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ORIGINAL ARTICLE

Role of Punarnava Mandura in Iron Deficiency Anaemia (Pandu Roga) with Special Reference to Pradhana Lakshana

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Clinical research involves investigating proposed medical treatments, assessing the relative benefits of competing therapies, and establishing optimal treatment combinations. It is the most fruitful line of approach for methods of diagnosis and treatment as described in Ayurvedic literature. Anaemia is the most common indicator used to screen for iron deficiency, the terms anaemia, iron deficiency, and iron deficiency anaemia are sometimes used interchangeably. Iron deficiency anaemia would be considered a public health problem only when the prevalence of haemoglobin concentration exceeds 5.0% of the population. The prevalence of iron deficiency anaemia in a population is therefore a statistical rather than a physiological concept, although it reflects that proportion of the population that has iron-deficient erythropoiesis. As iron deficiency has been recognized as commonest nutritional deficiency disorder and a risk to the nation among top ten selected health risks, although this deficiency disorder has been described by the name Panduroga thousands of years ago in the Ayurvedic classics. Punarnava Mandura is an Ayurvedic iron preparation has been used for the management of this disease since that time. In the present study a clinical trial of Punarnava Mandura has been carried out for evaluating the better efficacy on Panduroga i.e., Iron deficiency anaemia. Study Drug Punarnava Mandura following the reference of Bhaishsjya Ratnavali was selected and its comparison was done with ferrous sulphate taken as a control.

Key words: Punarnava mandura, Iron difficiency, anemia, Pandu roga

Mainly Ayurveda make use of Yukti vyapasraya Chikitsa. For that it utilizes different drugs. Acharya Charaka says that the art of prescription depends on knowledge of dosage form and time, and on this art in turn depends success, hence the skillful physician stands ever superior to those possessing merely a theoretical knowledge of drug. Pandu roga is known since Vedic period and Iron preparations for the treatment of Pandu Roga are also well known since ancient time. (Bhagwat Sri Govinda Padacharya, Rasa Hridaya Tantra 2001). In Ayurvedic classics, many iron preparations are available and some among them are well known and are often used by physicians now a day. In this research study Drug Punarnava Mandura following the reference of Bhaishsjya Ratnavaliwas selected and its comparison was done with ferrous sulphate taken as a control. (S.N. Mishra , 2015)

Punarnava Mandura a classical herbomineral formulation is available in the market either in tablet form or in churna form and frequently used for Anemia, Low Platelet count, Low RBC count, swelling around Joints, generalized swelling, Gout and other endotoxins accumulation. Pandu Roga is a group of diseases characterized by group of diseases having main symptom pandu, pandu roga is Raktalpata. Pandu is a clinical condition characterized by whitish yellow discoloration of skin, eyes, nails etc. The person with this disease suffers from decreased blood amount, strength and complexion. He becomes insipid i.e., Nihsar (loss of natural integrity, tone and strength of Dhatus). Pandu roga (anaemia) is most common in Indian female population. Anaemia is a state in which the number of red blood cells or the haemoglobin concentration within them is lower than normal. Haemoglobin is needed to carry oxygen and if you have too few or abnormal red blood cells, or not enough haemoglobin, there will be a decreased capacity of the blood to carry oxygen to the body's tissues.The most common causes of anaemia include nutritional deficiencies, particularly iron deficiency, though deficiencies in foliate, vitamins B12 and A are also important causes; haemoglobinopathies; and infectious diseases, such as malaria, tuberculosis, HIV and parasitic infections. Anaemia is a solemn global public health issue that particularly affects young children and pregnant women because Indian are not caring much rather then her family and socio-economic status is another big reason behind that. (Anonymous, Mineral Year Book 2007) .WHO estimates that 42% of children less than 5 years of age and 40% of pregnant women worldwide are anaemic. (Khandelwal et.al 2015) So our study is very much focusing around this world wide common problem. Punarnava Mandura is also practiced by Ayurvedic physicians for the management of all types of Pandu. (Formulary of India 2003, 2012) Role of Punarnava Mandura and Dhatri Lauha, has been mentioned in previous study. (ASHA Kit 2015)

MATERIALS AND METHODS

Selection of Patients:

The present study was carried out in 40 patients of Pandu Roga (Anaemia). Most of the patients were registered from the Kaya Chikitsa OPD and some patients from Rasa Shastra OPD, Ayurveda wing, Sir Sundarlal Hospital, Banaras Hindu University, Varanasi, India. Only those patients having pandu as an independent disease and not as purvarupa, rupa or upadrava were taken into consideration. After clinical evaluation, on the basis of signs and symptoms and laboratory investigations, irrespective of age, sex, caste, religion and profession, 40 patients of pandu fulfilling the diagnostic criteria were selected for the present study. Patients were divided in two groups, each group containing 20 patients. One group has given Punarnava Mandura and another group has given Ferrous Sulphate as a control.

Criteria for Inclusion: The following criteria were considered for including the patients in the study,Patients having complained of generalized weakness and fatigueless,pallor of Conjunctiva and nails and most important criteria for this study is individual having haemoglobin content below 11 gm/dl and age groups of patients were in between 15 years to 50 years.Laboratory investigations like blood for complete hemogram, serum iron, serum ferritin and TIBC (total iron binding capacity) were carried out and a level of the parameters was fixed for diagnosis of patients as:

Exclusion Criteria: Some criteria were fixed for exclusion of patients like, Haemoglobin percentage: Below 7 g/dL,Pregnant and lactating women, Iron deficiency anemia (Panduroga) with cardiac complication, diabetes mellitus and malignancy, renal failure and tuberculosis. Iron deficiency anemia in a case of defective absorption like patients of gastrectomy, gastro-jejunostomy, sprue syndrome, chrones disease etc.Congenital anemias like sideroblastic anemia, congenital dyserythropoietic anemia, thalassemia, sickle cell anemia.Child less than 15 years of age.

Assessment Criteria:

The results of the therapy were assessed after completion of treatment on the basis of improvement in the selected symptoms and signs based on both Ayurvedic and modern descriptions.Investigation conducted before and after treatment and Other necessary investigations were carried out to exclude other pathologies as well as for the assessment of present health status of patients.Sign and symptoms taken into consideration were, Panduta, Daurbalya, Hridspandna, Bhrama, and Shunakshikuta shotha, Rukshata, Swasa, Aruchi, Pidikodweshtanam and Jwara. Haematological parameters observed were haemoglobin percentage, total RBC count, total WBC count, Platelet count, MCV, MCH, MCHC, Serum iron, Serum ferritin, Total iron binding capacity (TIBC) and peripheral smear test for presence of anisocytosis and poikilocytosis.

In this study, Punarnava Mandura capsules were given in the dose of 500 mg twice a daya and Ferrous sulphate tablets were given in the dose of 325mg twice a day.Punarnava Mandura and Ferrous sulphate was given to the patients for 3 months, by keeping in mind that treatment schedule was continued for 90 days. Both the test drugs were prescribed to administer through oral route with drinking water.

OBSERVATIONS AND RESULTS

Table no.1 shows that all the patients were having Panduta(100%) before treatment. *Daurbalya* was present in (72%) patients. Pindikodwestana in (57%) patients, and *Aruchi* in (45%) patients, Rest of the symptoms were in the range of (25 to 40%) approximately.

Table no, 2 shows that the total 40 patients were registered, out of which 17 patients have completed the treatment course and 03 patients became LAMA in *Punarnava Mandura* treated group while 16 patients have completed treatment course and 04 patients became LAMA (Left against Medical Advice) in Ferrous Sulphate treated group.

Table No. 3 shows that the mean score of *Panduta* was 1.706 before treatment which reduced upto .235 after treatment with 86.2% relief, which statistically highly significant ($p<0.001$).Initially the mean score of *Daurbalyata* was 1.471before treatment which reduced up to .706 after treatment with 51.98% relief, which was statistically highly significant ($p<0.001$). The mean score of *Hridspanadanama* was .647 before treatment which reduced up to .176 after treatment with 72.73% relief, which was statistically significant ($p<0.05$). It was reported that initial mean score of *Bhrama* in this group was .706 and after treatment it reduced up to0.118. This 83.31% relief was statistically highly significant (statistically highly significant ($p<0.01$).It was found that the mean score of *Shunakshikutashotha* was .412 before treatment and after the completion of the course it was reduced up to .059This 85.65% relief was statistically insignificant at ($p>0.05$). 5% but statistically significant ($p<0.1$) at 10%.It was observed that the mean score of *Rukshata* was .588 before treatment and after treatment it was reduced up to .176. So here 70.03% relief was found which was statistically significant ($p<0.05$).The mean score of *Swasha* before treatment was 412 which was reduced to .059 after treatment with 85.65% relief which was statistically insignificant at ($p>0.05$) at 5%, but statistically significant ($p<0.1$) at 10%. Before treatment mean score of *Aruchi* was .588 which was reduced up to 0.059 after treatment, this way treatment provided 90.03% relief, which was statistically highly significant ($P<0.01$).The mean score of Pindikodewshatanama was before treatment was 1.471 which reduced up to 0.647 after treatment and thus 55.98% relief was found which was statistically highly significant ($P<0.01$). Before treatment means score of *Jwara* was 0 .765which was reduced up to 0.118 after

treatment, this way treatment provided 84.58% relief, which was statistically significant. (P<0.05) (Brahmanand Tripathi(2002). (Srikanta murty 2001)

Table No. 4 illustrations that the mean score of Hb % before treatment was 9.135 and after treatment it was 11.088 which was statistically highly significant. (p< 0.001).The mean score of TLCs before treatment was 7.611 and after treatment it was 7.866 which was statistically insignificant. (p> 0.05).The mean score of total RBC count /cmm before treatment was 3.715 and after treatment it became 4.845 which was statistically highly significant (p<0.001).The mean score of MCV before treatment was 71.138 and after treatment 74.894 which was statistically highly significant (p< 0.001).The mean score of MCH before treatment was 24.476 and it became 27.341 after treatment statistically highly significant (p< 0.001).The mean score of MCHC before treatment was 31.647 and it became 33.259 after treatment. Which was statistically highly significant (p< 0.01)

Table 5 illustrations that the mean score of *Panduta* was 2.00 before treatment which reduced up to 0.250 after treatment with 87.5% relief, which statistically highly significant (p< 0.001). Initially the mean score of *Daurbalyata* was 1.188 before treatment which reduced up to .375 after treatment with 68.39 % relief, statistically highly significant (p< 0.001). The mean score of *Hridspanadanama* was 0.5 before treatment which reduced up to 0.312 after treatment with 37.5 % relief, which was statistically insignificant (p>0.05). It was reported that initial mean score of *Bhrama* in this group was 0.562 and after treatment it reduced up to 0.125. This 77.84 % relief was statistically significant (p<0.05). It was found that the mean score of *Shunakshikuta Shotha* (Datta GK et al (2002). was 0.562 before treatment and after the completion of the course it was reduced up to 0.062 This 88.96 % relief was statistically significant (p<0.05). It was observed that the mean score of *Rukshata* was 0.375 before treatment and after treatment it was reduced up to 0.118. So here 50 % relief was found which was statistically insignificant (p>0.05).The mean score of *Swasha* before treatment was 0.75 which was reduced to 0.188 after treatment with 75% relief but it was statistically highly significant (p<0.01).Before treatment mean score of *Aruchi* was 0.812 which was reduced up to 0.188 after treatment, this way treatment provided 76.97% relief, which was statistically highly significant (p<0.01).The mean score of *Pindikodewshatanama* was before treatment was 0.875 which reduced up to 0.312 after treatment and thus 64.28% relief was found which was statistically significant (p<0.05).Before treatment mean score of Jwar*a* was 0.375 which was reduced up to after treatment, this way treatment provided 100 % relief, which was statistically insignificant at (p>0.05) at 5%, but statistically significant (p<0.1) at 10% . (Sarkar Prasanta Kumar, 2005)

Table 1: Pradhana lakshana wise distribution of 33 patients of *pandu*:

Pradhana lakshana	No. of Patients		Total	%
	Group A	Group B		
Panduta	17	16	33	100
Daurbalyta	13	11	24	72
Hridspandana	7	4	11	33.33
Bhrama	7	6	13	39.39
Shunakshikutashotha	4	5	9	27.27
Rukshta	4	4	8	24.24
Swasha	5	8	13	39.39
Aruchi	7	8	15	45.45
Pindikodwestanam	12	7	19	57.57
Jwara	6	4	10	30.30

Table 2: Group wise distribution of 40 patients registered for the study:

Group	Completed	LAMA	Total	%
Punarnava Mandura	17	03	20	51.5
Ferrous Sulphate	16	04	20	48.5
Total	33	07	40	100.0

Table 3: Showing effect of Therapy according to Sign and Symptoms in 17 patients of Punarnava Mandura (Group A):

Signs & Symptoms	N	Mean SD		% Relief	S.E.	't'	P
		B.T.	A.T.				
Panduta	17	1.706 0.9852	.235 0.5623	86.201	.1611	8.452	.000
Daurbalyata	13	1.471 1.3284	.706 0.9196	51.98	.6642	4.747	.000
Hridspandanama	7	.647 0.9315	.176 0.3930	72.73	.1740	2.704	.016
Bhrama	7	.706 0.9852	.118 0.3321	83.31	.1929	3.050	.008
Shunkshikuta shotha	4	.412 0.8703	.059 02425	85.65	.1702	2.073	.055
Rukshata	4	.588 1.0037	.176 0.5286	70.03	.1728	2.384	.030
Swasha	5	.412 0.7123	.059 0.2425	85.65	.1906	1.852	.083
Aruchi	7	.588 0.8703	.059 0.2425	90.03	.1740	3.043	.008
Pindikodweshatanama	12	1.471 1.374	.647 0.7019	55.98	.1962	4.197	.001
Jwara	6	.765 0.1251	.118 0.3321	84.58	.2416	2.678	.017

Table 4: Showing the effect of therapy according to haematological investigations in 17 patients of *Punarnava Mandura*(Group A)

Investigations	N	Mean Score		%Relief	S.E.	't'	P
		B. T	A.T.				
Hemoglobin	17	9.065 1.3266	11.265 0.6809	21.37	0.2685	6.297	.000
TRBC	17	3.715 0.5010	4.845 0.4556	30.40	0.1105	10.224	.000
TLC	17	7.611 1.286	7.866 1.628	3.35	0.1641	1.556	.139
MCV	17	61.138 2.466	74.894 3.043	5.28	0.6518	5.763	.000
MCH	17	24.476 1.064	27.341 2.0267	11.7	0.3845	7.450	.000
MCHC	17	31.647 2464	33.259 1.046	5.09	0.4468	3.453	.003
PLT	17	169.294 46.8852	208.0 61.767	22.86	7.1248	5.433	.000
HCT	17	30.353 1.5428	36.318 4.722	19.65	1.145	5.209	.000

Table 5: Showing the effect of therapy according to Sign and Symptoms in 16 patients of Ferrous Sulphate (Group B: Control Group):

Signs & Symptoms	N	Mean Score		% Relief	S.D.	S.E.	't'	P
		B.T.	A.T.					
Panduta	16	2.000 0.966	.250 0.447	87.5	.6831	.1708	10.247	.000
Daurbalyata	11	2.000 0.981	.375 0.50	68.39	.6551	.1638	4.961	.000
Hridspandanama	4	.500 0.966	.312 0.704	37.5	.4031	.1008	1.861	.083
Bhrama	6	.562 0.892	.125 0.342	77.84	.7274	.1819	2.406	.029
Shunkshikuta shotha	5	.562 0.964	.062 0.25	88.96	.7019	.1702	2.236	.041
Rukshata	4	.375 0.619	.188 0.403	50.00	.4031	.1008	1.861	.083
Swasha	8	.750 0.856	.188 0.403	75.00	.7274	.1819	3.093	.007
Aruchi	8	.812 0.981	.188 0.403	76.97	.8062	.2016	3.101	.007
Pindikodweshatanama	7	.875 1.147	.312 0.602	64.28	.8139	.2035	2.764	.014
Jwara	4	.375 0.718	.000 0.000	100.00	.7188	.1797	2.087	.054

Table 6: Showing the Effect of therapy according to haematological investigations in 16 patients of Ferrous Sulphate (Group B: Control Group)

Investigations	N	Mean Score		% Relief	S.E.	't'	P
		B.T	A.T.				
Haemoglobin	16	9.069 1.1152	10.894 0.9637	20.12	0.3101	6.297	.000
TRBC	16	3.661 0.4479	5.146 0.4837	40.54	0.1210	10.527	.000
TLC	16	7.441 1.573	7.481 1.567	1.26	.1026	.384	.707
MCV	16	72.219 1.6798	75.844 3.3868	5.01	.6614	5.481	.000
MCH	16	23.965 0.930	26.925 1.192	12.38	.2565	11.573	.000
MCHC	16	31.625 21.093	33.038 1.719	4.46	.2716	5.205	.000
PLT	16	170.375 49.93	200.750 55.82	17.82	23.49	9.404	.000
HCT	16	30.780 1.816	39.367 4.546	27.89	1.0116	8.488	.000

Table No. 6 shows that the mean score of Hb % before treatment was 9.069 and after treatment it was 10.894 which was statistically highly significant. (p<0.001).The mean score of total RBC count /cmm before treatment was 3.661and after treatment it became 5.146 which was statistically highly significant (p< 0.001). The mean score of TLC before treatment was 7.411and after treatment it was 7.481 which was statistically insignificant. (p>0.05).The mean score of MCV before treatment was 72.219and after treatment 75.844 which was statistically highly significant (p<0.001).The mean score of MCH before treatment was 23.965 and it became 26.925 after treatment. Which was statistically highly significant (p< 0.001).The mean score of MCHC before treatment was 31.625 and it became 33.038 after treatment which was statistically highly

significant (p< 0.001)

CONCLUSION

In the present study a clinical trial of Punarnava Mandura (P.V. Sharma 1979) has been approved out for appraise the better efficacy on Panduroga i.e., Iron deficiency anaemia. (https://www.who.int/health-topics/anaemia 2021). In this study sign and symptoms taken into consideration were, Panduta, Daurbalya, Hridspandna, Bhrama, and Shunakshikuta shotha, Rukshata, Swasa, Aruchi, Pidikodweshtanam , Jwara, Virupaksha gupta k.l et al, and all the symptoms statically improved after taking Punarnava mandur, (Reddy KRC 2007) . so this study proved that purnava mandur is highly effective in Iron diccievcy anemia (Virupaksha gupta k.l et al 2006) and which improve multiple sign am symptoms in anemia (Gupta Vijay et al 2006), (Trikamji Yadavji Acharya 1980),(Upadhyay Madhav 2007).

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CONFLICTS OF INTEREST

The authors declare that they have no potential conflicts of interest.

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