagandara* (fistula-in-ano), *murcha* (coma or fainting), *mada* (intoxication), *adhmana* (abdominal distention), *galagraha* (stiffness in neck), *pandu*, *amavisha* (indigestion), *kilasa* and *kushta* (various skin diseases), *grahani* (diseases of intestines), *shotha*, *amlapitta* (gastritis), *jwara*, *pinasa* (rhinitis) and *santana nasha* (infertility). *Viruddha anna* can lead to

disorders up to impotency and infertility, thus it has an impact up to *Shukra dhatu dushti*. Consumption of *Viruddha ahara* regularly causes *Mandagni, Pitta* and *Vata Dosha Prakopa* → hampering the digestion → improper nourishment → *Dhatu Aposhana* (improper nourishment of tissues) → *Pandu Roga*[16].

Masha –

84.3% of the subjects are taking Masha with 29.4% taking it frequently in their diet. Masha in the form of idli, dosa, vada. *Masha* (black gram) contains high levels of protein, potassium, magnesium and calcium which hinders the absorption of iron inturn leading to *Pandu* disease.

Tila / Tila taila –

24.5% of the subjects are taking *Tila/Tila Taila* in their diet. *Tila* has tikta-*Kashaya anurasa*, *Ushna, Tikshna* (sharp)*, Lekhana* (scraping) *Guna* and it does *Rakta-Pitta Prakopa* (*Bhavaprakasha*). *Kashaya Rasa* is a *Nidana* for *Pandu Roga* (Harita)[17].

Presence of magnesium, copper, calcium, zinc and vitamin B6 in *Tila* hampers the absorption of iron. Consumption of *Tila Taila* and *Masha* frequently causes *Mandagni* (slow digestive power) and *Tridosha Prakopa* mainly *Pitta Dosha Prakopa* thereby causing the *Pandu Roga*.

Kshara **(Pickles):**

83.4% of the subjects are taking pickles with 52% taking it as a compulsory in their diet. It is used for *Pachana* (digestion)*, Dahana* (burning) and *Bhedana* (pierce) *Karya* but if used excessively it causes *Khalitya* (hairfall)*, Palitya* (white hair)*, Andhata* (blindness)*, Nampumsakata* (infertile) and pain in *Hrit* (heart) *pradesha*. *Kshara* has *Lavana Rasa, Katu Vipaka* (pungent)*, Tikshna, Ushna* (hot)*, Ruksha* (dry)*, Dahana, Lekhana Guna* and it is *Raktapitta Kara* → because of the above-mentioned properties gastric mucosa is damaged → no proper *Dhatu Poshana* → *Deha Shitilata* → *Pandu*[18].

The predominant constituents of all the samples were sodium, potassium, calcium and magnesium which could be related to the presence of *Kshara* in all samples. These substances obstruct the iron absorption in the intestine resulting in Pandu *Roga*[19].

Diwaswapna –

44.1% of the subjects are sleeping during the day time. *Diwaswapna* causes *Kapha Prakopa* and thereby produces *Agnimandya* which leads to incomplete digestion and *Ama* (undigested metabolic waste) *Utpatti*. This Ama is absorbed in *Rakta* and other *Dhatus* ultimately producing *Raktapradoshaja Vikara* (disorders of blood) like *Pandu*[20,21].

A prospective cohort study was conducted in the Chinese population, to study the association between sleep duration and the prevalence of anemia. And it was found that the risk of anemia in women with long sleep duration was higher. But the difference was not significant among men and the exact cause of the result was not found yet. The reason for the gender difference in the relationship between the sleep time and the anemia may be due to the differences in hormonal secretion and psychological factors. In addition, considering that this connection might be affected by different sleep behaviours in different age groups and performed a stratified analysis based on age. Participants aged <60 years and sleeping ≥9 hours were found to be more likely to develop anemia. Still the underlying mechanism for sleep duration and incident anemia. Still the underlying mechanism for sleep duration and incident anemia was not found[22].

Inflammation is one of the most important biological pathways, because the long sleep time can lead to the increasing of inflammatory markers. And in this study, individuals who reported short (≤5 h) or long sleep duration (≥9 h) were more likely to be engaged in higher level of sensitivity C-reactive protein group than those who slept 7 h. It was also found that the level of sensitivity C-reactive protein in participants with anemia was higher than those without anemia. In conclusion, the study suggests that both long and short sleep durations may cause an increased risk of anemia in a Chinese population[22].

***Vegadharana*:**

36.3% of the subjects are suppressing their urges. *Chardinigraha* causes *pandu*[23]. *Vegadharana* causes *vata dosha prakopa* in *srotas* causing *agnimandya* and hampering the digestion capacity leading to malnutrition and causing *Pandu*.

***Manasika Bhavas* :**

***Krodha* and *Shoka* –**

90% of the subjects are having *Krodha* and *Shoka* frequently. Affliction of mind with *shoka, chinta, bhaya*, may cause defective intake of iron due to anorexia. *Mana* with *krodha, shoka, chinta, bhaya* → aggravate *doshas* (specially *pitta dosha*) → *Raktadushti*[21] → producing paleness. The digestive functions are disturbed because of these *manasika bhavas* & the food would not digest properly resulting in *mandagni* and poor nutrition for *dhatus* or *dhatu aposhana* leading to *Pandu Roga*.

Iron plays a key role in the metabolism of monoamines in the brain thus iron deficiency leads to symptoms such as apathy, drowsiness, irritability and lack of attention

due to impaired monoamine oxidase activity. Patients affected from iron deficiency display many behavioural and emotional signs and have symptoms similar to the ones in depressive individuals[24].

The generation of dopamine in the brain necessitates the presence of iron. Depression, anxiety & even movement disorders such as restless leg syndrome can all be caused by a lack of dopamine Low Iron → Low Dopamine → Depression

Depressive patients may be deficient in folate & low vitamin B12 & it has been advised that oral dosages of both folic acid & vitamin B12 be given to these people to improve depression.

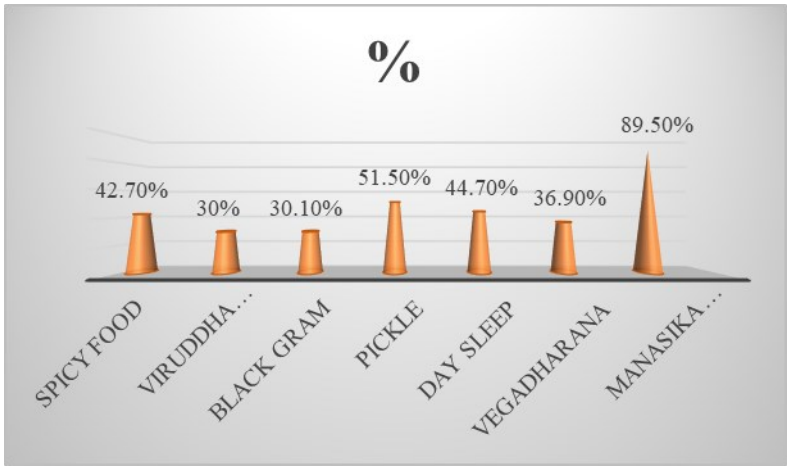

Fig.1- Graph Showing the Nidanas observed

CONCLUSION:

"*Nidana Parivarjanameva hi Chikitsa*" This signifies the role of *Nidana* in manifestation of particular disease. This was a survey done in 100 adult girls to know the *Nidana* of *Pandu*.

- *Ahara* :

  Sour items – 19.4%, Sometimes – 51.5%

  Spicy food – 42.7%, Sometimes – 49.7%

  Viruddha Ahara – 30%

  Black gram – 30.1%, Occasionally – 54.4% and

  Pickle – 51.5%, Sometimes – 32%

- *Vihara* :

  Day sleep – 44.7% and *Vegadharana* – 36.9%

- *Manasika* :

Stress – Often – 17%, Fairly often – 26.2%, Sometimes – 50.5%

Anger – Frequently-49.5%, Occasionally – 38.8%

Sad and depressed – Frequently – 41%

By the above mentioned data, it is clear that the majority of *Nidana's* are *Rakta* and *Pitta Prakopaka*. When looked into Ashraya Ashrayi

Bhava, Raktadhatu is Ashraya and Pitta Dosha is Ashrayi. So, when one gets affected the other will also get affected. These *Nidanas* cause *Mandagni* which leads to the production of *Ama* then proper *Dhatuposhana* will not occur in turn leading to *Pandu Roga*. All the *Nidana's mentioned* by *Acharyas* under *Pandu Roga* are found as contributing factors in the pathogenesis of iron deficiency anemia also. More detailed study can be done in a larger population for understanding the effect of each *Nidana* in Anemia.

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