

## ***STUDY OF VITAMIN B<sub>12</sub> DEFICIENCY WITH SPECIAL REFERENCE TO TYPES OF PANDU VYADHI***

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### ABSTRACT

In this 21<sup>st</sup> century, life style changes occur rapidly. Now there is competition in every field so most of people have lot of stress. As life style is changing in the society, dietary habits are also changing very rapidly. Now a day's people take fast food regularly, moreover they show negligence in taking care of their health. As a result of this, people are suffering from various diseases, among these diseases *Pandu vyadhi* is very common disease seen especially in the developing countries like India. Vitamin B<sub>12</sub> is required for the proper function and development of the brain, nerves, blood cells and many other parts of the body. If left untreated, vitamin B<sub>12</sub> deficiency, also known as B<sub>12</sub> deficiency, can lead to anemia, as well as nerve and brain damage, which may eventually become irreversible. Usually it runs a chronic course along with slow and insidious onset. Sometimes patients are accidentally diagnosed who come to doctor with other related problems or while accompanying another person.

**Keywords:** Anemia, *Pandu vyadhi*, Vitamin B<sub>12</sub>

### INTRODUCTION

The word *Pandu* has been derived from the *dhatu* "*padi gatou*". *Padi* means *gati* (i.e. *parinaman* or transformation). The word *padi gatou* implies the formation of *rasa*, *raktadi dhatus*. *Pandu vyadhi* is considered as *pitta pradhan*. The vitiating factors of *pitta* can also be taken as a cause of *Pandu vyadhi*<sup>1</sup>

Types of *Pandu vyadhi*<sup>2</sup>

- 1) *Vataja Pandu vyadhi*
- 2) *Pittaja Pandu vyadhi*
- 3) *Kaphaja Pandu vyadhi*
- 4) *Tridoshaja Pandu vyadhi*
- 5) *Mrudbhakshanjanya Pandu vyadhi*

The word anemia is derived from Greek language the meaning of which is lack of blood. Anemia can be defined as a reduction in the hemoglobin, hematocrit or red cell number. Anemia is a pathological condition characterized by a decrease in oxygen carrying capacity of the blood. Anemia is the most common disorder of the blood.

There are several kinds of anemia produced by a number of underlying cause –

- Due to deficiency of nutrients
- Due to impaired red cell production
- Iron deficiency anemia
- Due to excessive red cell destruction
- Due to excess blood loss.

Megaloblastic anemia due to deficiency of folate or Vitamin B<sub>12</sub>.

### Aim

- To study vitamin B12 deficiency with special reference to types of *Pandu vyadhi*.
- To study the *Pandu vyadhi*
- To study *Samprapti* of *Pandu vyadhi*
- To study the vitamin B<sub>12</sub> deficiency
- To study the *Ashrya - ashryashryi Sambhandha* of *Pandu vyadhi*

### Material and methods

*Pandu vyadhi* described in *Ayurvedic* classical texts can be compared to Anemia. Its pathology begins, with the dysfunction of *agni*, formation of *aam* and in this case disturbance of *Pitta dosha* that is circulated in the body by aggravated *vata*. *Pandu vyadhi* is one of the major disorders which affect the mankind on a large scale. Majority of sufferers happen to be middle aged, females, having *vatapitta pradhan prakruti* & *krura koshta*. Thus an attempt has been made to study *Panduroga* according to *ayurvedic* text in the context of vi-

tamin B<sub>12</sub> deficiency according to modern science<sup>3</sup>.

Vitamin B<sub>12</sub>, also called cobalamin, is a water-soluble vitamin with a key role in the normal functioning of the brain and nervous system and for the formation of blood. It is one of the eight B type vitamins. It is normally involved in the metabolism of every cell of the human body. Vitamin B<sub>12</sub> deficiency is seen mostly in people who follow a strict vegan diet, who don't eat the major food sources of B<sub>12</sub> viz. meat, eggs and dairy products. The reason is vitamin B<sub>12</sub> deficiency hampers overall capacity of person to normally perform his daily activities. Vitamin B<sub>12</sub> deficiency anemia is the most common and widespread nutritional disorder in the world<sup>4</sup>.

The world health organization (WHO) defines anemia as a hemoglobin level less than 13 g/dl in men and 12 gm/dl in women. Normal Hb count is 14-18 gm/100 ml of blood. In macrocytic anemia MCV is greater than 100fl. Two types of macrocytosis can be distinguished on blood smear; round and oval.

Their causes are listed below-

1. Oval macrocytosis- megaloblastic anemia due to deficiency of Vit B<sub>12</sub> or folate, drug therapy (Hydroxyurea, zidovudine, chemotherapy), myelodysplasia.
2. Round macrocytosis- Alcoholism, liver disease, hypothyroidism.

Daily requirements of Vit B<sub>12</sub>-

In normal adults – 3µg/day

Infants – 0.3 µg/day

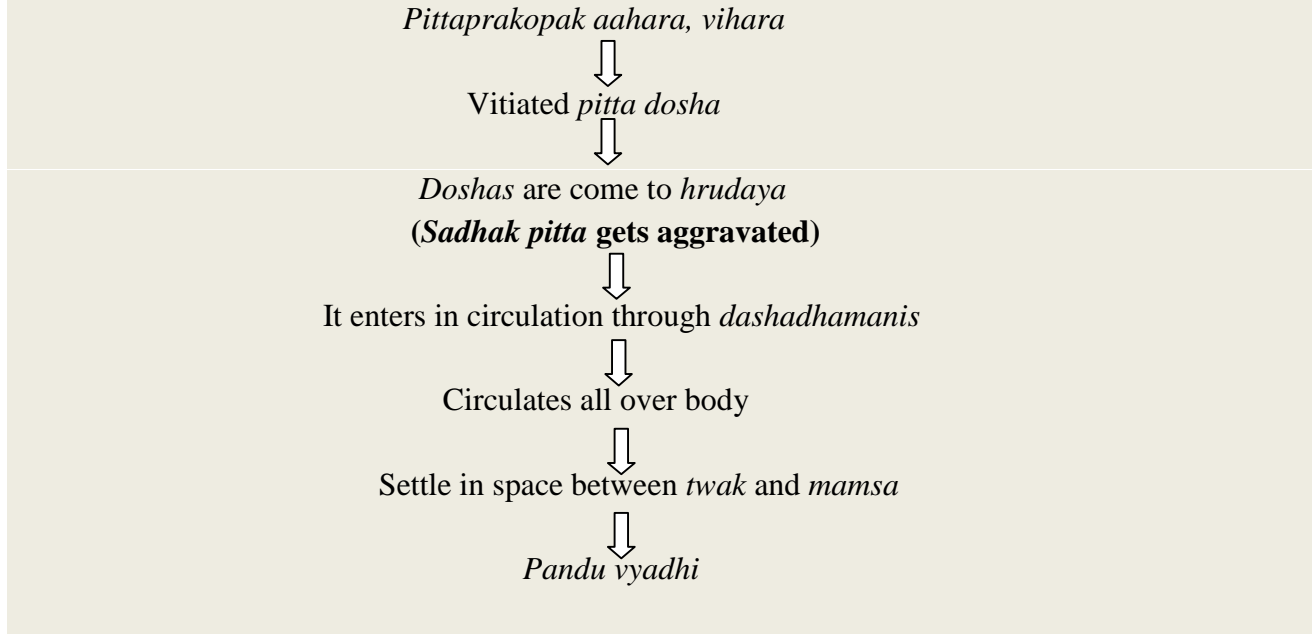
Childrens - 1-2 µg/day

In pregnancy and lactation requirement increased approximately 4 µg/day.

In *Ayurvedic* texts *Pandu vyadhi* is considered as *pitta pradhan vyadhi*. The vitiation factors of *pitta* can also be taken as a cause of *pandu*

vyadi. *Pandu vyadhi* has been diagnosed by *panduta*, *akshikuthashotha*, and *hrudspan-* *dan*<sup>5</sup>.

### Samprapti of *Pandu vyadhi*<sup>6</sup>



*Pandu vyadhi* is a disease characterized by pallor of body which resembles with ‘Anemia’ of modern science. *Rakta* has been considered as a key factor for the *jeevana*, *preenana*, *dharana*, and *poshana karma* of the body<sup>7</sup>. Many a times it is seen that *rakta* gets vitiated by *doshas*, mainly by *pitta dosha* as *rakta* and *pitta* share an *ashrayashrayi bhava*, leading to *Pandu vyadhi*<sup>8</sup>. Vitamin B<sub>12</sub> has many important functions in the body. It works with the vitamin folate to make our body’s genetic material i.e. DNA<sup>9</sup>. It helps keep levels of amino acid homocysteine in check, which may help decrease heart disease risk and it is essential to the production of red blood cells, which carry oxygen through blood to the body’s tissues. A lack of Vitamin B<sub>12</sub> is one causes of the major of anemia<sup>10</sup>.

Megaloblastic anemia is due to deficiency of either vitamin B<sub>12</sub> or folic acid due to inadequate intake or insufficient absorption<sup>7</sup>. *Ranjak Pitta* brings *raktatva* to *rasa* i.e. it imparts color to *rasa* leading to natural formation of *rakta dhatu*. Due to vitiation of this *pitta*, *rakta* formation hampers and *Pandu* occurs i.e. occurrence of pallor. *Alochak*, *Bhrajak*, *Pachak*, *Ranjak* and *Sadhak Pitta* all types of *pitta* have an *ashrayashrayi bhava* with *Rakta dhatu*. Hence the predominance of *Pittaj* type of *Pandu* is seen. These things happen in *Pittaj Pandu vyadhi*<sup>11</sup>.

These *lakshanas* are common in both vitamin B<sub>12</sub> and *Pandu vyadhi*, viz *Daurbalya*, *Peeta-mutra shakrut*, *Trushna & Murcha & Daha*<sup>12</sup>.

## Study Design:-

### PLAN OF WORK

Males having Hb less than 11gm% and females having Hb less than 9gm% were selected from the population, then screening was done for macrocytosis. Patients with macrocytosis in peripheral blood smear will be subjected for serum vitamin B12 investigation.

30 Patients of vitamin B12 deficiency was selected considering exclusion and inclusion criteria by simple randomized sampling technique by lottery method.

Written informed consent of patient were taken.

Detailed case history of the patient was taken and clinical examination was done with the help of specially prepared case proforma.

Symptoms of *Pandu* was studied. Types of *Pandu vyadhi* was decided according to *ayurvedic* classification.

Based on observations, comparison of *Pandu vyadhi* and vitamin B12 deficiency was done

Statistical analysis was done

Conclusion was drawn according to the data

### SELECTION OF PATIENTS:

#### Inclusion Criteria:-

- 1) Age Group –Between 18 - 80 years of age.
- 2) Gender – Both males and females.
- 3) Males having hemoglobin less than 11 gm %
- 4) Females having hemoglobin less than 9 gm%.
- 5) Patients having macrocytosis in their Peripheral blood smear (PBS) examination.
- 6) Patients having Serum vitamin B12 levels below normal range (detected by method Chemi

Luminescent Microparticle Immunoassay. (CLMIA))

#### Exclusion Criteria:-

1) Pregnant women.

2) Patients of known case of chronic diseases like AIDS, Koch's, Cancer and Leukemia's.

#### Vit B<sub>12</sub> deficiency:-

Folate deficiency normally does not produce neurological symptoms, while Vit B<sub>12</sub> deficiency does. Megaloblastic anemia is the most common cause of macrocytic anemia. Vit B<sub>12</sub> and folate coenzymes are required for thymidylate and purine synthesis; thus, their deficiency results in retarded DNA synthesis. In Vit B<sub>12</sub> deficiency and folic acid deficiency, the defect in DNA synthesis affects other rapidly dividing cells as well, which may be manifested as glossitis, skin changes and flattening of intestinal villi. DNA synthesis may

also be delayed when certain chemotherapeutic agents are used, including floate antagonists, purine antagonists, pyrimidine antagonists and even folate antagonists antimicrobials.

Symptoms according to types of *Pandu*:-

1) *Vataja Pandu*: Symptoms of *Vataja Pandu* are dryness, *Krishna - aruna* colouration of *twak, mutra, mala, netra* etc. *Angamarda*, tremors, *bhrama*, loss of vitality, *Bala kshaya*, *Aruna, Krishna* colouration of the limbs, *nakha, Sira, Akshi*, pain at the *Parswa* and head, *anaha*, constipation, pricking pain etc.

2) *Pittaja Pandu*:- In *Pittaja Pandu*, the person has Greenish yellow discolouration of *mutra, mala, netra, nakha*, burning sensation of the body, *trushna, jwara* and deep yellow watery stool. Excessive perspiration, craves for cold things, do not relish food and has a pungent taste in mouth, loose bowels, *durbalata, ushna amla udagara, vidahata, durgandata, murcha*.

3) *Kaphaja Pandu*: In *Kaphaja Pandu*, patient has watery discharge from *Netra, Mukha* and *Nasa, Shotha, Murcha, Nirutasahi, Anggaurava*, white discolouration of skin, urine, eyes and stool, stupor, sweet or salty taste in the mouth, *Swara kshaya, klama, shwasa, Chardi*, anorexia and letharginess.

4) *Tridoshaja Pandu*: -When all *tridosha* gets vitiated they cause *tridoshja Pandu* and show all symptoms of three *doshas*.

5) *Mrittikabhakshana Pandu*:- In our country *Mrittikabhakshanjanya pandu* is very common condition seen in children and women. When mud is eaten it does not get digested in *amashaya* and it blocks the *rasavaha strotas*. Due to this gradually *rasa dhatu kshaya* takes place and in turn due to this the subsequent *dhatu* are not properly nourished and there by *Pandu roga* is produced.

*Mrittikabhakshana* causes *Agnimandya, Rukshata* of body, *shotha, Dhatudaurbalya, indriya-Teja-Bala-Oja-Veeryakshaya* and *Krimi* etc.

Sign and symptoms of Anemia:-

Symptoms- Lassitude, fatigue, palpitation, breathlessness on exertions, dimness of vision, insomnia, angina, parasthesia in finger and toes.

Signs- Pallor of skin, mucous membrane, palms of hand, conjunctiva, tachycardia, cardiac dilatation, systolic flow of murmur, edema.

Neurological signs and symptoms: Tingling or numbness of the fingers, Tingling or numbness of the toes, general muscle weakness, difficulty walking properly (staggering), irritability, confusion, forgetfulness, tender calves.

#### Observations:-

In this study 30 diagnosed patients of vitamin B<sub>12</sub> deficiency were selected irrespective of their sex, caste, religion. A detailed case history of the patients was taken with the help of a specially prepared case record form in order to find which type of *Pandu* is present.

**Gender:-** In this study more incidence of *Pandu vyadhi* is seen in females i.e. 70% while 30% in males. This indicates that the females are more prone to vitamin B<sub>12</sub> deficiency.

**Prakruti:-** In *prakruti* wise distribution 83.33% patients were of *Vata-Pitta prakruti* and 10% of *Pitta-Kapha prakruti*. 6.66% patients were of *Pitta-Vata prakruti*. This indicates that *Vata-pitta prakruti* is more prone to vitamin B<sub>12</sub> deficiency. *Pandu vyadhi* is *pitta* dominant *tridoshaja vikara* and malnutrition is commonly found in *vata-pitta dosha* dominance and *dwandja prakruti* especially *vata-*

*pitta* is *heena prakruti*. So this might be the reason for majority of patients being of *vata-pitta prakruti* in the present study.

**Age:-** It was observed from the present study that maximum number of patients i.e. 60% belonged to age group between 18 to 33 years whereas 20% belonged to the age group 34 to

39 years and 16.7 % belonged to 50 to 65 years while 3.3 % were of age group between 66 to 80 years. This indicates that disease is common between age group 18 to 33 years in which predominance of *pitta dosha* leads to vitamin B<sub>12</sub> deficiency.

**Table 1: Age**

Age (in yrs)	No. of patients	Percentage
18-33	18	60
34-49	6	20
50-65	5	16.7
65-80	1	3.3
Total	30	100

**Occupation:-**In the present study 26.66% were housewives and a worker followed by job 23.33%. For both, the reason might be excessive labour and improper diet as well as inadequate diet. In the cases of housewives, it

was observed that *diwaswap* was done by most of the patients which also leads to *agni-mandya* causing *dhatvagnimandya* leading to *rasarakta dhatudushti* and then leads to vitamin B<sub>12</sub> deficiency.

**Table 2: Occupation**

Occupation	No. of patients	Percentage
Business	4	13.33
Farmer	1	3.33
Housewife	8	26.66
Job	7	23.33
Retired	2	6.66
Worker (Semiskilled/Unskilled)	8	26.66
Total	30	100

**Koshtha:-** In present study maximum i.e. 43.33% patients were having *Krura Koshtha* while 26.66% were having *Mrudu Koshtha* & 30% having *Madhyam Koshtha*. This indicates that in *Krura Koshtha* there is more possibility

of occurrence of *Pandu. Krura Koshtha* shows dominance of *vata dosha* which leads to improper digestion, which is important cause of disease.

**Table 3: Koshtha**

Koshtha	No. of patients	Percentage
<i>Krura</i>	13	43.33
<i>Mrudu</i>	8	26.66



Madhyam	9	30
Total	30	100

**Panduta:-** *Jivha* and *Netra Pariksha* shows that most of the patients were having coated tongue and most patients were having pale colored conjunctiva. *Pandu* is a *pitta pradhana roga*, and *Panduta* or pallor is a cardinal symptom of this.

**Akshikuta Shotha:-** *Akshikuta Shotha* or Peri-orbital edema was found in all patients in variable amount. This is known sign of *Pandu vyadhi*.

**Hrudspandan:-** *Hrudspandan* or palpitation in *Pandu vyadhi* is due to lack of proper nou-

rishment and *raktalpta* due to which heart has to pump quickly so as to provide rapid blood flow to body tissues and that is the reason of palpitation. Palpitation can be also taken as a common symptom.

#### **Types of Pandu -:**

It shows 56.66 % of cases were *Pittaja Pandu*, followed by 20 % cases of *Vataj Pandu* & 13.33% patients were *Mrudbhakshanjanya Pandu* and only 10 % of cases were of *Kaphaj Pandu*.

**Table 4:** Types of *Pandu*

Types of <i>Pandu</i>	No. of patients	Percentage
<i>Vataj</i>	6	20
<i>Pittaj</i>	17	56.66
<i>Kaphaj</i>	3	10
<i>Sannipataj</i>	0	0
<i>Mrudbhakshanjanya</i>	4	13.33
Total	30	100

In vitamin B12 deficiency, *Pittaja Pandu* is the commonest type of *Pandu* found in present study. *Ranjak Pitta* brings *raktatva* to *rasa* i.e. it imparts color to *rasa* leading to natural formation of *rakta dhatu*.

Due to vitiation of this *pitta*, *rakta* formation hampers and *Pandu* occurs i.e. occurrence of pallor. *Alochak*, *Bhrajak*, *Pachak*, *Ranjak* and *Sadhak Pitta* all types of *pitta* have an *ashrayashrayi bhava* with *Rakta dhatu*. Hence, the predominance of *Pittaj* type of

*Pandu* is seen. These things happen in *Pittaj Pandu vyadhi*.

*Pittaj pandu lakshanas* in vitamin B<sub>12</sub> deficiency:- In present study *Jwar lakshana* was found in maximum number of patients of *pittaj Pandu lakshana* in vitamin B<sub>12</sub> deficiency i.e. 100% followed by *daurbalya* found in 88.23% patients and 76.47% have *Peeta-mutra shakrut* & 52.94% have *Trushna* and *Murcha*, remaining 41.17% patients were having *Daha lakshana*.

## DISCUSSION

**Table 5:** Pittaj Pandu lakshanas in vitamin B12 deficiency:-

Pittaj Pandu lakshanas in vitamin B12 deficiency	No. of Patients	Percentage
<i>Jwar</i>	17	100%
<i>Daurbalya</i>	15	88.23%
<i>Peet-mutra shakrut</i>	13	76.47%
<i>Trushna</i>	9	52.94%
<i>Murcha</i>	9	52.94%
<i>Daha</i>	7	41.17%
<i>Na cha asya ushnam amla upashete</i>	0	0%
<i>Bhinnavarchasva</i>	0	0%
Total	17	100%

It was observed from the study that *Jwar lakshana* found in maximum number of patients of *Pittaj Pandu lakshanas* in vitamin B12 deficiency i.e.100% followed by *Daurbalya* found in 88.23% patients and 76.47% have *Peet-mutra shakrut* & 52.94% have *Trushna* & *Murcha*, remaining 41.17% patients were having *Daha lakshana*.

Finally vitamin B<sub>12</sub> deficiency can be correlated with *Pittaj Pandu*.

Thus, the aim for the present study for dissertation "STUDY OF VITAMIN B12 DEFICIENCY WITH SPECIAL REFERENCE TO TYPES OF PANDU VYADHI" stands validated with above specific observations with the alternative hypothesis certainly being proved.

## CONCLUSION

On the basis of the review of literature and observations made by this study, which was conducted on 30 diagnosed patients of vitamin B<sub>12</sub> deficiency the following conclusions can be drawn.

Majority of sufferers happen to be middle aged, females, having *vata-pitta pradhan prakruti* & *krura koshttha*.

The present study helps us to understand *lakshana* of *Pandu* according to vitamin B<sub>12</sub> deficiency.

It can be concluded that out of 30 selected patients, the incidence of *Pittaj Pandu* i.e. 56.66% is found to be more than other types followed by *Vataj Pandu*, *Mrudbhakshanjanya Pandu* and then *Kaphaj Pandu*.

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