ABSTRACT

Pandu is Rasavaha strotodushti janya vyadhi and commonly found in India. Malnutrition, poverty, stress and changed lifestyle are most common trigger factors of Pandu. Skin of person with Pandu gets whitish and pallor (pandu varni) and hence the name is given to it. As per modern consideration Pandu can be correlated with Anemia in which Pallor is the cardinal symptom and decreased level of Hemoglobin is the basic diagnostic criteria. As Rakta dhatu is also called as ‘Lohitam’ and Loha is similar to Rakta dhatu by its Dravya samanyata, there is trend to use herbo-mineral compounds containing Loha bhasma to treat Pandu vyadhi. Many studies have shown that such compounds are proved useful in treatment of Pandu. A herbo-mineral compound, Loha Rasayana was tested here in a Randomized clinical trial. Arogyavardhini Vati was used as control drug. Study was carried out in 60 patients of Pandu Vyadhi (IDR) divided equally in two groups. Panduta, Ayasena shwasa, Akshikuta shotha, Agnimandya, Daurbalya were subjective parameters while, Hb, MCV, MCHC were objective parameters. Loha Rasayana was found slightly better effective than Arogyavardhini Vati in subjective and objective parameters. Statistical analysis shown that the difference is not greater than by chance (P>0.05). Finally, we concluded that Loha Rasayana and Arogyavardhini Vati both are almost equally effective in Pandu Vyadhi (IDR).

Keywords: Pandu, Iron deficiency anemia, Hemoglobin, Loha Rasayana.

1. INTRODUCTION

The present changing climatic conditions & lifestyle hamper the individual’s physical & mental health. Hence, the normal levels of Dosha are affected. Deteriorating physical health conditions causes indigestion which further results in formation of Apakva Ahar rasa i.e. Aam Nirmiti. Ayurveda emphasizes that ‘Raktam jivamiti smrutam’ which means the blood is life. Further it is also mentioned that there is important role of iron in Utpatti and Karya of Rakta dhatu in ours body. The big evidence suggesting the same is the synonym ‘Lohitam’ which is termed for Rakta dhatu in Ayurveda literature. Therefore, it is necessary to do management of Pandu vyadhi as early as possible and to use iron in its treatment is second important thing. About 22% of the population is below poverty line in our country. Due to their economic status they remain malnourished. It further leads to diseases like Pandu in future. Ashrayaa ashrayi relation of Pitta and Rakta is mentioned by Acharya Charaka. In Pandu, Rasa and Rakta get vitiated by Doshas, mainly by Pitta dosha. Almost all classical texts have described Pandu as a distinct disease with its own pathogenesis and treatment.

Pandu, is a disease in which pallor is present almost all over the body, which very closely resembles with modern science disease Anemia. Due to reduction in number of RBCs per cu.mm. of Blood and quantity of Hb, pallor like other symptoms arises. Samanya hetu of Pandu are stated as Ati Amla-Lavana rasatmak ahara, Tikshna ahara, Nishpava sevana, Viruddha bhojana, Kashara-Vidahi ahara,
Ativyayam, Ativyavaya, Diwaswapa, Chinta, Krodha etc. Pandu is of five types in which causatives factors slightly differs and give rise to that type of Doshaja Pandu except of Mridbhakshanaja Pandu. Clinical presentation of Pandu may be from mild up to severe stage. Pandu if not treated properly or if not treated in time may give rise to different complications. Management includes Snehana, Mrudu swedana, Snehayukta vircahana along with herbal and herbo-mineral formulations. Among two types of Anemia Iron Deficiency Anemia is mostly found in our country. Modern medicine advises many hematinc drugs to treat Anemia. Constipation is the most common complication during treatment. But many times, even after proper medications and Blood transfusion it does not get treated.

In this context Ayurveda has proved its greatness many times. Herbo-mineral drugs containing Loha bhasma are very effective to treat Iron deficiency anemia. Anulomana drug like Triphala Churna is used along with Loha bhasma in such compounds to avoid constipation. One of such compounds Loha Rasayana was used in present clinical trials to treat Pandu (Iron deficiency anemia). Arogyavardhini Vati which is tested in previous studies is used as Control drug.

2. MATERIALS AND METHODS
2.1. Aims and Objectives
- To Study the efficacy of Loha Rasayana in the management of Pandu Vyadhi (IDR).
- To study effect of Loha Rasayana on Hb, MCV and MCHC Values.
- To compare efficacy of Loha Rasayana and Arogyavardhini Vati in Vyadhi (IDR).
- To study the side effects of drugs if any.

2.2. Materials
- 60 Patients (selected randomly by Lottery Method)
- Patients Information and Consent Form
- Case Record Form
- Loha Rasayana (Trial Drug GROUP A)
- Arogyavardhini Vati (Control Drug GROUP B)

2.3. Research methodology
2.3.1. Sample Size: 60 patients
2.3.2. Site: Clinical study conducted in Institutional Hospital of SVNHT’s Ayurveda Mahavidyalaya, Rahuri Factory. ICE approved ethical clearance.
2.3.3. Study Type: Randomized open clinical Trial.
2.3.4. Study design
Total 60 patients having the classical picture of Pandu were randomly selected from institutional Hospital. They were treated in 2 groups. In Group A 30 patients were treated with Loha Rasayana (500mg x BD, Vyanodaan kala) with Ghrita anupana for 60 days and follow up for 15 days. In Group B 30 patients were treated with Arogyavardhini Vati (500mg x BD, Vyanodaan kala) with Ghrita anupana for 60 days and follow up for 15 days. After completion of treatment effect of therapies were assessed and compared.

2.4. Clinical study
2.4.1. Inclusion Criteria
- Gender: Male/Female
- Age: 18 To 60 Years
- Hb%: 7 to 10 gm %
- All types of Pandu Vyadhi
- Iron Deficiency Anemia (MCV less than 80)

2.4.2. Exclusion Criteria
- Pandu vyadhi associated with other vyadhi such as Kamala, Halimaka etc.
- Megaloblastic anemia
- Patients suffering from other than Iron deficiency anemia such as Thalassemia, Sideroblastic Anemia etc.
- Anemia associated with other diseases like Liver cirrhosis, Alcoholic liver diseases, ascites, CCF, Immuno-compromised patients
- Mrudbhakshanjanya Panduroga
- Any type of malignant diseases e.g. Leuke-
Acute Hemorrhage and infectious condition
Poisoning

2.4.3. Withdrawal Criteria
- The patient will be withdrawn from the Trial if,
- The patient is not willing to continue the test to follow the assessment schedule.
- Occurrence of serious adverse events.
- Patient has become in cooperative.

2.5. Criteria for assessment

2.5.1. Subjective parameters Gradations
1. **Panduta**
   - 0: Absent
   - 1: Mild (*Alpa shwetpitata*)
   - 2: Moderate (*Shwetpitata*)
   - 3: Severe (*Shwetpitata*)

2. **Ayasenshwasa**
   - 0: Absent
   - 1: Mild (Patient Feel Breathlessness While Fast Walking)
   - 2: Moderate (Patient Feel Breathlessness while Walking normally)
   - 3: Severe (Patient Feel Breathlessness at Rest)

3. **AkshikootShotha**
   - 0: Absent
   - 1: Mild (Morning one to two hour)
   - 2: Moderate (Morning two to four hour)
   - 3: Severe (More than four hour or whole day)

4. **Agnimandya**
   - 0: Absent
   - 1: Mild
   - 2: Moderate
   - 3: Severe

5. **Daurbalya**
   - 0: Absent
   - 1: Mild (Feels fatigue after routine work less than 6 hour -8 hours/day)
   - 2: Moderate (Feels fatigue after routine work less than 4 hour -6 hours/day)
   - 3: Severe (Feels fatigue after routine work less than 4 hours/day)

2.5.2. Objective parameters
- Hb
- MCV
- MCHC

2.6. Overall assessment of the therapy
Steps for calculating overall percentage of improvement of individual patient: All the BT score of every symptoms of a patient were added. All the AT score of every symptom of that patient were added. Overall percentage of improvement of each patient were calculated by the formula: 
\[
\frac{\text{Total BT} - \text{Total AT}}{\text{Total BT}} \times 100.
\]

3. RESULTS AND DISCUSSION
In the present study, maximum numbers of patients i.e. 42.0% were from the age group of 18 to 30 years. i.e. Younger group increased prevalence in this age group was due to mental stress, excessive exertion, irregular and improper diet, fast foods and improper vihara, Atapa sevana, Ratri jagarana and due to their professional responsibilities. Maximum numbers of patients i.e. 80.3% were females and 19.7% were males. The higher percentage of Pandu roga in female was due improper diet, Ratri jagarana, stress, fasts, regular loss of blood through menstruation. Maximum number of patients i.e. 73.0% were having *Vata Pitta prakruti*, 14.3% patients were having *Kapha Vata prakruti*, 5.7% patients were having *Kapha-Vata prakruti* and 7.0% *Pitta Kapha prakruti*. This observation has a clinical significance as the persons with this *Vata* and *Pitta prakruti* naturally are more prone to Pandu. Maximum 44.0% patients were House wife, 32.0% patients were student, 22.7% patients were doing service and 1.3% patients were labor. Housewife found more as they do not have quantity and quality of food because of the domestic responsibilities. The present study showed that majorities i.e. 64.3% of the patients were having *Mandagni*, and remaining either *Tikshagni* or *Vishamagni*. *Mandagni* is
the main cause of diseases. Proper nutrition is not provided to body because of the Mandagni. Mandagni and Vishamagni creates Ama production and improper Rasa Dhatu formation which is the foremost step in development of Pandu roga.

In both Groups, symptoms scores were decreased at the end of Day 60. It means symptoms of Pandu patients were relieved by both Loha Rasayana and Arogyavardhini Vati. When compared we found that Loha Rasayana was found slightly better to relieve symptoms than Arogyavardhini Vati. Likewise, objective parameters were increased at the end of Day 60. It means both Loha Rasayana and Arogyavardhini Vati have increased Hb, MCV and MCHC. When compared we found that Loha Rasayana was found slightly better to relieve symptoms and to improve objective parameters than Arogyavardhini Vati. The proportion of Loha Bhasma is more in Loha Rasayana than in Arogyavardhini Vati, is main reason behind better efficacy of it. Percent relief in symptoms and percent change in Objective parameters calculated by formula [(Total BT – Total AT) / Total BT X 100] is shown in Table No 1. Mann-Whitney’s test and Unpaired t test were used to analyze subjective and objective parameters respectively. Statistically no significant difference was found between efficacy of Loha Rasayana and Arogyavardhini Vati. Details are mentioned in Table No. 2 and Table No. 3. Hence statistically it was concluded that both Loha Rasayana and Arogyavardhini Vati are almost equally effective to reduce symptoms and to improve objective parameters in Pandu vyadhi (IDR).

Loha Rasayana which is a herbo-mineral drug described in Pandu vyadhi chikitsa. Agni is root cause of diseases. Agni is supposed to be major factor for well-being. Pandu is Rasavaha strotodushtijanya vyadhi and Rasavaha strotas is the first which gets vitiated after disturbance of Agni. In Pandu roga due to Agnivikriti, Varnahani, Utsahahani, Prabhahani and Krishata are seen. Most of drugs in Loha Rasayana (i.e. Prada, Gandhaka, Lohabhasma, Patha, Tulasi, Trikatu, Triphala, Adulasa, Guduchi, Nirgundi, Dadim iwayka, Kamalnal, Maka, Kurantaka, Palasha, Kadali, Vijayasara, Nilika, Shatavari, Gokshura, Nagabala, Patalgarudi) are having properties like Dipana, Pachana, Rasayana, Anulomana, Tridoshguna, Dhatwagni vardhaka, Rasa-Rakta vardhaka, Balya, Brihama, Shothaghna, Mutral, Yakrita-plha dosha hara etc. These all properties of assist in Samprapti Vighatan of Pandu. Loha bhasma14 is Dipana, Ruchikara and Rakta vrudhikara. It cures excess of Pitta with its Shita virya and Kashaya-Tikta rasa. It stimulates the functional activities of liver and spleen etc. It increases Hemoglobin level in the blood due to its Dravya samanyata (Samanya Vishesh Siddhant). So, mode of action of Loha Rasayana on Pandu can be summarized as follows: Pandu is Dhatu apatarpanajanya vyadhi (caused by strotavarodha) with vitiation of Pitta in which ahara pachan kriya (absorption of nutrients) is hampered. Contents of Loha Rasayana act as Tarpan, Dipan, Pachana, Anulomana, Agnivardhana, Rasayana, Pittashamaka and Ghrita amupana does required Snehana which is advised by Charaka in Samanya chikitsa sutra of Pandu.11

Shodhan karma always plays major role in treatment of disease. Virechana is mostly indicated Shodhan in the context of Pandu. Further trials may be conducted using Shodhan procedures in Pandu. In present study sample was drawn from very limited population hence results can be generalized to that population only. Trials on sample drawn from large population are needed.

4. CONCLUSION

Pandu is the disease caused by impairment of Rasavaha strotas. Herbo-mineral compounds containing Loha Bhasma give good relief in symptoms as well as rise in Hemoglobin level. Loha Rasayana reduced symptoms as well as increased Hb, MCV and MCHC level in Pandu (IDR) patients. Loha Rasayana found slightly better than Arogyavardhini Vati in Pandu (IDR) but statistical analysis shown that the difference
is not greater than by chance. No side effects were observed.

5. REFERENCES

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6. TABLES

<table>
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<tr>
<th>Sr. No.</th>
<th>Parameters</th>
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<tr>
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<td>Trial Group</td>
<td>Control Group</td>
</tr>
<tr>
<td>1</td>
<td>Panduta (Pallor)</td>
<td>88.4</td>
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<tr>
<td>2</td>
<td>Ayasen shwasa</td>
<td>85.6</td>
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<td>3</td>
<td>Akshikut shotha</td>
<td>82.9</td>
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<td>4</td>
<td>Agnimandya</td>
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<tr>
<td>5</td>
<td>Daurbalya</td>
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<tr>
<td>6</td>
<td>Hemoglobin</td>
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<td>7</td>
<td>MCV</td>
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<tr>
<td>8</td>
<td>MCHC</td>
<td>6.8</td>
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</table>

Table No 1. Percent relief (Overall assessment)
Gaikwad AB. A Randomized Controlled study of efficacy of Loha Rasayan in Pandu Vyadhi (IDR).

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Table No 2. Statistical Analysis: Subjective parameters
(‘=’ means nearly equal, ‘NS’ means Not significant)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Symptom</th>
<th>Mean Rank Gr. A</th>
<th>Mean Rank Gr. B</th>
<th>U</th>
<th>P</th>
<th>Result</th>
<th>Efficacy</th>
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</thead>
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<tr>
<td>1.</td>
<td>Panduta (Pallor)</td>
<td>29.3</td>
<td>24</td>
<td>454.0</td>
<td>0.633</td>
<td>NS</td>
<td>Gr A = Gr B</td>
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<td>Ayasen shwasa</td>
<td>32.60</td>
<td>30.45</td>
<td>426.5</td>
<td>0.618</td>
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<td>3.</td>
<td>Akshikut shotha</td>
<td>32.85</td>
<td>29.95</td>
<td>385</td>
<td>0.271</td>
<td>NS</td>
<td>Gr A = Gr B</td>
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<td>Agnimandya</td>
<td>41.33</td>
<td>38.59</td>
<td>410</td>
<td>0.598</td>
<td>NS</td>
<td>Gr A = Gr B</td>
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<tr>
<td>5.</td>
<td>Daurbalya</td>
<td>33.65</td>
<td>30.15</td>
<td>445.5</td>
<td>0.913</td>
<td>NS</td>
<td>Gr A = Gr B</td>
</tr>
</tbody>
</table>

Table No 3. Statistical Analysis: Objective parameters
(‘=’ means nearly equal, ‘NS’ means Not significant)

<table>
<thead>
<tr>
<th>Sr. No.</th>
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<th>Mean Gr. A</th>
<th>Mean Gr. B</th>
<th>t</th>
<th>P</th>
<th>Result</th>
<th>Efficacy</th>
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<td>1.</td>
<td>Hemoglobin</td>
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<td>MCHC</td>
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